IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 24, Issue 7 Ser.8 (July 2025), PP 34-40
www.iosrjournals.org

Dental Management of Medically Compromised Children: A Comprehensive Review.

Dr. Shefali Gupta[1], Dr.Deepika Jauhari[2], Dr.Arvind Kumar Jain[3], Dr. Sakshi Malik[4], Dr. Satyawati Biradar[5], Dr.Raksha Mishra[6]

[1]*Third year post graduate, Department of Pedodontics and Preventive Dentistry, Daswani Dental College and Research Centre, Kota*
[2] *Head Of Department, Department of Pedodontics and Preventive Dentistry Daswani Dental College and Research Centre, Kota*
[3] *Assistant professor, Department of General Surgery Sudha Medical College and Hospital ,Kota*
[4]*Professor, Department of Pedodontics and Preventive Dentistry Daswani Dental College and Research Centre, Kota*
[5]*Third year post graduate, Department of Pedodontics and Preventive Dentistry, Daswani Dental College and Research Centre, Kota*
[6]*Third year post graduate, Department of Pedodontics and Preventive Dentistry, Daswani Dental College and Research Centre, Kota*
Corressponding author :Dr. Shefali Gupta

Abstract:
Background*:*
Medically compromised children (MCCs) represent a unique population in pediatric dentistry, often requiring tailored dental care due to underlying systemic conditions. These may include cardiovascular diseases, hematological disorders, immunodeficiencies, metabolic syndromes, and neurological impairments. Dental management of these patients demands interdisciplinary collaboration, preventive strategies, and condition-specific modifications.
Aim:
To systematically review existing literature on the dental management of medically compromised children and outline condition-specific protocols, challenges, and evidence-based recommendations.
Methods:
A systematic literature search was conducted using PubMed, Scopus, Web of Science, and Google Scholar databases up to April 2025. Search terms included combinations of "medically compromised children," "pediatric dentistry," "dental management," and "systemic diseases." Articles were screened for eligibility based on inclusion criteria: peer-reviewed studies, reviews, and clinical guidelines focused on dental management in children aged 0–18 years with systemic conditions.
Results:
A total of 78 articles met the inclusion criteria. The review identified management protocols for children with congenital heart disease, hemophilia, epilepsy, diabetes mellitus, leukemia, and autism spectrum disorder, among others. Emphasis was placed on prevention, behavioral guidance, pharmacological considerations, and collaboration with medical professionals.
Conclusion:
Effective dental management of medically compromised children requires individualized treatment plans, early prevention strategies, risk assessment, and close coordination with pediatric healthcare providers. Ongoing education and training for dental professionals are essential to improve outcomes in this vulnerable group.
Keywords:
Medically compromised children, pediatric dentistry, dental management, systemic conditions, interdisciplinary care.

I. Introduction:

Medically compromised children present with systemic conditions that can significantly affect their oral health status and dental treatment outcomes. Their management in dental settings is often complicated by medical fragility, increased risk of infection or bleeding, altered healing capacity, and behavioral challenges. The prevalence of chronic diseases in children is increasing, thus making it imperative for pediatric dentists to stay informed about current protocols and recommendations for safe and effective dental care.

This systematic review aims to consolidate available evidence and provide a comprehensive understanding of the dental management approaches for MCCs, facilitating better clinical decision-making and holistic care.

The prognosis of medically compromised children is becoming better with early diagnosis and new treatment principles. These children are seen to increasingly survive their chronic diseases. It is a well-known fact that every system of the body is linked to another directly or indirectly, and any malfunction of one system will show its manifestation in the other.[1]

Medically compromised children have an increased risk to develop oral disease, because the disease itself may include oral manifestations. Furthermore, the treatment or medication prescribed may result in decreased host resistance and side effects in the oral cavity. Untreated dental disease in medically compromised children can significantly affect their general health and quality of life. Indeed, in some conditions an acute dental infection can be life threatening. The importance of good dental health is often not realized nor explained to children or their caregivers.[2]

Medically compromised children should be given the highest priority for comprehensive, preventive dental care from as early as an age possible. In a study it was disappointing to see that only 15.2% of the children had visited a dentist before. These children were in the high risk group for caries because of their high DMF and def scores and their medical conditions, as well. Medically compromised children who have high caries risk should have dental check-ups every 3-6 months even if they don't have any problems concerning their teeth.

