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Unmasking Ghost Teeth: A Rare Dental Anomaly (Regional Odontodysplasia): A Case Report

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Abstract
This case report presents an 8-year-old female patient with delayed eruption and gingival enlargement in the upper left quadrant. Clinical and radiographic examinations confirmed RO (regional odontodysplasia), with findings of hypomineralization, poorly developed roots, and ghost-like teeth. RO a rare, non-inherited dental condition, mainly affects the dentin and enamel of a specific localized group of teeth and maxilla is most commonly affected. It is characterized by hypoplasia, hypocalcification and a recognizable "ghost-like" appearance on radiograph. The patient had a history of calcium deficiency, which was addressed with supplementation. A conservative approach, including restorative treatment for carious teeth and periodic follow-ups, was adopted to monitor eruption status and plan future rehabilitation. Hence this case emphasizes how crucial it is to manage RO using a multidisciplinary strategy in order to maintain jaw development and functional results.

Keywords: Regional odontodysplasia, ghost teeth, hypocalcification, dental anomalies, conservative management

Introduction
An uncommon developmental disorder known as regional odontodysplasia (RO) affects the mesodermal and ectodermal dental components of a specific localized set of teeth. Hitchin was the first to identify the condition in 1934, and Mc Call and Wald later used the term "arrested tooth development" in 1947 [2, 3]. In 1954, Rushton also came up with the name "shell teeth." [1]. RO primarily presents as a localized developmental and eruption abnormality affecting either the maxillary or mandibular teeth, with involvement of both deciduous and permanent dentition [1, 4]. The prevalence of regional odontodysplasia is extremely low, estimated to be less than 1/1,000,000 [11]. with fewer than 200 reported cases as of April 2022 [4-6]. The condition shows no racial predilection, but it more commonly affects the maxilla than the mandible in a (2:1) ratio, predominantly involving the anterior teeth.[4] Hypocalcification and hypoplasia of the enamel and dentin, resulting in tiny, discolored, and abnormal shaped teeth, are clinical characteristics of RO. Teeth that are involved frequently have surface abnormalities such pits, grooves, and yellowish or brownish discoloration. Due to arrested root formation, eruption may be delayed or entirely absent [2, 7]. Other associated findings include Pulpal pathosis, periodontal issues [4, 7, 8], hyperemic gingival tissue and the presence of fistulas. In cases involving the Permanent dentition, teeth may fail to erupt or only partially emerge, often covered by fibrous gingival tissue [2, 8]. Diagnosis of RO is relatively straightforward due to its distinctive clinical features. It can be confirmed through a combination of clinical examination, imaging techniques and histopathological analysis [4-6]. Here we present a case report of regional odontodysplasia managed conservatively.

Case Description
An 8-year old girl visited the Department of pedodontics and preventive dentistry at Sri guru ram das institute of dental sciences and research Amritsar. Patient reported with the complain of delayed eruption of teeth in upper left region, also complained of gingival enlargement in the same area. No definitive information was obtained on patients prenatal or natal problems

also no family history of teeth or genetic problem was reported. Whereas Patient gave a history of calcium deficiency when she was 3 years old and took the required treatment for the same. On intraoral examination it revealed delayed eruption of permanent molars and primary dentition in upper left region. Soft tissue examination revealed presence of gingival enlargement in upper left region and tongue tie was also seen. Hard tissue examination showed multiple dental caries suggestive of high risk patient. A thorough clinical Extraoral examination revealed normal facial symmetry, healthy skin, hair and nail, no lymphadenopathy was also reported. Intraoral radiographical examination revealed Hypomineralization and decreased radiodensity, "ghost- like'' appearance of teeth with faint radiopaque contour and no distinctive crown or root structures were seen.

