

Oral Health Findings and Comprehensive Management of a Patient with Hypotonic Cerebral Palsy- A Case Report with a Two-Year Follow-Up

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ABSTRACT:

Background: Cerebral palsy is a group of disorders that affect the movement and muscle tone or posture caused by a non-progressive abnormality of the immature brain that originates during the prenatal period/first few years of life. The dentist is a crucial element of the interdisciplinary healthcare team that treats this special group since cerebral palsy patients frequently have oral manifestations.

Case report: This case report presents a 14-year-old male with hypotonic cerebral palsy and a description and importance of a comprehensive dental approach. On oral examination, the patient presented poor oral hygiene, plaque accumulation, several carious teeth in the upper and lower arch, and root stumps. A comprehensive dental treatment was planned and performed accordingly.

Conclusion: This case report underscores the vital role of comprehensive, structured dental interventions in enhancing the oral health-related quality of life for children with cerebral palsy. It's imperative to raise awareness about the significance of well-planned oral health strategies in caring for individuals with cerebral palsy, thereby ensuring a fulfilling and healthier life for these patients and their caregivers.

KEYWORDS:

Cerebral palsy, comprehensive care, dental care, health education.

1. Introduction

Little (1843) first described the disease of "spastic rigidity" related to prematurity and birth complications, which was initially known as Little's disease. In 1888, Osler introduced the term "cerebral palsy" (CP).¹ The centres for disease control and prevention defines CP as a multi-morbidity disorder that affects an individual's movement, posture, and balance.² Currently, it is recognized as a group of neurological disorders caused by non-progressive lesions of the central nervous system that occurs early in life.³ CP is multifactorial and leads to debilitation in the coordination of muscle actions resulting in an inability to maintain posture or perform normal movements.⁴ Spasticity is considered to be the most common movement disorder associated with cerebral palsy accounting for around 80% of disease; dyskinesia, ataxia, or mixed are the other less common of its types.⁵ CP is also classified according to the location of motor impairment i.e., tetraplegia, hemiplegia, or diplegia. In these types, the motor impairment may vary from difficulties with fine motor control to severe hypotonia in all limbs.⁶

Studies have reported the global prevalence range of CP from 1.5 to 4 per 1000 live births or children.⁸⁻¹¹ Less than 1 in 1000 newborns with a birth weight of >2500 g experience this condition.¹ According to National Family Health Survey (NFHS) 2015-16, 79% of childbirths took place in a health facility while the rest were conducted at home by untrained birth attendants.¹² When translated into actual figures, the number of unsupervised obstetrics deliveries in India is still very huge and have a very high rate of obstetrics complications, resulting in perinatal

asphyxia.¹³ Banerjee et al. reported that the majority of children with CP had spastic diplegia.¹⁴ Singh et al. in a study reported 1000 cases of CP and identified spastic quadriplegia (61%) as the most common type followed by diplegia (22%) among the north Indian population.¹⁵ In a systematic review and meta-analysis conducted by Chauhan et al., the overall pooled prevalence of CP per 1000 children surveyed was 2.95.¹⁶

CP often causes motor impairments that significantly impact oral health and overall well-being of patients. The most prevalent oral issues include a high occurrence of cavities and periodontal diseases, attributed to compromised muscle coordination. Insufficient muscle control also leads to dental and soft tissue injuries, bruxism, and temporomandibular joint problems. These factors, combined with a diet prone to causing cavities, contribute to overall poor oral hygiene in CP patients. In India, there is a scarcity of studies addressing comprehensive rehabilitation for CP patients. Therefore, this case report aims to underscore the physiological symptoms of CP and emphasize the necessity for thorough, integrated care during dental procedures for these individuals¹⁷.

2. CASE PRESENTATION

A 14-year-old male patient (Fig. 1 a and b), along with his father, reported to the department of Paediatric and Preventive Dentistry, at M. A. Rangoonwala College of Dental Sciences & Research Centre, Pune, Maharashtra, India, with the chief complaint of pain in the lower right back tooth region. Informed consent was obtained from the father and he granted consent for all the rights to the use of photographs, family histories, clinical and laboratory examination results, and information concerning planning, diagnosis, and treatment for teaching and research purposes.

