CASE REPORT

# Successful Management of Oro-Dental Needs in A Child with Down Syndrome Using Holistic Approach

**Namita Kalra, Rishi Tyagi, Amit Khatri, Drishti Kaushal and Neetu Garg**

*From the Unit of Pedodontics, Department of Dentistry, University College of Medical Sciences and GTB Hospital, Dilshad Garden, Delhi 110095*

*Correspondence to Dr. Rishi Tyagi, Professor (SAG), Department of Dentistry, University College of Medical Sciences and GTB Hospital, Dilshad Garden, Delhi 110095. tyagi_rishidoc@hotmail.com*

**Abstract**

Down syndrome is a chromosomal abnormality associated with mild to moderate intellectual disability. Patients with DS present peculiar orofacial characteristics, which may entail a multitude of oral health issues. Treating such patients can pose a challenge to dental practitioners in terms of behaviour management and safety as the affected individuals experience cognitive delay. This case report intends to present successful management of oro-dental issues including root canal treatment, restoration, oral prophylaxis, and preventive measures in a 10-year-old child with down syndrome.

**Key words:** Down syndrome, Dental, Oral health

## Introduction

Down syndrome is a chromosomal disorder characterized by delayed psychomotor development and dysmorphic features. First described in a child by Jean-Etienne-Dominique Esquirol, a French psychiatrist, in 1838, down syndrome derives its name from Langdon Down who enumerated some of the characteristic features of this syndrome accurately in his article in 1866.[1] A triplication of material on chromosome 21, caused by an error in cell division results in the presence of an additional third chromosome 21 in down syndrome, hence it is also termed trisomy 21 / trisomy G.[2] Being one of the most frequent chromosomal disorders in children, it has a prevalence of 1 in 800-1000 live births.[3] Three genotypes of down syndrome have been identified, *viz,* trisomy 21 (94%), translocation (5%), and mosaicism (1%).[4]

The typical phenotype in down syndrome comprises short stature and craniofacial features like brachycephaly, a flat occiput, frontal bossing, flattened nasal bridge, mid-face deficiency, up slanting palpebral fissures and epicanthal folds, short ears, small mouth, deviated nasal septum, and Brushfield's spots in the iris. In addition, there can be hypotonia with increased joint flexibility, an open mouth, hearing disability, protruded tongue, developmental delay in speech and language, and a Simian (single palmar) crease.[2,4] A risk of concomitant congenital defects and non-inherited mental retardation is seen.[5,6]

The myriad orofacial manifestations include a small maxilla, mandibular protrusion, fissured and protruding tongue, thick lips, malocclusion (class III), periodontal disease, delayed tooth eruption, hypodontia and hypotonicity of perioral muscles which leads to drooling and difficulty in swallowing and sucking, although, a lower prevalence of caries in down syndrome patients has been found by most investigators in both dentitions.[2] The poor oral health increases morbidity and adds to the health burden of care-givers of children with down syndrome.[7] Thus, the populations with developmental disabilities like down syndrome should receive focussed, individualized and comprehensive management of oro-dental issues.[8] The present case report aims to present the chairside management of a child affected with down syndrome and the challenges faced during treatment.

## Case Report

A 10-year-old boy, a known case of down syndrome, presented in the department of pedodontics and preventive dentistry with pain in the upper left back tooth region for the preceding 15 days. The child was suffering from intellectual disability and had been attending a school for children with special needs. He was able to read and write and had a friendly attitude towards people. The child was made comfortable in the hospital environment during his first visit so that a dental check-up could be carried out. The child's extra-oral features had typical Down's facies with upward

