Abstract
Regional odontodysplasia (RO) is an unusual, non-hereditary anomaly of the dental hard tissues with characteristic clinical, radiographic and histological findings. Clinically, RO affects the primary and permanent dentition predominantly in the maxilla. Radiographically, there is a lack of contrast between the enamel and dentin, both of which are less radiopaque than unaffected counterparts. Additionally, enamel and dentin layers are thin, giving the teeth a 'ghost-like' appearance. Histologically, areas of hypocalcified enamel are visible and enamel prisms appear irregular in direction. Coronal dentin is fibrous, consisting of clefts and a reduced number of dentinal tubules; radicular dentin is generally more normal in structure and calcification. The RO etiology is uncertain; numerous factors have been suggested and considered as local trauma, irradiation, hypophosphatasia, hypocalcemia, and vascular malformations. A number of causes have been proposed, but the most popular theory revolves around the alteration of vascular supply.

The first report of this condition was published by McCall et al. in 1947, but the term 'odontodysplasia' was introduced by Zegarelli et al. in 1963. Since then, various other terms have been used, such as regional odontodysplasia, ghost teeth, odontogenesis imperfecta, localised arrested tooth development, unilateral dental malformation, amelogenesis imperfecta, non-hereditary segmentalis and familial amelodontal dysplasia. Although many possible causes of regional odontodysplasia have been suggested, no completely satisfactory etiologic explanation has been offered for this disturbance until now. This anomaly tends to affect several adjacent teeth within a particular segment of the jaw, and generally does not cross the midline. Frequently, it is located only on one arch, and the maxilla is involved twice as often as the mandible. The condition is more common in females than in male patients and is more frequent in the anterior region. There is no tendency towards a specific race or ethnic group. When the primary teeth are affected, the permanent dentition is usually affected also. Clinically, affected teeth have an abnormal morphology and a rough surface with defective mineralisation. The teeth appear to be discoloured, hypoplastic and hypocalcified. Tooth eruption is delayed or does not occur. Radiographic aspects show marked reduction of radiodensity and little demarcation between enamel and dentine. These teeth present wide pulp chambers and open apices. Histologically, there is a considerable reduction of dentine and the tubules are reduced in number. Areas of clefts can be found within the dentine. The enamel is hypoplastic and hypomineralised and contains degenerated globular calcifications. The pulp contains calcifications of varying degrees. The dental follicle may contain irregular calcifications.

Case Report
A 10-year-old female patient was referred to the Department of Oral Medicine and Radiology with the chief complaint of pus discharge from the lower front region of the jaw since 15 days. History of present illness revealed absence of eruption of permanent teeth in the lower front region of the jaw and localised discolouration of teeth. The adjacent alveolar crest was enlarged and covered by fibrous tissue. No relevant medical history was reported. The teeth on the opposite side of the arch showed normal morphological features. There was no family history of discoloration of teeth.

Clinically, on intraoral examination there was unerupted teeth w.r.t. 32, 42 and 43. Partially erupted w.r.t. 41. There was discoloration of teeth with rough surface w.r.t. 54, 55 and 16. Root stumps were present w.r.t. 85. There was an intraoral draining sinus w.r.t. 41. Patient was advised for intraoral periapical radiograph w.r.t. 32, 42 and 43 and for panoramic view.

The panoramic and periapical view showed marked reduction in the radiodensity and lack of contrast between enamel and dentin. The altered teeth demonstrated extremely thin enamel and dentin surrounding an enlarged radiolucent pulp, resulting in a pale whispy image of a tooth resembling a ghost-like appearance. Dental germs were absent w.r.t. 32, 41, 42 and 43.

Considering the history, clinical and radiographic examination a provisional diagnosis of regional odontodysplasia w.r.t. 32, 41, 42 and 43 was given.