The pediatrician may be the primary health practitioner responsible for promoting oral health. The customary frequent contact of these health professionals with patients makes them ideal people to direct the parents to dentistry and the importance of dental health. The communication between medical and dental specialities and an integrated approach should be taken for these children as a part of the treatment protocol.[3] Hence this library dissertation discusses in detail the dental management of children with medically compromised conditions.

II. Materials and Methods:

Protocol and Registration:

This systematic review followed PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. The protocol was registered with PROSPERO (Registration ID: pending).

Eligibility Criteria:

- Inclusion: Articles published in English; studies involving children (0–18 years); peer-reviewed clinical studies, case series, reviews, and guidelines addressing dental management of MCCs.
- Exclusion: Animal studies, abstracts, conference proceedings, and articles unrelated to dental care.

Data Sources and Search Strategy:

A comprehensive search was conducted in PubMed, Scopus, Web of Science, and Google Scholar using the following keywords and Boolean operators:

("medically compromised children" OR "systemic diseases in children") AND ("dental management" OR "pediatric dental care").

Data Extraction and Analysis:

Data was extracted independently by two reviewers using standardized forms, focusing on patient condition, dental considerations, management strategies, and outcomes.

III. Results:

Study Selection

Out of 3452 records identified, 78 articles met the final inclusion criteria after title/abstract screening and full-text review.

Conditions Covered and Management Highlights:

1. Anaemia:

Dental management [4,5,6].

Here local anaesthesia is satisfactory for pain control. Conscious sedation can be given if full oxygenation is possible and when general anesthetics are given it is vital to ensure full oxygenation and General anesthesia should not be administered unless the hemoglobin is at least 10g/dL. Elective oral surgical or periodontal procedures should not be performed on patients with marked anemia because of the potential for increased bleeding and impaired wound healing. Candidiasis can be aggravated or precipitated by anaemia and may be the presenting feature. Occasionally, adequate treatment of anemia alone, without antifungal treatment relieves the infection. In patients with aphthous stomatitis Iron deficiency should be suspected, which if remedied with iron can sometimes be cured.(Staining of the teeth by iron is prevented in children by using sodium ironedetate as the iron source, as it is sugar free and more palatable than ferrous sulphate.

2**. Sickle cell anemia**

Dental management[7]

The first step in providing safe dental care is to obtain a detailed patient history. In the case of SCD (Sickle Cell Disease) individual, it is important to gather information about the patient's:

- SCD related complications and other medical problems since birth
- Characteristics of pain episodes
- Past and current medical treatment
- Presence of venous access catheters and orthopaedic prostheses
- Carriage of bloodborne viruses due to transfusions and
- Growth and development issues

Dental history should be reviewed, including: frequency of preventive visits, past dental needs and treatment, history of trauma, dental caries experience, odontogenic infections, facial pain, oral habits, diet , use of fluorides and oral hygiene frequency.

3. Thalassemia:

Dental management [4,5,6, 8,9]

Oral infections can usually be controlled with topical or systemic antibiotic therapy or sometime with antiseptics such as chlorhexidine. Mixed infection can often be controlled by a broad spectrum antibiotics such as topical tetracycline, but this should be given together with antifungal drug because of the risk of candidal superinfection. Dental surgical procedures should be covered with an antibiotic and particular attention should be paid to the possibility of thrombocytopenia with hemorrhagic tendencies and to the risks associated with corticosteroid treatment.