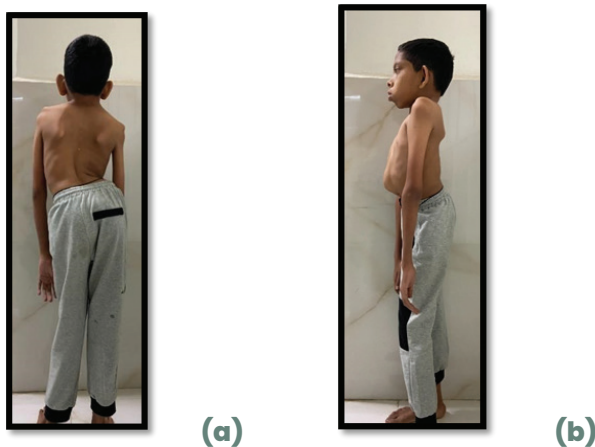


Fig. 1 Physical appearance of patient (a) Straight profile (b) Lateral profiles.

3. PATIENT HISTORY

Patient's parents had a consanguineous marriage. The father gave a history of the mother being in prolonged labour and a forceful delivery resulting in the child having hypotonic cerebral palsy. The patient had received treatment from a paediatrician during early childhood. Due to the low socioeconomic status, the parents could not afford to continue the medical treatment. Also, according to the parents, strong medicines were hampering the child's growth, so they discontinued the treatment.

4. PHYSICAL EXAMINATION

On physical examination the patient had severe wasting and weakness in the proximal shoulder girdle and upper limbs. Wasting and weakness of both the lower limbs were noticed, but with lesser magnitude. The patient had good independent seating balance with no pelvic obliquity. Independent ambulation was seen with minimal support from the caregiver. Magnetic Resonance Imaging (MRI) of the cervical spine revealed acute kyphotic deformity with the apex at the C4 vertebra. Narrowing of the spinal canal was noted at the apex. Acute angulation and stretching of the spinal cord were observed with changes of myelomalacia. The patient's physical examination and medical reports suggested neuromuscular scoliosis (long C-shaped thoracolumbar scoliosis), gross muscle atrophy, and signs of congenital facial-musculoskeletal dystrophy (Figure 1 a and b).

INTRA ORAL EXAMINATION

Soft tissue examination: During intraoral examination, it was observed that the patient lacked rooting or bite reflexes, but had mild gag reflexes. The tongue exhibited normal tonicity and protruded during swallowing. The patient's lips remained partially open at rest, and the tongue rested on the floor of the oral cavity, indicative of a mouth-breathing pattern. Additionally, mild gingivitis was noted (Figure 2 a and b).

Hard tissue examination (Figure 2 a and b) and Pre-operative Orthopantomograph (OPG) (Figure 3) of the patient revealed the following findings: Plaque accumulation on the posterior teeth, enamel hypoplasia on the upper and lower incisors, anterior open bite with protrusion and overjet of the upper incisors (Figure 2). Pit and fissure caries were seen with 14, 15, 24, 34, 45 and 47. Class I occlusal caries with an ICDAS CODE 5 were observed in 16, 26, 43 and 44. Smooth surface caries were seen with 33. ICDAS CODE 6 were seen with 46; root pieces with 63, 65, and 36 and Ellis class I fracture and palatal surface caries with 11 were noticed.



(a)



(b)

Fig. 2. Pre-operative intra oral photographs (a) Maxillary arch; (b) Mandibular arch.

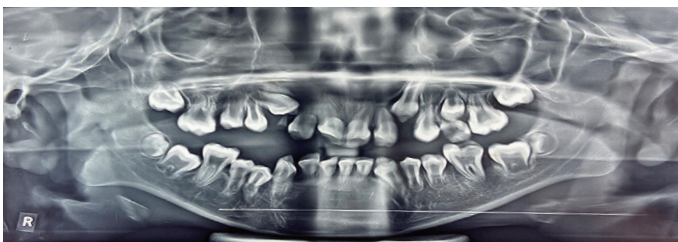


Fig. 3. Preoperative Orthopantomograph (OPG) of patient.