slanting palpebral fissures, midface deficiency, and flattened nasal bridge. Intra-oral examination revealed a fissured tongue, poor oral hygiene with plaque deposits on the lingual surface of lower anterior teeth (***Fig.* 1a**) and caries in the upper right and left first permanent molar, i.e., tooth 16 and tooth 26 respectively (***Fig.* 1b**). Radiographic examination of tooth 16 revealed caries extending from enamel into dentin without pulpal involvement whereas examination of tooth 26 revealed decay extending from enamel, dentin into pulp with widening of periodontal ligamental space and discontinuity of lamina dura. Restoration of tooth 16 and root canal therapy (RCT) of tooth 26 was planned. As preventive therapy, supragingival hand scaling and topical fluoride therapy by the placement of GC MI Varnish™ (5% sodium fluoride with recaldent) was done on the patient's second dental visit to accustom the child and for step-wise escalation of dental procedures. The child was made comfortable through behavioural reinforce-ment using verbal and non-verbal communication, tell-show-do, euphemisms, modelling, and distraction techniques to enable him to cope with the procedural interventions. In the next follow up visit, chair-side management of the child was tried for which excavation of dental caries was done very slowly for tooth 16, followed by restoration of the tooth with GIC and composite restoration. The child showed reluctance yet cooperative behaviour towards getting chairside procedure. In the subsequent visit, stepwise progression of RCT for tooth 26 was planned following which access opening was performed using round bur (size 2) for gaining access to pulp chamber following which working length was also determined (***Fig.* 2a** and ***Fig.* 2b**). All three canals were prepared in the next visit to keep the visits short and acceptable to the patient to achieve cooperative behaviour with hand K-files (2% taper Mani K-files) and preparation was completed up to size 35 of K-file. After completion of biomechanical preparation (BMP), calcium hydroxide dressing was given as intracanal medicament for two weeks. The patient was asymptomatic in the subsequent visit hence obturation was completed with gutta-percha of the same taper (2%) using lateral condensation technique (***Fig.* 2c**). The patient was followed up telephonically after one week for any associated discomfort and the procedure turned out to be uneventful. After completion of root canal therapy, the tooth was restored with composite restoration (3M ESPE™ posterior composite). However, the parent was reluctant for placement of stainless-steel crown due to compromised aesthetics and refused to undergo crown placement for his child. The chairside management in the child was challenging as he had to be counselled each time he underwent any procedure. Behaviour management with the help of modelling, tell-show do and distraction really helped in the completion of chairside procedure for the child without any requirement of general anesthesia.

## Discussion

The unique oro-facial traits in children with down syndrome may put them at risk for oral health issues.[8] It is crucial to comprehend these oral health issues faced by children of down syndrome at the earliest to prevent their Quality of Life (QoL) from being affected adversely.[4,7] Deps, *et al.* in their meta-analysis found that individuals with down syndrome have significantly lower dental caries, which can be attributed to the presence of spacing between teeth, delay in eruption, and certain salivary characteristics.[9]

Performing pulp therapy in down syndrome may depend on the patient's intellectual quotient (IQ), physical, dental, and soft tissue assessment.[6] A single visit RCT is given preference in patients requiring endodontic therapy. With the use of advanced dental technologies, the ease of performing RCT has also been simplified for practical management of such cases.[10] The present case was managed chairside with behavioural reinforcement using verbal and nonverbal communication, tell-show-do, euphemisms, modelling, and distraction techniques for achieving cooperative behaviour.[2] But since the child had to be slowly reinforced for dental treatment, thereby multiple short visits for RCT were preferred over a single visit. The child was practically introduced step by step to the air rotor, endodontic files to simplify ease of access opening, and BMP. The child was particularly fearful on seeing the heated instrument for searing of gutta-percha during obturation. He had to be counselled several times and made at ease while performing obturation.[10]