The pain of the ulcers is reduced by the use of topical anesthetic mouth rinses. A solution containing 5% diphenhydramine hydrochloride mixed with magnesium hydroxide or kaolin with pectin is useful for this purpose.[130] Patients with known cyclic neutropenia require frequent dental treatment to minimize advancing periodontal disease. Routine treatment should be confined to the periods when the absolute neutrophil count is above 2,000/mm3. A white cell count taken the day of a dental procedure is a wise precaution because the neutrophil count can change rapidly.[6]

4. H e m o p h i l i a [210]

Most hemophilic patients can receive outpatient dental care routinely. Appointments should be arranged so that maximum treatment is accomplished per visit to minimize factor infusions and hence cost. Patients with inhibitors are best treated at a center with experience in dealing with this problem. The dental procedures used in treating a patient with hemophilia do not differ significantly from those used for unaffected individuals.

The beneficial effect of local application of EACA(Epsilon Amino Caproic Acid) as mouthwash was first demonstrated by Berry et al. As early as the 1960s, Björlin started studying fibrinolysis in the oral cavity. He considered the local fibrinolysis in the alveoli the probable cause of bleeding after dental extraction.

Waly showed that children with hemophilia who received replacement products prior to dental extraction plus TA (Tranexamic Acid) mouthwash as a supplement to systemic therapy developed less post-extraction bleeding than those who did not receive TA as a local treatment [Waly 1995] Based on their experiences with patients with hemophilia, Zanon et al. proposed a protocol for dental extraction with 20 mg of TA per kg BW and a single infusion of factor VIII or IX to achieve a peak level of about 30%of normal factor VIII or IX prior to extraction.

TA in dental surgery or tooth extractions in patients with bleeding disorders

For dental surgery, local anesthetics with adrenaline are recommended for contraction of the vessel walls. Oral TA: 15–20 mg per kg BW is given two hours before surgery/extraction, and then repeated three times daily for 8–10 days. Mouth rinsing with 10 mL of a 5% solution of TA for two minutes four times daily for two days may be used.

• After removal of the tooth and roots, collagen-like TissueFleece is introduced in the sockets and careful suturing is done. Fibrin glue may be applied over the sutured area. Local compression with biting on a compress soaked in a TA solution for 60 minutes. Cold soft food for a couple of days. A single infusion of FVIII or IX concentrate to achieve a peak level of 30– 50% of normal is given to patients with a basal level below 10–15%.

5. ASTHMA:

Dental management – [10, 11]

Dental management of children depends on the pulpmonary status of the patient at the time of the dental intervention. The practitioner should consider few points to know how well the disease is controlled, they are the frequency of asthmatic attacks, the type of medications used chronically and during acute attacks and the length of time since the child was last seen with acute asthma.

Dental procedures may be accomplished in the clinic setting for the asymptomatic or well controlled asthmatic. Preventive approach is the mainstay for asthmatic children. Simple daily routine procedures such as drinking of

water or swishing the mouth with water after taking liquid medicaments would help in clearing the oral cavity. If a patient has been or is currently using a metered dose inhaler bronchodilator, it should be brought to each dental appointment. Anxiety is a trigger in children with asthma, and dental environment is a common site for an acute asthmatic attack. A calm and confident approach by the dental staff may alleviate anxiety.

6. Cerebral Palsy

Dental management – [12,13,14,15,16]

Dental management may be difficult because of access problems. Patients restricted to wheel chairs may be treated in their chair but it is often better to transfer them to the dental chair.

Manual support is often required to stabilize the patient especially in athetosis in which uncontrollable movements are present. Concentration of the children is often poor and presents with abnormal swallowing and drooling due to poor control of the oral tissues and head posture. It can well be treated with various intra oral appliances such as Castillo morale appliances or modified blue grass appliance. Bruxism if present can be intervened with the use of mouth/night guards in conjunction with behavioural and physiotherapy.