Comprehensive multidisciplinary dental approach

The complete treatment plan was explained to the parents, and it was aimed to provide a clear, objective information using simple language. After receiving signed informed consent from the father, treatment was initiated.

The patient was counselled regarding importance of oral hygiene maintenance. Empathy and support was shown towards the patient and the parent throughout. All this led to gradual positive change in the parental attitude. Provisions such

as wheelchair assistance, pillows for back support to provide protective stabilization were made. At no point were physical restraints used for the patient. Patient behaviour was managed using communication techniques (“tell-show-do,” and positive reinforcement) with parental presence. Thus, continuous tender love and care was ensured. The treatment plan decided for the patient was as follows:

Oral prophylaxis

Root canal treatment (RCT) followed by preformed stainless steel crown with 46

Preventive resin restoration (PRR) with 14, 15, 24, 34, 45, and 47

Light cure composite restoration with 11, 16, 26, 43, and 44

Extraction of root piece with 63, 65, and 36

Topical Fluoride application

The daily use of fluoridated toothpaste in small portions on a dry toothbrush was recommended. The caregiver was also well-versed of the risk of aspirating toothpaste and the need to remove excess toothpaste with a clean, dry cloth. The treatment was completed in the dental hospital with two professionals working simultaneously. The father proved to be quite active and interested in all the appointments, which was reflected in the final outcome of the treatment. This led to a considerable improvement in the patient’s oral health. The carious teeth’s condition warranted Atraumatic Restorative Treatment (ART), eliminating the need for local anaesthesia. Restorations were performed using a mouth prop without premedication or anaesthesia, while the patient was positioned laterally. Caries were removed, and isolation was achieved. PRR and light cure composite resin were the choice of restorative materials used. RCT was done on 46, followed by stainless steel crown (Figure 4).

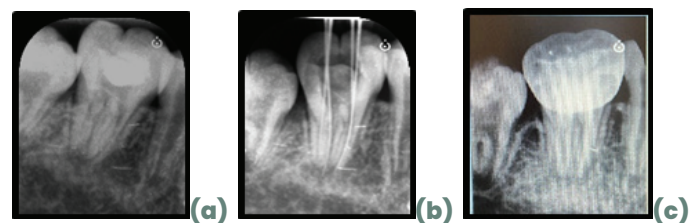


Fig. 4. IOPA of tooth no. 46 (a) Intraoperative (b) Working length (c) Post-operative.

All the post-operative oral health care instructions were provided to the father of the patient. The patient was followed up with three-monthly visits for 1 year. He showed a significant reduction in plaque build-up, which demonstrated his father’s adherence to the instructions given. Clinical examination revealed the restorations to be in satisfactory condition, which highlighted the father’s ability to maintain the child’s oral health.

The father reported that the patient did not experience any kind of dental pain. The patient was seen to be less sensitive to instrumentation during the subsequent dental appointments. The child had lesser apathetic behaviour as compared to the initial appointments. During subsequent follow up visits, hard tissue examination showed pit and fissure caries with 17 and 27, and smooth surface caries with 13, which were further restored with PRR (Figure 5 a and b; & Figure 6).



Fig. 5 Post-operative photographs of the



Fig. 6 Post-operative OPG of patient

5. DISCUSSION

Dental care for patients with CP requires an in-depth knowledge of the associated neuro-psychomotor abnormalities.³ These abnormalities should be tackled by adopting a comprehensive approach to ensure treatment success. A holistic view is, therefore, needed to understand the patient's limitations and provide safe treatment. Dental compliance of children with CP can be made better by implementation of Dental Home. Knowing the clinical representation and pathophysiology of CP can help one understand the condition better which could help in better execution of dental management.

