

# Full-Mouth Rehabilitation of a Hydrocephalus Patient

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## Abstract

Dentists frequently encounter patients who are either medically, physically, or mentally compromised. One such medically compromised condition is “hydrocephalus.” Hydrocephalus is basically a neurological disorder caused by excessive intracranial pressure due to abnormal accumulation of cerebrospinal fluid within the ventricles or subarachnoid space of the brain and raised intracranial pressure. Ventriculoperitoneal shunt (VPS) is the most commonly used treatment, but ventriculoatrial shunt is another treatment option. To keep the intracranial pressure within normal range, the patients are kept on medications which make them more prone to dental caries. Because of poor oral hygiene, these patients require a regular dental care. This report discusses the dental management process employed for a 5-year-old patient with VPS-treated hydrocephalus.

**Keywords:** Handicapping conditions, hydrocephalus, special care dentistry, ventriculoperitoneal shunt

## INTRODUCTION

In our daily practice, we dentists frequently encounter patients who are either medically, physically, or mentally compromised. These patients can be categorized under the special care dentistry as they require oral health needs with specialized care. Pediatric dentists are the ones who generally come across such cases. One such medically compromised condition is “hydrocephalus.”<sup>[1]</sup>

According to the Greek terminology, *hydrocephalus* means water in head. It is basically a neurological disorder caused by excessive intracranial pressure due to abnormal accumulation of cerebrospinal fluid (CSF) within the ventricles or subarachnoid space of the brain and raised intracranial pressure.<sup>[2]</sup> These patients often present with delayed development, visual disorders, irregular breathing patterns, bradycardia, hypertension, and behavioral disturbances.<sup>[3]</sup>

Hydrocephalus is mostly treated surgically by inserting a shunt system.<sup>[4]</sup> Sometimes, to keep the intracranial pressure within normal range, the patients are kept on medications which makes them more prone to dental caries.<sup>[5]</sup> Because of poor oral hygiene, these patients requires a

regular dental care.<sup>[6]</sup> Therefore, pediatric dentists should have a proper knowledge of adequate treatment strategies so as to prevent the complications occurring during their treatment.<sup>[7]</sup>



**Figure 1:** Extraoral photographs: (a) Frontal view (b) occipital view.

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**Figure 2:** Preoperative intraoral photographs of the patient: (a) Frontal view, (b) maxillary view, (c) mandibular view.



**Figure 3:** Position of the patient during treatment: (a) Frontal view, (b) lateral view.

Hence, the aim of this article is to discuss a case of hydrocephalic pediatric patient and the modification in managing the child in the dental operatory.

## CASE REPORT

A 5-year-old male patient presented to the department of pedodontics and preventive dentistry with the chief complaints of pain in the right upper back tooth region for the past 1 week. Before taking history and examination an informed consent obtained by the parents. While taking the complete history of the patient, his grandfather reported that the patient had undergone ventriculoperitoneal shunt (VPS) surgery at 18 days of age for the same. The child was operated again for VPS at 9 months of age because of shunt sepsis. The general examination revealed the normal built of the patient and an abnormal enlargement of the head [Figure 1]. Intraoral examination revealed discolored 51, 61 due to pulpal necrosis. The patient's grandfather gave no relevant history of trauma in the anterior region of the cavity. A further examination revealed deep caries in 54 and 64, whereas pit and fissure caries was present in 65, 74, and 85 [Figure 2]. Intraoral periapical radiographs were advised for 51, 61, 54, and 64. The radiograph confirmed the pulpal involvement of the lesion.

Before planning the dental treatment, the patient was referred to a neurosurgeon and a cardiologist for the evaluation of present medical condition. Consent was given by the medical team to perform an invasive dental treatment under local anesthesia

with antibiotic prophylaxis and protective stabilization. The patient exhibited a positive behavior and showed good cooperation during the examination. Hence, the treatment was planned on the dental chair under the supervision of the medical team. On his neck, we palpated the location of the catheter before proceeding with the treatment, and a neck pillow was placed for protective stabilization [Figure 3]. With all due precautions, treatment was performed with minimal movement of the neck. The teeth with small carious lesions were restored with glass ionomer cement on 65, 74, and 85. Pulp therapy was done on 51, 61, 54, and 64. This was followed by stainless steel crown over 54 and 64, whereas 51 and 61 were restored with the help of strip crowns [Figure 4].

Later, the patient was scheduled for periodic follow-up for the management of oral hygiene, development and eruption of permanent teeth, and structural change of the craniofacial region.

## DISCUSSION

The main concern while treating a patient with hydrocephalus is first to prevent the shunt sepsis and second to prevent the dislocation of the shunt system.<sup>[8]</sup> Helpin *et al.* conducted a study with 14 patients to investigate the incidence of shunt infections during dental procedures without antibiotic prophylaxis, and they found no shunt infections in a 12-month follow-up period.<sup>[9]</sup> However, in our case, as the patient gave a history of shunt sepsis, it was necessary to start the dental treatment under antibiotic coverage so as to prevent the chances of reinfection of the shunt system.

Patients with hydrocephalus are usually treated surgically during their early days by inserting a shunt system. This system diverts the flow of CSF from the central nervous system to another area of the body, where it can be absorbed as part of the normal circulatory process, thereby reducing intracranial pressure and preventing brain damage through a system of small tubes known as catheters.<sup>[7]</sup> Mishandling of catheter due to excessive force over it can lead to complications such as improper placement, obstruction, fracture, and migration of the components.<sup>[10]</sup>

While planning a dental treatment for shunt-treated patients, it is very essential to check the location of the catheter through palpation before treatment.<sup>[10]</sup> In VPS-treated patients, the catheter is palpable in the cervical region of neck and can be disturbed during dental treatment.

de Carvalho *et al.* reported a 2-year-old child with migration of a catheter from the abdomen to the supraclavicular region



**Figure 4:** Postoperative intraoral photographs of the patient: (a) Frontal view, Before proceeding for dental treatment a informed consent was obtained from the parents. (b) maxillary view, (c) mandibular view.

caused by inadvertent mechanical forces to the shunt and vigorous movement of the patient's head.<sup>[11]</sup> To prevent the dislocation of the shunt system, various case reports have been published in which they have managed the patient on the dental chair with the help of pillows and cushions which provides a more comfortable and adequate posture for the patient during dental treatment.<sup>[6]</sup> In our patient, all dental procedures were performed with a comfortable position of patient's head with neck pillow and saliva ejector so as to reduce the movement of patient neck. Kim *et al.* used neck pillow and pediwrap during dental treatment to prevent excessive movement of neck.<sup>[10]</sup> de Morais Gallarreta *et al.* suggested the use of pillows and cushions to provide a more comfortable and adequate posture for the patient during dental treatment.<sup>[6]</sup>

Dental treatment of hydrocephalus patient can be done in the dentist's office with little change in protocol. It is important to interview the patient and the family to include a careful history of general health, because systemic conditions are often associated with hydrocephalus, and should be taken into account before developing a treatment plan.

## CONCLUSION

Children with hydrocephalus tend to have poor oral hygiene and a high prevalence of caries due to regular intake of medicine. Caregivers should be advised to take their children to the dentist more frequently and to receive instructions on oral hygiene. The VPS used to treat hydrocephalus should not be compressed during the dental treatment, and special headrests can be used to facilitate the positioning of the patient's head.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other

clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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## Conflicts of interest

There are no conflicts of interest.

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