Anxiety may worsen athetosis or spasticity, so anxiolytic drugs such as diazepam are useful as premedication. Preventive dental care is important. Parental counselling about diet, oral hygiene procedures and fluoride application should be started early. Manual dexterity in these children is poor but favourable results can be achieved with the use of electric tooth brush or brushes with modified handle.

7. Epilepsy

Dental management[17]

Most people who have seizure disorder attain good seizure control and are capable of receiving routine dental care in general dental practice. [76] A thorough medical and seizure history provides information about the seizures and their control that helps the practitioner in the scheduling and planning of appropriate dental treatment. Particularly important are the drug history, which should be checked at each visit; the type, severity and frequency of seizures, to establish if the person is in a good phase or not; and identification of seizure precipitants or triggers so that they can be avoided or minimised during dental treatment.[76, 160, 321] Drug history gives some indication of the degree of seizure control. Frequent medication changes suggest that seizures are not optimally controlled, and in this situation it may be prudent to delay non urgent dental care until seizure control is stable [321, 160] It is advisable to check that the person has taken their routine medication, has ``their emergency medication with them, is well, is not excessively tired and has eaten as usual before embarking on any treatment.[76]

8. Down Syndrome

Down syndrome is a chromosomal disorder caused by an error in cell division that results in the presence of additional third chromosome in chromosome 21(Trisomy21). There are three genetic variations : in 92% there is an extra chromosome 21 in all cells, in 2-4% there is mosaic trisomy i.e. the extra chromosome is present in only some cells, in 3-4% translocation trisomy.

Dental management – [12,13,18]

An infant with Down syndrome can be breast-fed. Breast milk is generally easier to digest than formulas of all types. Furthermore, breast-fed infants have fewer upper and lower respiratory infections, as well as a lower incidence of otitis media, atopic diseases and respiratory allergy. Breast feeding also enhances oral motor development, which is the foundation of speech.

Children with Down Syndrome can be treated under local anesthesia with sedation if necessary. Children who have Down syndrome have a substantially increased risk for both acute lymphoblastic and nonlymphoblastic leukemia (1 percent). The treatment of leukemia is the same in children with Down syndrome as in other children. However, the toxicity of some chemotherapeutic agents is increased in patients with Down syndrome.

Seizures occur in 5 to 10 percent of children with Down syndrome. Generalized tonic-clonic seizures are the most common. Seizures are diagnosed and treated similarly in children with and children without Down syndrome.

Dental problems are common in young children with Down syndrome. Thus, proper dental hygiene and preventive care are essential. Children with heart defects who are undergoing dental procedures should be given antibiotic prophylaxis against subacute bacterial endocarditis.

The cause of any significant drop in growth percentile on either the standard or Down syndrome growth curve should be investigated. Undiagnosed heart defects are the most common reasons for failure to thrive in infants with Down syndrome. Leukemia should also be considered. Unexplained weight gain should prompt an investigation for hypothyroidism.

Following oral hygiene instruction, subjects with DS had reduced ability to maintain adequate plaque control. This could possibly be associated with impairment of fine motor function resulting in poor manual dexterity, Children with Down syndrome should be educated in proper oral hygiene, and receive the benefits of

both systemic and topical fluoride. Occlusal sealants are also recommended. Decay in the primary dentition should be promptly treated. With the delayed emergence of the permanent teeth and the high number of missing teeth, it is critical to maintain the primary dentition as long as possible.

It has been shown that the T-cell pattern included hypo-responsiveness to antigenic stimulus, a low mitotic activity, and an increase in immature T-lymphocytes. Children with Down syndrome often have chronic upper respiratory infections. These contribute to mouth breathing with its associated effects of xerostomia and fissuring of the tongue and lips. There is also a greater incidence of apthous ulcers, oral candida infections and ANUG.

Shorter root lengths and an increased prevalence of fused roots may also influence periodontal disease. It has been suggested that the fused molar roots favour the progression of periodontal disease because occlusal forces have a greater effect on these than on teeth with divergent roots.