Pathophysiology of CP

During the initial trimester until the 24th week of pregnancy, cortical neurogenesis occurs, involving the organization, migration, and proliferation of neural precursor cells. Genetic deficits, infections, or exposure to toxic agents can lead to malformations such as lissencephaly, polymicrogyria, cortical dysplasia, and schizencephaly. Environmental factors like ischemia and hypoxia at this stage can cause CP by disturbing developmental mechanisms, leading to impaired brain development.¹⁸

When seeing children with cerebral palsy for dental examination or treatment, the dentist must bear in mind the limitations that may lead to adjustment of his/her approach, such as apprehension, difficulty in communication, low intelligence, poor concentration, convulsions, posture and ability to cooperate.¹⁹

Cerebral Palsy and Oral Health

It is now well-established that people with CP are more susceptible to caries and periodontal illnesses because they are unable to execute necessary oral hygiene procedures due to movement deficits. Due to their inability to chew properly, they are offered a soft diet which leads to caries progression. All these factors increase the risk of caries in such patients.²⁰ Patients with CP have a high prevalence of Class II malocclusion with protruding maxillary incisors, incompetent lips, and a greater incidence of seizures, all of which enhance the risk of dental damage.¹⁹

A study was conducted in various parts of the Nagpur region, India, to determine the barriers in providing best possible dental care for children with special health care needs. It was found that about 13% practitioners lacked training in order to provide dental care to children with special needs which were similar to the study of Bindal et al., Rao et al. and Dao et al.²¹ Thus it can be observed that the ability and efficiency to treat them is compromised

due to lack of proper knowledge and experience, and a constrained work environment.²¹

Dental treatment of a child with hypotonic CP

It is better to schedule the dental visit early in the day and allow sufficient time to establish appropriate interaction during such encounters.²² There is a chance of the child with CP or the dentist to be hurt during the procedures due to sudden and uncontrolled movements of the child.¹⁹ In this case, pillows for back support and mouth prop were used which provided protective stabilization to prevent such movements.

Prevention

Home dental care should be promoted from early on by learning to gently clean the teeth with a soft cloth or an infant soft toothbrush. For older children who are or physically unable to brush, the dentist should teach the parent proper brushing techniques and ways to safely restrain the child when necessary. To encourage independence of children with milder motor disabilities, an electric toothbrush may be utilized effectively.²²

Non-pharmacological Behaviour Management in CP

Behaviour management is an important aspect of providing dental treatment for children.²³ Talking to one's patients, singing to them, playing some music, and/or counting down from 10 and then taking a break are ways to distract the patient. Euphemisms can be useful in desensitizing the child.¹⁹ Patients are advised to watch the photographs and/or films daily to gradually become accustomed to, and less fearful of, the dental environment.²³ Restraints such as head positioners, mouth props, and/or positioning devices, may be employed to prevent sudden jerky movements. One of the dental staff members should hold the head in the midline position over occiput-level head support. Velcro straps can be used to maintain the midline alignment of the patient.¹⁹ A finger guard and a steel mirror are preferred to avoid injury. There are no reservations on using local anaesthesia²².

Sedation and Anesthesia

Children with CP may be difficult to handle during dental visits. Sedation and general anaesthesia are frequently needed in such situations, particularly for invasive procedures. Assessment by the concerned specialty (pediatrics, anesthesia, and/or neurology) is often needed prior to the dental procedure. Oxygen saturation should be monitored and the airway should be protected throughout the procedure. Children with CP are at an increased risk of aspirating dental materials, dental debris

or even an extracted tooth. A throat shield should always be used to protect the airway in these cases.²²

6. CONCLUSION

One of the most important aspects for successful treatment in children with CP is attitude and skills of the operating dentist and the team and willingness of the caregivers to render treatment to the child. The caregivers should be imparted knowledge and trained to become competent in oral hygiene maintenance at home.

This case highlights the value of ongoing collaboration among dental professionals, caregivers, and healthcare providers, ensuring positive outcomes for individuals with hypotonic CP.

Why this case report is important to Paediatric Dentistry?

In many cases involving children with special health care needs, oral health care is often neglected, leading to debilitating dental conditions. This article stresses the role of the paediatric dentist which is to improve the oral hygiene, encourage the caregivers for a good oral hygiene maintenance and also skilful management of a child with CP.

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