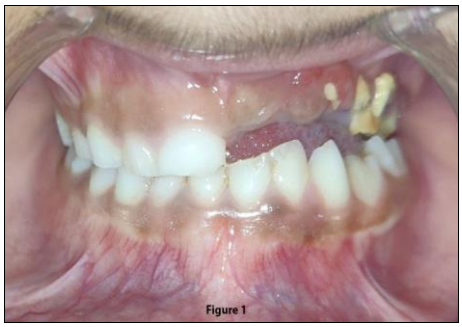
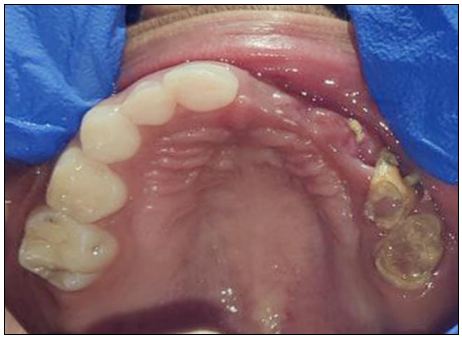
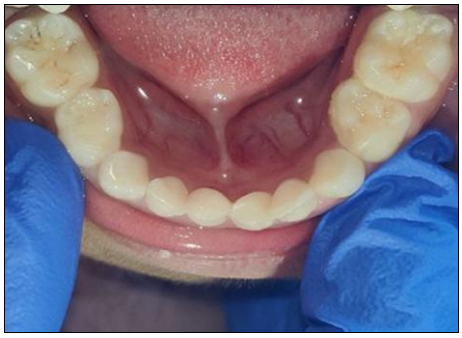
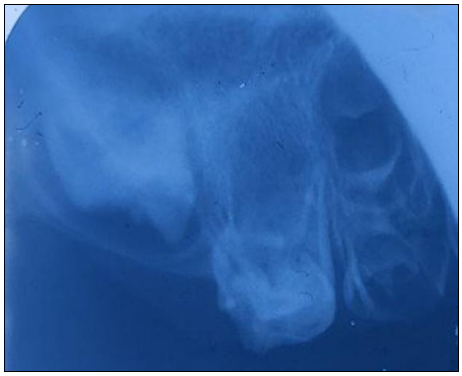


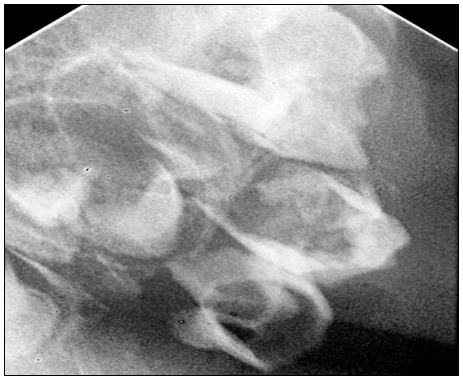
Figure 1

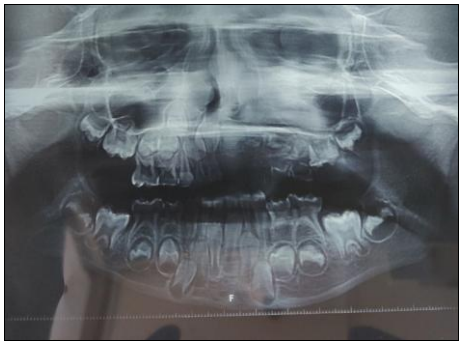




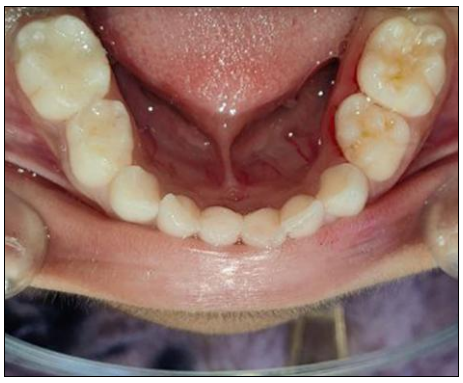


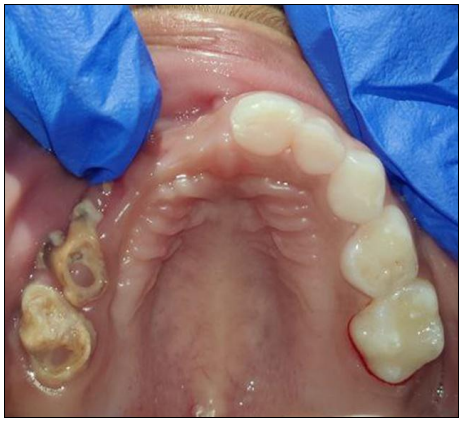
Further follow up radiographs were taken to assess the status of eruption of dentition within the oral cavity which showed delayed development of tooth germ and ghost teeth like images.



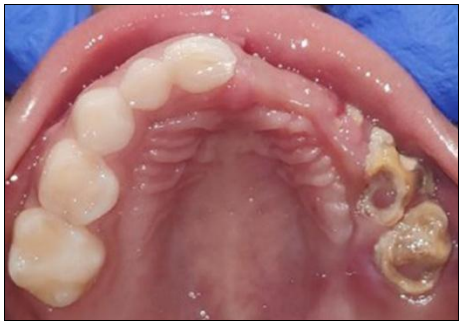


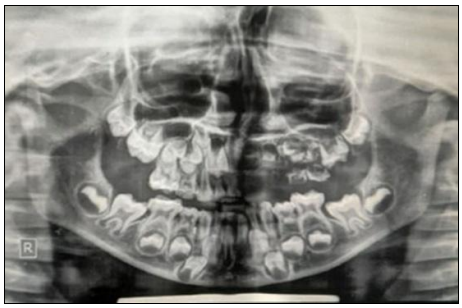
Lab investigations revealed vitamin D and calcium deficiency. The case was discussed and rehabilitation treatment was advised for upper left region. Parent and the child were informed and consent was taken for restorative treatment that was done for multiple carious teeth. Patient was further asked to take the desired supplements and treatment to treat deficiency. Patient was further kept on follow up at regular intervals to plan for further treatment.

