

DENTAL MANAGEMENT OF MEDICALLY COMPROMISED CHILDREN

Dr Daniel Ford

BDS Sc (Hons), BSc (Hons), MDSc (Paed), FRACDS

Specialist Paediatric Dentist





www.pdgdental.com.au



GENERAL PRINCIPLES

- Emergency relief of symptoms only during the acute phase of medical illness
- Elective dental treatment should be provided following stabilisation / remission of illness
- Consultation with child's physician is essential
- Referral to specialist in Paediatric Dentistry must be considered

GENERAL PRINCIPLES

- Accurate diagnosis
- Assessment of risk
- Prevention
- Definitive treatment
- Review

CARDIAC

- Congenital
 - Accounts for 80% of all paediatric cardiovascular conditions
 - Classification:
 - acyanotic defects with shunts
 - acyanotic defects with obstruction (stenosis)
 - cyanotic defects with shunts
- Acquired

CARDIAC

- Examples of congenital cardiac conditions
 - Acyanotic left to right shunt:
 - Ventricular septal defect – most common
 - Atrial septal defect
 - Patent ductus arteriosus
 - Cyanotic obstructive lesions:
 - Pulmonary stenosis
 - Coarctation of the aorta
 - Aortic stenosis
 - Cyanotic right to left shunt:
 - Tetralogy of Fallot
 - Transposition of the great arteries
 - Truncus arteriosus

CARDIAC

- Examples of acquired cardiac conditions
 - Cardiac arrhythmias
 - Cardiomyopathies
 - Cardiac failure
 - Infectious endocarditis
 - Rheumatic fever – carditis and valvular damage

CARDIAC

CLINICAL FEATURES:

- Easily fatigued
- Low stress tolerance
- Feeding difficulties
- Shortness of breath
- Delayed growth and development
- Potentially, compliance issues

CARDIAC

CLINICAL FEATURES:

- Cyanosis
 - lips, cheeks, mucosa
- Clubbing of fingers
- Dyspnoea
- Heart sounds
 - murmur
 - thrill
 - click
- Heart rate
 - Varies depending on condition

CARDIAC

ORAL FEATURES:

- Developmental defects of enamel
 - Particularly in primary dentition
 - Attributed to:
 - Relationship between the genetic basis of the cardiac condition and development of the dentition
 - Metabolic features of the condition
 - Effect of treatment of the cardiac condition



CARDIAC

ORAL FEATURES:

- Increased risk of dental caries
 - Primary and permanent dentition
 - Prevalent despite the finding that cardiac children receive more dedicated oral health care
 - Attributed to:
 - DDE
 - Medications
 - Compliance
 - Diet
- Cyanotic gingivitis
- Delayed tooth eruption
- Intrinsic tooth stains

CARDIAC

ORAL FEATURES:

- Increased prevalence of periodontal disease
 - Attributed to:
 - Compliance
 - Association with the syndromic patient; eg Trisomy 21
- Increased prevalence of malocclusion and crowding
 - Attributed to association with the syndromic patient; eg DiGeorge syndrome or Trisomy 21
- Delayed dental development (possibly) and delayed eruption
- Intra-oral soft tissue cyanosis

CARDIAC

MEDICAL IMPLICATIONS:

- Oral disease impacts adversely on the cardiac patient
- Risk of bacterial endocarditis
- Bacterial resistance
- Bleeding tendency
 - anticoagulant therapy
- Immunocompromised if transplant case
- Other medical conditions

CARDIAC

DENTAL MANAGEMENT:

- Essential principles:
 - Eliminate oral infection
 - Reduce the risk of bacterial endocarditis
 - Maintain good oral health
 - Liaise with the patient's cardiologist



CARDIAC

- DENTAL MANAGEMENT:
- Vigilant preventive regimen
- Pre-surgical 0.2% chlorhexidine mouth wash
- Determine coagulation status (INR)
- Reduce stress with sedation or GA
- Reduce stress with profound anaesthesia
- Monitor for respiratory distress
- Regular review

CARDIAC

DENTAL MANAGEMENT:

