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Case Report

Navigating dental challenges in a paediatric patient with Toxic Epidermal Necrolysis (Lyell's syndrome): Clinical case insights and literature review

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ABSTRACT:
Toxic Epidermal Necrolysis (TEN), also known as Lyell's syndrome, is a severe mucocutaneous condition that is rarely encountered in dental practice. It is typically triggered by drug reactions or, less commonly, by infections. The condition manifests as a rapidly spreading skin rash that evolves into widespread dusky erythema, intense necrosis, and large areas of epidermal detachment. This case report discusses a 12-year-old girl who developed TEN at the age of 7 years. An unusual complication was observed, with incomplete root development (stunted roots) in nearly all teeth, as revealed by an orthopantomogram, where root formation was incomplete following the disease's resolution. This report highlights the importance for dental practitioners to recognize the potential diagnostic and management challenges associated with this condition and underscores the need for caution and appropriate modifications in treatment planning.
Keywords: adverse drug reaction, Lyell's syndrome, paediatric, stunted root anomaly, toxic epidermal necrolysis.

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INTRODUCTION

Toxic epidermal necrolysis (TEN) is a severe mucocutaneous adverse drug reaction with low incidence but high mortality. First described by Lyell in 1956, it is also known as Lyell's syndrome[1]. TEN is most commonly triggered by certain medications, including antibiotics such as sulfonamides,beta-lactams, tetracyclines, and quinolones; anticonvulsants like phenytoin, phenobarbital, and carbamazepine; antiretroviral drugs; nonsteroidal anti-inflammatory drugs (NSAIDs); and allopurinol [2]. The condition is widely recognized as a manifestation of a dysregulated immune response against epithelial cells. TEN is characterized by epidermal detachment affecting more than 30% of the body surface area [3]. Clinically, it presents as an acute macular erythematous rash with bullae that rapidly exhibit Nikolsky's sign. This leads to the separation of large sheets of epidermis from the dermis, followed by localized and potentially extensive shedding of the skin [4]. In this case report long term manifestation of the disease has been presented with abnormal root form and morphology with stunted root development. The report also highlights the importance for dental practitioners to recognize the potential diagnostic and management challenges associated with this condition and underscores the need for caution and appropriate modifications in treatment planning.There are a few studies in the literature that report dental anomalies associated with Stevens-Johnson syndrome, but cases involving Lyell's syndrome are extremely rare.

CASE REPORT

A 12-year-old female patient visited the outpatient department of pedodontics and preventive dentistry with a primary complaint of decayed teeth. During a comprehensive evaluation, which included medical, dental, drug, and family histories, along with extraoral and intraoral examinations, it was noted that the patient had previously been treated for a skin condition. Upon further investigation and review of her past medical records, it was revealed that she had

suffered from a severe mucocutaneous disorder known as Toxic Epidermal Necrolysis (TEN). According to her medical history, the condition first appeared when she was 7 years old, following episodes of sudden fever for which she had received medication from a private practitioner in her village. After taking medications her fever worsened, she developed painful rashes all over her body, oral ulcers, and blisters around her eyes. The patient was immediately admitted to the dermatology ward. It was suggested that after taking a course of medication (paracetamol and amoxicillin), prescribed by a local practitioner the drug eruption has occurred. To confirm the diagnosis, a tissue biopsy was conducted, which revealed Toxic Epidermal Necrolysis (TEN). Over 30% of her body surface area was affected by vesicular lesions, along with ocular involvement. The treatment included intravenous immunoglobulin G, along with sufficient fluids for hydration, as well as comprehensive ophthalmic and skin care to manage the condition. Additionally, the child underwent a corneal transplant to restore her vision.

During the extraoral examination, healed scars were observed on the facial and neck regions (Fig.1). The face was symmetrical, mouth opening was adequate, and no abnormalities were detected in the temporomandibular joint region.

During the intraoral examination, it was observed that the patient had all her teeth erupted up to the second permanent molars in both arches. Six of her teeth, specifically 17, 27, 37, and 47, were carious, with the caries in teeth 37 and 47 being more extensive (Fig. 2a,2c). Intraoral periapical (IOPA) radiographs were recommended for these teeth, and the images revealed stunted roots with abnormal morphology (Fig.4a).To further investigate, serum calcium levels were checked to rule out other possibilities and an orthopantomogram (OPG) (Fig. 3),was advised, which showed incomplete root development in almost all of her teeth. The most severely affected were the canines, premolars, and second molars, which exhibited nearly negligible root formation, while the first permanent molars in both arches were relatively spared.Despite the incomplete root development, all teeth responded positively to thermal and electric pulp tests. As there was no history of irreversible or reversible pulpitis, the teeth were permanently restored using glass ionomer cement (GIC) and composite (Fig. 2b,2d). In one of the mandibular second molars, the patient reported pain while chewing, and radiographic examination showed that the caries was approaching the pulp, although no periapical pathology was observed. A mineral trioxide aggregate (MTA) pulpotomy was performed on this tooth (Fig. 4a), followed by regular follow-ups. Due to the unusual morphology of the clinical crown, a stainless-steel crown could not be placed, so a composite restoration was used to prevent microleakage.