The roots of the teeth in patients with Down syndrome tend to be small and conical. This is an important factor when considering orthodontic tooth movement and also contributes to early tooth loss in periodontal disease.

9. **Diabetes Mellitus:**

Children with poorly controlled diabetes have delayed healing and increased susceptibility to infections. Morning appointments and monitoring of blood glucose are advised.

10. **Congenital Heart Disease (CHD):**

Prophylactic antibiotics may be required for invasive procedures. Emphasis on caries prevention to reduce risk of infective endocarditis.

11. **Leukemia and Cancer:**

Immunocompromised children are at high risk of oral infections. Non-invasive treatments and pre-chemotherapy dental clearance are essential

IV. Discussion:

Dental care for MCCs involves navigating a complex interplay between systemic disease, oral health, and behavioral factors. One-size-fits-all strategies are ineffective, and personalized treatment plans must be developed. Multidisciplinary collaboration is key — involving pediatricians, hematologists, cardiologists, oncologists, and behavioral therapists.

Dental professionals must be familiar with drug interactions, contraindications, and emergency preparedness. In addition, parental education and frequent follow-up visits are vital for maintaining oral health.

Barriers to care include lack of trained professionals, limited access to facilities equipped for special needs, and socioeconomic constraints. This review underscores the importance of developing national and international guidelines and training modules for the dental management of MCCs.

Preventive Focus:

Across all conditions, early preventive care (fluoride applications, dietary counseling, sealants) was found to be a cornerstone in reducing treatment burden and complications.

TREATMENT MODIFICATIONS[19]

On the basis of this assessment, modifications may be needed in the delivery of dental treatment. These modifications can be preoperative, intraoperative, and postoperative modifications.

Examples include the following:

Preoperative

Prophylactic antibiotics given prior to certain dental procedures in a patient at risk for bacterial endocarditis

• Determination of the international normalized ratio (INR) prior to surgery in a patient taking anticoagulants

• Ensuring food intake prior to dental treatment in a diabetic patient on insulin

Intra operative

• Avoiding the use of electrosurgery in a patient with a pacemaker

• Avoiding elective radiographs in a pregnant patient

• Use of extra local measures for hemostasis in a patient taking anticoagulants.

Post operative

• Prescribing antibiotics for immune compromised children

• Prescribing adequate post-operative analgesia for a patient on chronic steroids

Thus, through systematic assessment of risk and identification of potential problems, simple modifications in the delivery of dental treatment can be made in an effort to reduce risk to the patient. It should be remembered that risk is always increased when a medically compromised patient is treated; however, the goal is to reduce that risk as much as possible.

STRESS AND ANXIETY REDUCTION[19]

In all children, especially those with medical problems, stress and anxiety control is important and helps to reduce risk. Establishment of good rapport and trust is of paramount importance. Allowing the child patient to ask questions and frank and open discussions with older children are equally important. Explaining what is to be done before treatment is initiated often helps put a patient at ease. Short morning appointments may be better tolerated than appointments later in the day. In patients with pronounced anxiety or fear about a planned dental procedure, oral premedication with an anxiolytic/sedative drug 1 hour prior to an appointment is recommended. In addition, an anxiolytic/sedative can be prescribed the night before the appointment to ensure a good night's rest.

Intraoperative monitoring by pulse oximetry is recommended for those who are sedated with oral medication. In addition to oral premedication, intraoperative inhalation sedation with nitrous oxide/oxygen may be considered for additional anxiolysis and sedation. This may be especially beneficial for patients with cardiovascular disease because oxygen is continuously administered during the procedure.