- Antibiotic prophylaxis
 - The list of cardiac conditions for which prophylaxis is recommended is much shorter and only includes conditions associated with the highest risk of adverse outcomes from endocarditis.
 - The list of procedures for which endocarditis prophylaxis should be given is more precise.
 - Dependent upon the lesion (including all congenital conditions, prosthetic valves, previous bacterial endocarditis) and the dental procedure
 - Protocol: www.tg.com.au
 - Cochrane review by Oliver *et al.* (2004) – no evidence to support antibiotic prophylaxis during oro-dental procedures to reduce the risk of bacterial endocarditis in at-risk patients. Notwithstanding, generally considered that the consequences are too severe to deviate from current guidelines

CARDIAC

DENTAL MANAGEMENT:

- Pulp therapy
 - Extraction of pulpally involved primary teeth
 - Vital and non-vital pulp therapy of the primary dentition is contraindicated in children at risk of bacterial endocarditis. This is due to the fact that cleansing, shaping and obturation is problematic in primary teeth, resulting in the potential for recurrent and/or sub-clinical bacterial infection of the primary root canal system.
 - Endodontic treatment of the permanent dentition is not contraindicated in cardiac patients, even those at risk of bacterial endocarditis; provided canal cleansing, shaping and obturation is effective, and technique is employed to avoid transportation of debris through the apex.

HAEMATOLOGY

- Coagulation mechanism disorders
- Platelet disorders
- Vascular disorders

HAEMATOLOGY

- Coagulation mechanism disorders
 - Inherited
 - Haemophilia A
 - Haemophilia B (Christmas disease)
 - von Willebrand's disease
 - Acquired
 - Liver disease
 - Vitamin K deficiency
 - Renal failure
 - Bone marrow suppression
 - Anti-coagulation therapy

HAEMATOLOGY

- Platelet disorders
 - Manifest as either:
 - Quantitative: reduced platelet numbers (thrombocytopenia)
 - Qualitative: altered platelet function.
 - Quantitative:
 - Inherited: many forms; all are rare
 - Acquired
 - Reduced production; eg infections (HIV), medications, marrow infiltration (leukaemia)
 - Platelet sequestration; eg due to hypersplenism secondary to liver disease or malignancy
 - Increased destruction; eg immune thrombocytopenic purpura, drug induced
 - Qualitative:
 - Inherited: include forms of von Willebrand disease
 - Acquired: mostly drug-induced; mostly aspirin or NSAID via inhibition of COX which blocks production of thromboxane A₂, which results in reduced platelet aggregation
 - Mucocutaneous bleeding is the hallmark of platelet disorders.

HAEMATOLOGY

- Vascular disorders
 - Essentially these are disorders of connective tissue.
 - Examples include Vitamin C deficiency (scurvy) and Ehlers-Danlos syndrome.

HAEMATOLOGY

ORAL FEATURES:

- Prolonged bleeding
- Bruising skin / mucosa
 - petechiae
 - purpura
- Deep joint bleeding
 - haemarthrosis
- Other associated medical conditions; eg liver disease or malignancy

HAEMATOLOGY

ORAL FEATURES:

- Excessive or prolonged bleeding following trauma, surgery or extraction
- Oral petechiae, purpura, haematoma
- Spontaneous gingival bleeding

HAEMATOLOGY

MEDICAL IMPLICATIONS:

- Prolonged or excessive bleeding – trauma, oral surgery
- Increased risk of infection
- Delayed wound healing
- Anticoagulant considerations
- Other medical conditions; eg liver disease or malignancy

HAEMATOLOGY

DENTAL MANAGEMENT:

- Preventive regimen to avoid dental disease
- Liaise with haematologist
- Avoid extraction/oral surgery in the general dental setting
- Coordinate dental treatment with medical treatment; eg treat after platelet transfusion or factor replacement
- Monitor values; eg platelets must be $>50,000$, preferably $>80,000$
- Avoid prescription of drugs that would exacerbate; eg NSAID

HAEMATOLOGY

DENTAL MANAGEMENT:

- Gentle surgical technique
- Appropriate local measures to control haemorrhage – sutures, packing
- Local anaesthesia
 - Use vasoconstrictor
 - Maxillary infiltration is generally OK without haematologic prophylaxis
 - PDL injection is generally OK without haematologic prophylaxis
 - Nerve block (eg IAN block) requires haematologic prophylaxis



ONCOLOGY

- The effects of neoplasms may be a consequence of:
 - mass lesions, including the effects of a space-occupying lesion and of local tissue destruction, with or without haemorrhage
 - metastatic lesions
 - metabolic disturbances
 - abnormal functional activity.