The prescription of paracetamol and amoxicillin was avoided, as these drugs were suspected to have triggered the adverse reaction. Based on the patient's history, there was no known allergy to NSAIDs, so the patient was permitted to take this medication and advised to report any adverse reactions immediately.

(Written informed consent for this case study was provided by both the patient’s parent and the patient herself).

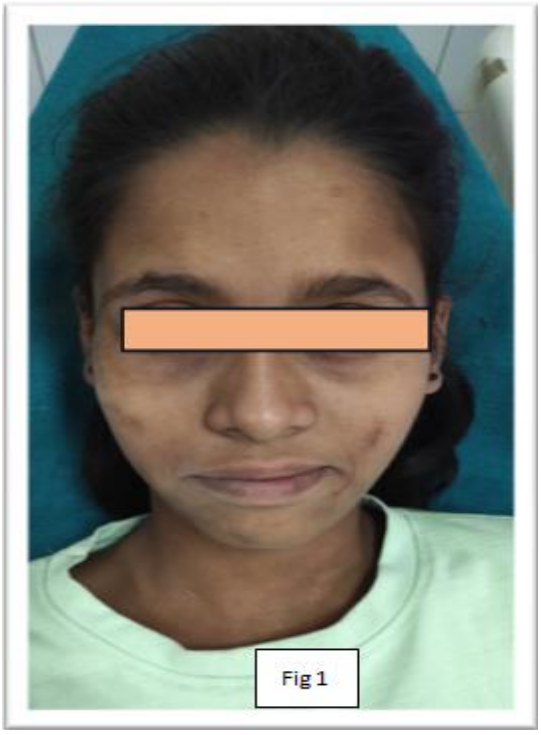

Fig.1-Extraoral clinical photograph of the patient

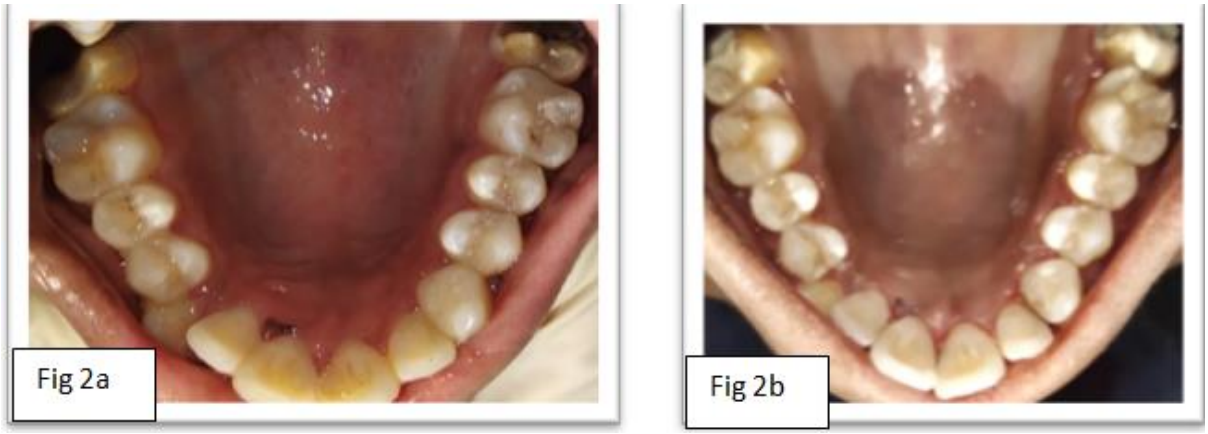

Fig. 2(a) and (b)-Clinical picture of maxillary arch pre and post operative respectively