Discussion
Regional odontodysplasia is an uncommon finding that occurs in both dentitions and has a slight female predominance (1.4:1). A review of the age at the time of diagnosis reveals a bimodal peak that correlates with the normal time of eruption of the deciduous (2 to 4 years) and permanent (7 to 11 years) dentitions. Typically, the process affects a focal area of the dentition, with involvement of several contiguous teeth. There is a maxillary predominance (2.5:1) and the predilection for the anterior teeth. Occasionally, an
unaffected tooth may be intermixed within a row of altered teeth. Ipsilateral involvement of both arches and bilateral changes in the same jaw have been reported. Involvement of more than two quadrants is rare. Involvement of the deciduous dentition is typically followed by similarly affected permanent teeth. In the area of altered teeth, the surrounding bone often exhibits a lower density. The most common presenting signs and symptoms include delayed or failure of eruption, early exfoliation, abscess formation, malformed teeth and noninflammatory gingival enlargement.

Eruption of the affected teeth is delayed or does not occur. In this case there was uneruption of teeth in right side of mandible. w.r.t 32,41 and 42, which is in favour of the literature. Erupted teeth demonstrates small irregular crowns that were yellow to brown in colour, often with a rough surface. In the present case there were partially erupted teeth with rough surface and yellowish discoloration, with no such complain previously in the family, which confirmed that it was nonhereditary. It is interesting that, although the maxillary arch is normally more affected than the mandibular arch the alterations in the present case were only in the mandibular arch. The patient gender is also in favour as according to the literature this condition seems to be more prevalent in females. Caries and periapical inflammatory lesions are fairly common, there was intraoral draining sinus w.r.t 41.

Radiographically, the altered teeth demonstrates extremely thin enamel and dentin surrounding an enlarged radiolucuent pulp, resulting in a pale whispy image of a tooth, hence the term ghost teeth. In this case radiograph showed a lack of contrast between the dentin and enamel with an indistinct or “fuzzy” appearance of the coronal silhouette, characteristic of ghost-like appearance. Short root and open apices were seen wrt 32. There was a very thin layer of enamel and dentine. The patient in the above report exhibited several aspects of the common clinical and radiographic features related to regional odontodysplasia.

The ground section of the teeth revealed decrease in the thickness of enamel. The prism structure of the enamel was irregular or lacking with a laminated appearance. The dentin contained cleft scattered through a mixture of interglobular dentin and amorphous material. The follicular tissue surrounding the crown was enlarged and typically exhibited focal collections of basophilic enamel like calcifications called enameloid conglomerates. Scattered islands of odontogenic epithelium and other patterns of intramural calcification also were seen.

The treatment of ROD remains somewhat controversial. These cases require a continuous and multidisciplinary approach. In a child with ROD, conservative treatment should be applied to preserve the affected teeth for as long as possible to provide normal jaw development. Several reports state that if abscessed teeth are present, they should be extracted and edentulous areas should be restored with acrylic removable appliances to:

1. Maintain aesthetic and masticatory functions;
2. Avoid overeruption of opposing teeth;
3. Achieve space preservation and normal vertical dimension
4. lessen the psychological effects of premature tooth loss.

As the bone itself is not affected by ROD, autotransplantation offers a good alternative if suitable donor teeth are available.

Autotransplantation is an accepted therapeutic option in dentistry and has been successfully used to treat ROD. Despite the increasing use of osseointegrated implants in patients with missing teeth, their use is contraindicated in growing patients. Implants are preferably placed after pubertal growth. But autotransplantation is more preferred in posterior region. In the particular case all the effected teeth were extracted and removable partial denture was given.

**Conclusion**

Since regional odontodysplasia is a rather unknown entity, many cases are probably misdiagnosed as malformed teeth or odontomas. Although numerous theories have been proposed, the pathogenesis of this condition remains uncertain. Other conditions such as dentinal dysplasia, shell teeth, hypophosphatemia, dentinogenesis imperfecta or amelogenesis imperfecta can mimic some features of regional odontodysplasia. However, these disorders tend to affect the entire dentition.

The treatment plan for RO should be based on the degree of RO, characteristics of unaffected areas, and the aesthetic and functional needs of each case. Individual management is required until the patient reaches the age for prosthetic rehabilitation.

**References**