ONCOLOGY

- Neoplasms in children; in order of frequency:
 - Leukaemia
 - Primary CNS tumours
 - Lymphomas
 - Wilm's tumour
 - Neuroblastoma
 - Rhabdomyosarcoma
 - Ewing sarcoma
 - Histiocytosis
 - Others



ONCOLOGY

CLINICAL FEATURES:

- Fatigue and weight loss
- Chronic infection
- Anaemia
- Skin purpura
- Febrile episodes
- Hepatosplenomegaly
- Bone pain
- Swelling
- Generally unwell

ONCOLOGY

BE

SUSPICIOUS

!!!

ONCOLOGY

ORAL FEATURES:

- Oral pain
- Gingival swelling
- Other swelling
- Spontaneous bleeding
- Tooth mobility
- Malocclusion
- Neoplastic infiltrate of gingivae

ONCOLOGY

ORAL FEATURES:

- Salivary changes – quality and quantity
- Mucositis
- Opportunistic infection
 - candidiasis
 - herpes simplex
- Gingivitis
- Periodontal disease
- Enamel demineralisation
- Dental caries

ONCOLOGY

MEDICAL IMPLICATIONS:

- Potential oral focus of infection
- Increased risk of opportunistic infection
- Delayed wound healing
- Transmission of infectious viral agents
- Prolonged bleeding from bone marrow suppression (disease / chemotherapy)

ONCOLOGY

DENTAL MANAGEMENT:

- Initial pre-treatment examination is mandatory
- Eliminate all sites of potential oral infection
- Avoid dental treatment during acute stage – emergency only
- Monitor platelet levels prior to surgery $>80,000$ / ml for haemostasis
- Prophylactic antibiotics, antifungal and antiviral agents as indicated

ONCOLOGY

DENTAL MANAGEMENT – Soft Tissues

- Aim is to prevent/
minimise infection and
mucositis and pain
 - 0.2% chlorhexidine
mouthwash
 - Sodium bicarbonate
mouthwash
 - Topical antifungal agent
 - Topical antibacterials
 - Topical LA (ointment/rinse)

ONCOLOGY

DENTAL MANAGEMENT –

Hard Tissues:

- Twice daily tooth brushing
 - 400-1000 ppm MPF paste
- Low caries risk
 - 0.05% neutral NaF mouthwash
- High caries risk
 - 0.05% neutral NaF gel in custom trays

ONCOLOGY

Oral complications of chemotherapy

- Mucositis due to cytotoxicity of the drugs
- Infection risk due to neutropenia and thrombocytopenia, secondary to bone marrow suppression
 - Bacterial (eg Staph)
 - Fungal (eg Candidiasis)
 - Viral (eg herpes)
- Haemostasis problems
- Salivary changes with increased caries risk

ONCOLOGY

Oral complications of radiotherapy

- Salivary gland atrophy
- Mucosal keratinisation
- Enamel caries /
demineralisation
- Arrested root development
- Microdontia
- Osteoradionecrosis

ONCOLOGY

BONE MARROW TRANSPLANT

[from RCH Melbourne patient education literature]

- Bone Marrow is the organ responsible for the production of blood cells. Stem cells from the marrow either divide to produce more stem cells or differentiate to produce RBC and WBC, or platelets. RBC carry oxygen, WBC are the body's main defence against infection, platelets play an essential role in haemostasis. Without effective bone marrow stem cells, the patient will die of anaemia, infection, or bleeding
- A bone marrow transplant (BMT) replaces defective bone marrow stem cells with healthy cells. Stem cells may fail either because of an underlying disease or due to the effects of chemotherapy or radiotherapy. BMT is used as a means to cure diseases in which the marrow is defective, but also allow higher doses of chemotherapy and radiotherapy to be used, than would otherwise be possible.