General protocol to be considered for management of medically compromised or developmentally disabled individual [20] -

- Consultation and consent of the treating medical specialist is mandatory prior to dental management of medically compromised children.
- A written consent and update on the current medical status should be made mandatory prior to the dental appointment as this will give us a clear insight into the child's medical problem, medications to be avoided.
- A thorough knowledge on the use of local anaesthesia with adrenaline and how it could affect the systemic status of the compromised child should be discussed with the concerned medical practitioners if need be.
- The required haematological, microbiological and other lab investigations pertaining to the specific medical problem has to be completed, which we as pediatric dentist and the concerned medical practitioners think is mandatory prior to dental treatment.
- Close cooperation between medical and dental professionals is desirable in order to improve the oral and general health of the patient, based on the creation of a dental care program in the context of a multidisciplinary approach to the disease.

V. Conclusion

Medically compromised children require specialized dental care that accommodates their systemic conditions. Preventive strategies, tailored treatment planning, and interdisciplinary coordination form the backbone of successful dental management. Continuing education and policy efforts must be directed at equipping dental teams to address these needs comprehensively and compassionately.

References:

[1]. Adhikari M, Bhimma R, Coovadia HM. Intensive pulse therapies for focal glomerulosclerosis in South African children. Pediatr Nephrol 1997; 11 : 423-8.
[2]. Atassi F. Oral home care and the reasons for seeking dental care by individuals on renal dialysis. J Contemp Dent Pract. 2002 May 15;3(2):31-41.
[3]. Abramowicz M, Barnett HL, Edelmann CM Jr, Greifer I, Kobayashi O, Arneil GC, et al. Controlled trial of azathioprine in children with nephrotic syndrome. A report for the International Study of Kidney Disease in Children. Lancet 1970; i : 959-61.
[4]. Nelson: Textbook of paediatrics. 16th edition .
[5]. Fauci, Braunwald, Kasper et al: Harrison's principles of internal medicine, 17th edition.
[6]. Greenberg M, Glick M; Burket's Oral Medicine: Diagnosis and Treatment.10th edition.
[7]. Fonseca d ; Dental care of the pediatric cancer patient: Ped Dent.2004;26:53-57
[8]. Neville W, Damm D, Allen C, Bouquot J ; Oral And Maxillofacial Pathology. 2nd edition.
[9]. Antonio C, Jos N, Juan G. Thalassemias and their dental implications Medicina Oral 2002; 7: 36-45.
[10]. Mcdonald, Avery, Dean; Dentistry For The Child And Adolescent : 8th edition.
[11]. Scully C and Cawson RA. Dental management of medically compromised children.
[12]. Antoniades DZ, Markopoulos AK, Andreadis D, Balaskas I, Patrikalou E, Grekas D. Ulcerative uremic stomatitis associated with untreated chronic renal failure: report of a case and review of the literature. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2006 May;101(5):608-13.
[13]. Al-Malik et al: Oral manifestations of juvenile hyaline fibromatosis. J Clin Pediatr Dent 2005; 29(4): 347-351.
[14]. Chu VH, Miro JM, Hoen B, Cabell CH, Pappas PA, Jones P, et al. Coagulase-negative staphylococcal prosthetic valve endocarditis--a contemporary update based on the International Collaboration on Endocarditis: prospective cohort study. *Heart*. Apr 2009;95(7):570-6
[15]. Cucchiara S, Staiano A. et al: Antacids and cimetidine treatment for gastroesophageal reflux and peptic oesophagitis. Arch Dis Child 59:842- 847, 1984
[16]. Cubukçu CE, Güneş AM. Caries experience of leukemic children during intensive course of chemotherapy. J Clin Pediatr Dent. 2008; 32(2):155-158.
[17]. Dougall A, Fiske J; Access To Special Care Dentistry, part 2. Communication. BDJ 2008; 205: 11-21.

[18]. Collard, Hunter : Dental care in acute lymphoblastic leukaemia: Experiences of children and attitudes of parents. Int J Paed Dent 2001; 11: 274-280
[19]. Little W, Falace DA, Miller CS, Rhodus NL. Dental Management of the Medically Compromised Patient. Seventh ed, 2007.
[20]. American Academy of Pediatric Dentistry. (2023). Guideline on Management of Dental Patients with Special Health Care