



Dental Considerations for a Pediatric Patient with Osteopetrosis: Case Report

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ABSTRACT/INTRODUCTION

Introduction: Osteopetrosis is comprised of a group of rare hereditary disorders characterized by impaired osteoclast development or activity resulting in altered bone metabolism and high bone mineral density. Resulting bone is denser and heavier but more fragile than healthy bone. This condition can have oral manifestations such as malformed teeth, hypomineralization, or agenesis of teeth. The treatment for osteopetrosis can include hematopoietic stem cell transplantation and recommendations for prophylactic dental treatment⁷. The purpose of this report is to present a review of the literature regarding the dental considerations for patients with osteopetrosis.

Case Report: This case report details a six-year-old male who initially presented to the Children's Mercy Dental Clinic in 2020 for dental clearance prior to a bone marrow transplant and the subsequent follow up care over the next four years. The patient's medical history is significant for osteopetrosis status post bone marrow transplant in 2020 as well as numerous medical diagnoses. Clinical and radiographic examination revealed carious primary teeth and multiple malformed, hypoplastic, or unerupted successor teeth. Clinical considerations for this patient include managing carious teeth as well as providing the parent with recommendations regarding future care are presented in this report.

CASE REPORT

A six-year-old male initially presented to the Children's Mercy Dental Clinic in January 2020 for dental clearance prior to a bone marrow transplantation (BMT). Medical history included autosomal recessive osteopetrosis diagnosed in early infancy. He presented with generalized decay and dense maxillary alveolar bone. Same day surgery (SDS) dental rehabilitation was recommended, but due to the urgency of BMT, hematology/oncology requested silver diamine fluoride (SDF) for caries management. In February 2020, he underwent myeloablative allogenic BMT with chemotherapy. Post transplant, he was treated for hypercalcemia from osteoclast-driven calcium release, managed with hydration, diuresis, calcitonin, and denosumab.

In December 2020, a periodic exam revealed caries and a recommendation for dental SDS and follow-up with an oral maxillofacial surgeon (OMFS) to monitor for osteonecrosis. In June 2021, SDS was performed, which included stainless steel crowns (SSCs) on primary posterior teeth, composite resins on primary anterior teeth, and extraction of tooth #K due to a periapical abscess. Multiple malformed and unerupted permanent teeth were visualized.

In August 2022, the patient presented for a routine dental exam. Findings included multiple carious primary teeth and malformed teeth #19 and #30. Radiographs showed unerupted teeth #3 and #14, malformed enamel, ectopic eruption of succedaneous teeth, and suspected congenitally missing teeth (Figure 1). Due to extensive treatment needs, medical complexity, and limited tolerance for in-office care, SDS was recommended. In October 2022, SDS was completed, including SSCs on primary and permanent posterior teeth and the extraction of exfoliating teeth #J, #N, and tooth #T due to a periapical abscess (Figure 2). Permanent incisors and teeth #3, 14 were unerupted. Follow-up with OMFS and the dental provider was advised.

In September 2024, the patient presented for a routine dental exam. Updated medical history included astigmatism, gastroesophageal reflux disease (GERD), obstructive lung disease, bronchiolitis obliterans graft versus host disease (GVHD) of lungs, and renal osteodystrophy. He had not established care with OMFS due to insurance issues. Exam revealed moderate generalized plaque, severe gingivitis, and recurrent decay of primary teeth SSCs. Permanent incisors presented with malformed enamel and moderate to severe crowding. Recommendations included SDS and collaboration with OMFS for a collaborative approach to address carious or impacted teeth. The patient has not returned for treatment.

Figure 1: August 2, 2022



Figure 2: October 27, 2022



DISCUSSION/CONCLUSION

Osteopetrosis, characterized by defective osteoclast function, alters bone metabolism and dental development. Dental manifestations of osteopetrosis include delay/failure of tooth eruption, malformed crown/roots, odontoma, tooth agenesis, enamel hypoplasia, dental caries, thickened lamina dura, and osteomyelitis⁷. Increased bone density reduces nutrient supply to developing tooth germs, resulting in malformed morphology³ and eruption issues^{2,6}. BMT can restore osteoclast function and support normal dental development¹. In this case, the patient was diagnosed with osteopetrosis at infancy and received BMT at six-years-old, after primary and permanent tooth bud calcification (excluding permanent third molars). At eight-years-old, the patient presented with unerupted permanent incisors and maxillary first molars and malformed crowns and roots of multiple teeth.

Osteomyelitis, an inflammation of the bone cortex and marrow,⁴ is a concern in patients who are on bisphosphonates or have osteopetrosis due to altered bone metabolism and decreased periosteal blood supply. Our patient was referred to OMFS prior to the primary tooth extraction to monitor for osteonecrosis.

Dental professionals must recognize the oral manifestations of osteopetrosis, coordinate with medical teams, and provide timely preventative and definitive care. This case highlights how gaps in dental care can result in an increased need for hospital dentistry, more aggressive care, and higher costs to address more serious complications. Routine dental exams are critical for monitoring development and guiding parents on oral hygiene and anticipatory care.

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