ONCOLOGY

BONE MARROW TRANSPLANT

[from RCH Melbourne patient education literature]

- Prior to the BMT there is a need for conditioning: high doses of chemotherapy and possibly total body irradiation (TBI). This destroys the child's lymphocytes, (the cells which may recognise the new bone marrow as foreign) so that they do not attack and reject the donor marrow, and kills any surviving leukaemia cells which could otherwise cause a relapse.

ONCOLOGY

BONE MARROW TRANSPLANT

[from RCH Melbourne patient education literature]

- Once the bone marrow has been transplanted, there is a period of two to four weeks before the marrow cells divide sufficiently and the blood count starts to improve. During this time the blood count is very low and most patients develop a fever, requiring IV antibiotics. The patient is in isolation. The infecting agent is generally commensal microorganisms from the patient's mouth, GIT, skin and nose; entering the circulation through breaks in the skin or through mouth or GIT ulcers. Careful mouth care is essential. Odontogenic infection (eg abscess secondary to caries) would kill at this stage.

ONCOLOGY

BONE MARROW TRANSPLANT

[from RCH Melbourne patient education literature]

- Once the bone marrow has taken (engraftment) and the blood count improves, the lymphocytes of the donor may recognise that the cells of the recipient are different from those of the donor, and try to reject the recipient tissues. Areas targeted for attack are the skin, oral and gut mucosa, and liver. This reaction is called graft versus host disease.

ONCOLOGY

Oral complications of bone marrow transplant

- Mucositis
- Mucosal sloughing
- Stomatitis
- Xerostomia
- Loss of taste sensation
- Increase saliva acidity
- Keratinisation

ONCOLOGY

Graft vs Host disease

- Oral mucosal erythema
- Desquamative gingivitis
- Angular cheilitis
- Loss lingual papillae
- Xerostomia

RENAL DISEASE

RENAL DISEASE

- Acute and chronic renal failure
- Ureteric reflux nephropathy
- Obstructive uropathy
- Urinary tract infections
- Systemic lupus erythematosus
- Dialysis and renal transplant

RENAL DISEASE

CLINICAL FEATURES:

- Pale (secondary anaemia)
- Growth retardation
- Progressive hypertension
- Fluid retention
- Metabolite retention

RENAL DISEASE

ORAL FEATURES:

- Chronological enamel hypoplasia
- Intrinsic discolouration
- Low caries rate
- Gingival hyperplasia

RENAL DISEASE

MEDICAL IMPLICATIONS:

- Bleeding tendency (thrombocytopenia and anticoagulation)
- Poor wound healing
- Secondary infection
- Hypertension
- Osteodystrophy (hypocalcaemia)

RENAL DISEASE

DENTAL MANAGEMENT:

- Consultation with specialist
- Haemostatic prophylaxis prior to surgery
- Antibiotic prophylaxis prior to surgery
- Intolerance to nephrotoxic drugs e.g. paracetamol, penicillin and tetracycline
- Extraction of pulpally involved teeth
- Aggressive management of infection
- Effective prevention and regular review

GASTROENTEROLOGY

- Oesophageal disorders (reflux)
- Liver disease
 - hepatitis A / B / C
 - biliary atresia
 - α_1 antitrypsin deficiency
- Liver transplant
- Inflammatory bowel disease (Crohns)
- Coeliac disease

GASTROENTEROLOGY

Reflux

CLINICAL FEATURES:

- Often asymptomatic
- Indigestion / heart burn
- Bad taste in mouth in morning
- 24 hour pH manometry shows multiple acidic events

GASTROENTEROLOGY

Reflux

ORAL FEATURES:

- Enamel erosion
- Restorations often “high”
- Halitosis
- Frothy saliva

GASTROENTEROLOGY

Liver disease

CLINICAL FEATURES:

- Hepatomegaly
- Biliary cirrhosis
- Portal hypertension
- Coagulation problems
 - Vitamin K-dependant factors
- Abnormal LFT