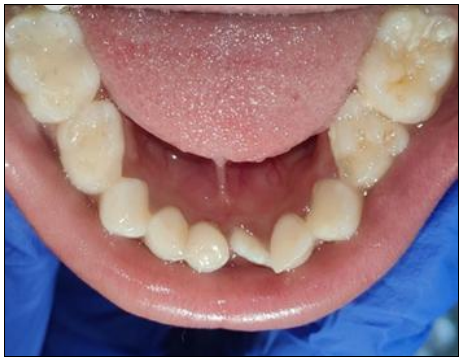


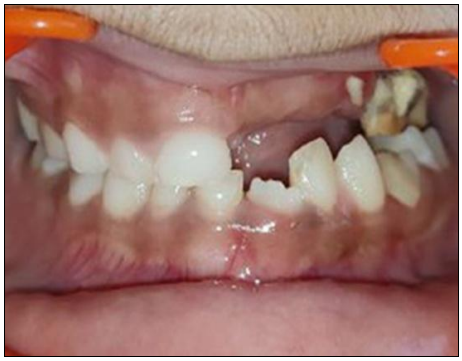


The patient returned to the department after a 2-month interval following the prescribed supplementation regimen. On reassessment, it was noted that the eruption of dentition had progressed more rapidly than expected, which is consistent with the known effects of adequate vitamin D and calcium on bone metabolism and tooth eruption [11, 12].









Discussion

A rare developmental defect that affects the hard tissue of the teeth is called regional odontodysplasia. A total of 138 cases of RO were recorded between 1934 and the end of 2002, per earlier literature surveys. Odontodysplasia was the term that was initially presented in 1963 by Zegarelli *et al*. [4] Later, Pindborg added the word "regional" to highlight the fact that the condition is limited to a certain area of the jaw. The etiology of RO is thought to be complex, with several hypothesized causes, including systemic disease, metabolic and nutritional disorders, ischemia, infection, local trauma, irradiation, and vascular anomalies., medications used during pregnancy, irradiation and systemic disease. [3] Some studies have also suggested a genetic component, implicating the sonic hedgehog in regulating root elongation. [9] Also mutation in paired box (PAX) 9 gene was also seen to be associated in development of RO. Affected individuals' abnormal tooth eruption has also been connected to a number of factors such as growth hormones, cytokines, the dental embryo, the dental capsule, and parathyroid-related protein (PT HrP). In clinical settings, the maxilla is affected twice as frequently as the mandible, with the most frequently affected region is the left maxillary quadrant. Because there are no established treatment protocols and there are continuous discussions about when to extract teeth and the best course of action, managing RO is still difficult [4]. Some researchers advocate for preserving all affected teeth, except those associated with abscess formation, to maintain jaw development until definitive restoration is possible [4, 6]. Due to the early onset and complexity of the condition the long term prognosis of these patients also remains uncertain [4]. So given these challenges, treatment planning requires a coordinated effort involving multiple dental specialists, including pedodontist, orthodontist, prosthodontist and oral surgeons. Cahuana *et al*. (2005) suggested a conservative strategy to maintain proper jaw development by keeping the impacted teeth as long as possible. [26] Similarly Melamed *et al* presented a multidisciplinary conservative treatment strategy for managing RO in mixed dentition stage. So in the present case, we opted for a restorative approach, followed by regular follow-up to monitor disease progression. Routine follow ups are crucial for timely interventions which may include fluoridization, pit and fissure sealants or crown placement. Additionally patient was counseled on removable partial denture and other possible rehabilitation options. Nutritional counselling was also provided to address potential vitamin deficiencies. Advancements in prosthetic rehabilitation now allow for implant supported prostheses as a viable option for restoring edentulous areas with predictable success [4]. An alternate strategy, premolar auto transplantation at the involved site in conjunction with orthodontic therapy has also been documented. [26] Ziegler suggested that the transplanted tooth should have developed at least two- third or three- quarters of its final root length to ensure successful transplantation [4].

Conclusion

Therefore, this case aids clinicians in reviewing the unique clinical and radiographic characteristics of RO, sometimes known as "ghost teeth." The primary basis for this condition's therapeutic considerations is the extent of abnormality, infection status, patient age, and each case's functional and aesthetic requirements.

Conflict of Interest

Not available

Financial Support

Not available

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