Institution of all possible preventive measures is essential in patients of down syndrome to prevent oral health issues at the earliest and to control the consequent long-term impli-cations. With most parents paying more attention to other health issues, oral health tends to get neglected in children with down syndrome. There should be a prevention strategy indivi-dualized for every patient consisting of parental participation and education, a regular visit to dental office starting at 12 to 18 months, assistance in adopting good dietary practices, oral prophylaxis and motivation for oral hygiene, topical fluoride application, pit and fissure sealant, and early intervention.[10,11] In this case, we have used topical fluoride therapy by the placement of GC MI varnish (5% sodium fluoride with recaldent) as a preventive measure for dental caries and composite resin as a restorative material to restore class II cavity in the right upper first permanent molar. Composite resins can be used successfully for class I and II restorations in permanent molars suggested by strong evidence from meta-analyses.[11]

Contributors: NK, RT: Conceptualized the work, performed

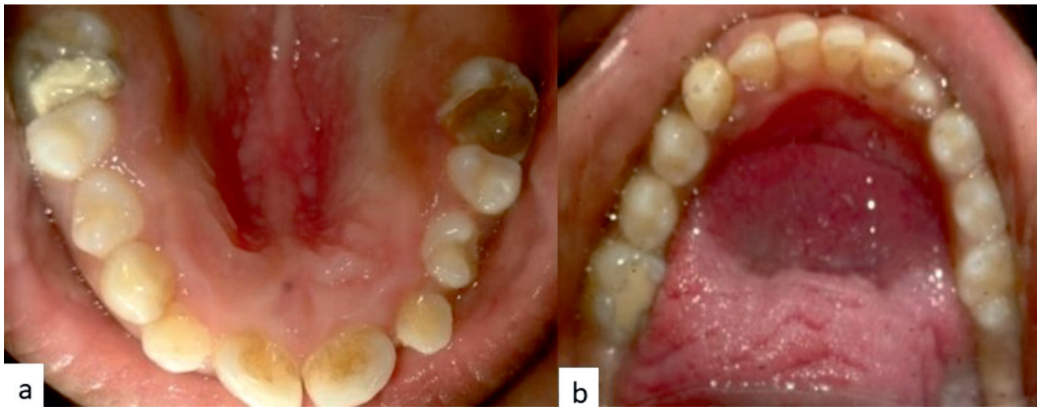


**FIG.1a.** Intraoral picture of the maxilla; **1b.** Intraoral picture of the mandible.

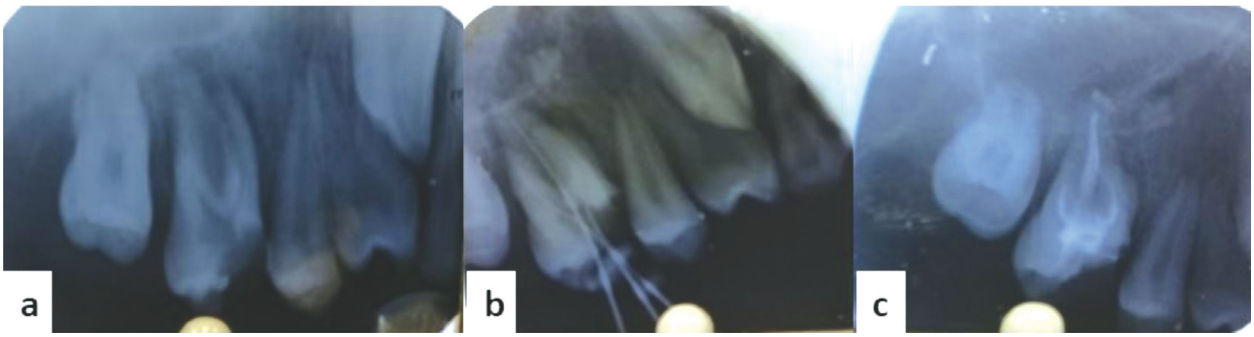


**FIG. 2*a***. Preoperative intraoral periapical radiograph of left maxillary first molar; **2*b***. Canal length determination in intraoral periapical radiograph of left maxillary first molar; **2*c***. Intraoral periapical radiograph showing obturation of left maxillary first molar.

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