GASTROENTEROLOGY

Liver disease

CLINICAL FEATURES:

- Developmental defects of enamel
 - stains
 - hypoplasia
- Delayed tooth eruption
- Gingival hyperplasia
- Periodontal disease

GASTROENTEROLOGY

MEDICAL IMPLICATIONS:

- Poor nutrition
- Failure to thrive
- Coagulopathy (Vitamin K-dependent factors)
- Associated viral agents
- Opportunistic infection

GASTROENTEROLOGY

DENTAL MANAGEMENT:

- Consultation with gastroenterologist (might be referral to gastroenterologist)
- Steroid prophylaxis as indicated
- Antibiotic prophylaxis as indicated
- Definitive treatment
- Vigilant preventive regimen, including fluoride supplementation

ENDOCRINOLOGY

- Diabetes
- Pituitary disorders
- Thyroid disorders
- Parathyroid disorders
 - calcium and phosphate metabolism

ENDOCRINOLOGY

- CLINICAL FEATURES:
- Growth alterations
- Altered physical activity
- Neuromuscular excitability
- Cardiovascular dysfunction
- Gastrointestinal disturbances
- Polyuria

ENDOCRINOLOGY



ORAL FEATURES:

- Altered oro-facial development
- Altered dental development
- Developmental defects of enamel
- Developmental defects of dentine
- “Spontaneous” abscesses
- Periodontal disease
- Xerostomia

ENDOCRINOLOGY

MEDICAL IMPLICATIONS:

- Altered general growth / development
- Hyperglycaemia
- Hypertension
- Skeletal anomalies
- Poor wound healing
- Inability to tolerate stress



ENDOCRINOLOGY

DENTAL MANAGEMENT:

- Consult with endocrinologist
- Emergency care only during acute phase
- Steroid prophylaxis as required
- Definitive restorative care
- Definitive periodontal care
- Vigilant preventive regimen
- Timing and duration of appointments

TRISOMY 21

CLINICAL FEATURES:

- Mental retardation
- Cardiac
- Gastrointestinal
- Immunity

TRISOMY 21

ORO-FACIAL FEATURES:

- Delayed dental development
- Irregular eruption
- Developmental defects of enamel
- Hypodontia
- Microdontia
- Relative macroglossia
- Increased risk periodontal disease
- Brachycephalic
- Flat nasal bridge
- Midfacial hypoplasia

ECTODERMAL DYSPLASIA

Clinical features

CLINICAL FEATURES

- Fine sparse hair
- Dry skin
- Frontal bossing
- Protuberant lips
- Peri-orbital
pigmentation
- Dysplastic nails

ECTODERMAL DYSPLASIA



ORAL FEATURES

- Oligodontia
- Conical teeth
- Developmental defects of enamel
- Maxillary hypoplasia
- Reduced alveolar growth / development
- Reduced occlusal vertical dimension

EPIDERMOLYSIS BULLOSA

- ORAL FEATURES:
- Oral bullae / scarring
- Microstomia
- Ankyloglossia
- Tongue atrophy
- Severe periodontal disease
- Developmental defects of enamel

RESPIRATORY

- Asthma
- Cystic fibrosis (CF)

RESPIRATORY

ORAL FEATURES:

- Developmental defects of enamel
- Dental erosion

RESPIRATORY

MEDICAL IMPLICATIONS:

- Restricted lung function
- Dyspnoea
- Risk of acute respiratory distress
- Chronic hypoxaemia

RESPIRATORY

DENTAL MANAGEMENT:

- Avoid long appointments
- Rubber dam to avoid triggers
- Steroid prophylaxis as indicated
- Vigilant preventive regimen
- Use of RA or GA must be discussed with physician
- Definitive treatment
- Emergency protocol

ALLERGY

- Hypersensitivity
- Anaphylaxis
- Allergic rhinitis
- Urticaria and angio-oedema
- Atopic dermatitis (eczema)

ALLERGY - Anaphylaxis

- Prodrome
 - coughing
 - choking sensation
- Cutaneous
 - urticaria
 - angio-oedema
- Cardiovascular
 - tachycardia
 - hypotension
- Respiratory
 - bronchospasm

ALLERGY

ORAL FEATURES:

- Metallic taste
- Pallor / cyanosis
- Paraesthesia
- Angio-oedema lips
- Contact stomatitis
- Leukoplakia
- Perioral dermatitis
- Facial blushing

ALLERGY

MEDICAL IMPLICATIONS:

- Potential allergens
 - GA, LA, insects
 - preservatives
- Prophylactic therapy
 - IV adrenaline 5 $\mu\text{g}/\text{Kg}$
- Allergy skin testing
- Ongoing assessment

ALLERGY

DENTAL MANAGEMENT:

- Avoid known allergens
- Consider alternative LA (antihistamine)
- Be prepared to deal with anaphylaxis
- Referral to allergist if indicated

NEONATES

- High risk pregnancies
- Birth trauma and injury
- Birth prematurity
- Neonatal medical conditions
- Prolonged ventilation



NEONATES

CLINICAL FEATURES:

- Respiratory distress
 - ventilation
- Metabolic disorders
- Facial dysmorphism

NEONATES

ORAL FEATURES:

- Palatal groove
- V shaped palate
- Maxillary hypoplasia
- Enamel anomalies
 - hypoplasia
 - hypocalcification (opacities)
- Dental caries

NEONATES

MEDICAL IMPLICATIONS:

- Congenital malformations
- Respiratory distress syndrome

NEONATES

DENTAL MANAGEMENT:

- Developmental dental anomalies
 - enamel hypoplasia
- Comprehensive antenatal, neonatal and postnatal history
- Parental counselling
- Neonatal teeth / soft tissue lesions
- Supportive dental appliances

- Burn

IMMUNODEFICIENCY

- Neutrophil Disorders
 - qualitative
 - chemotactic / phagocytic
 - quantitative
 - neutropenia $<1.8 \times 10^6$ cells/ml
- Primary immunodeficiency
 - B cell defects (selective IgA deficiency)
 - T cell defects (thymic aplasia)
 - combined (Wiskott-Aldrich syndrome)
 - acquired (HIV / AIDS)

IMMUNODEFICIENCY

CLINICAL FEATURES:

- Pale / anaemic
- Failure to thrive
- Growth retardation
- Febrile episodes
- Chronic infection
 - pneumonitis
- Encephalopathy

IMMUNODEFICIENCY

ORAL FEATURES:

- Candidiasis
- Abscess formation
- Gingivostomatitis
- Recurrent aphthous ulceration
- Recurrent herpetic infections
- Premature tooth exfoliation

IMMUNODEFICIENCY

MEDICAL IMPLICATIONS:

- Sepsis
- Opportunistic infections
- Prolonged bleeding
(thrombocytopenia)
- Delayed wound healing
- Transmission of infection

IMMUNODEFICIENCY

DENTAL MANAGEMENT:

- Oral mouthwash - 0.2% chlorhexidine qid
- Determine platelet status prior to surgery
- Prophylactic antibiotics, antifungal and antiviral agents mandatory
- Extraction of pulpally involved teeth
- Effective prevention and regular review

Paediatric Dental Group

http://www.pdgdental.com.au/

ecash1 ecash2 ecash3 ecash4 Cult of Mac

PDG ID Go



Specialist care for kids



[About Us](#)

[What We Do](#)

[Referrers](#)

[Patients](#)

[Kids Page](#)

[Downloads](#)

[Contact](#)

You are here: Home

Welcome to Paediatric Dental Group

The Paediatric Dental Group (PDG) is a specialist practice dedicated to the oral health of infants, children and adolescents. We provide comprehensive care in all aspects of paediatric dentistry, including management of very severe or complex dental conditions, dental treatment for children with medical conditions, emergency and ongoing care following trauma and infection, oral surgery, interceptive orthodontics, and care for anxious children. We also welcome those children who have no specific dental concerns, but want access to specialist care to build the foundations for great oral health for life.

Our focus is on specialist treatment for your children in a caring environment. We are dedicated to first class health care and promotion of good health in the future.



Location Maps



Online Enquiry



General Patient Info

[Back to Top](#)

Site Design by: 