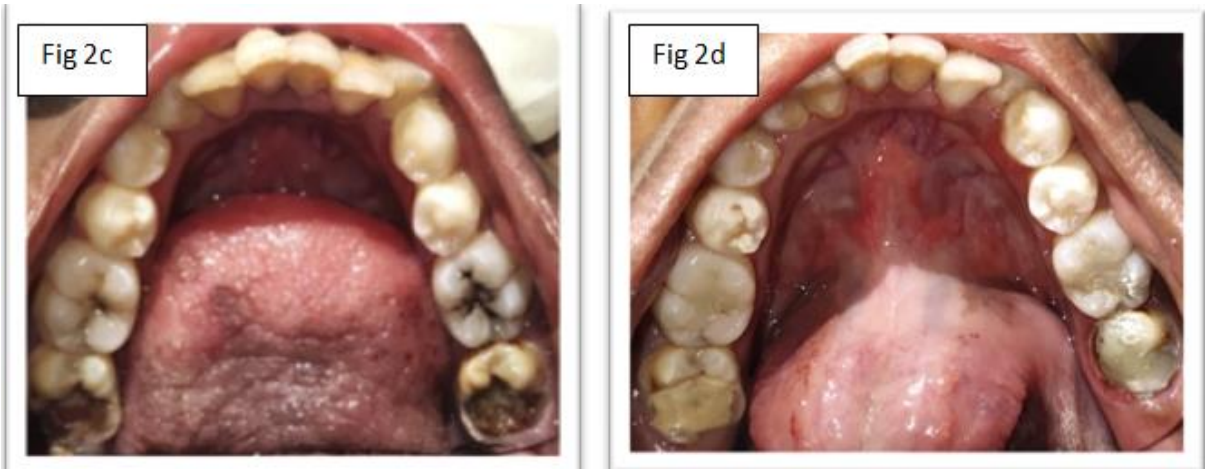

Fig. 2(c) and (d)-Clinical picture of mandibular arch pre and post operativerespectively

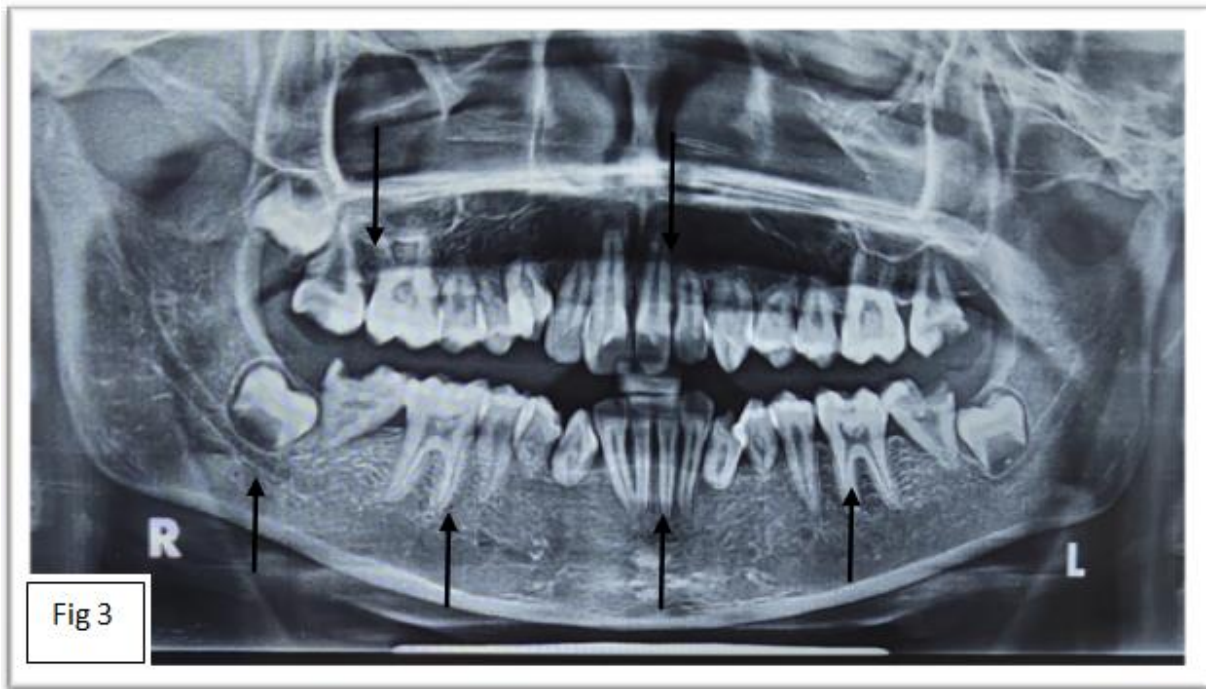

Fig. 3-Orthopantogram showing stunted root development in all teeth sparing incisors and first permanent molars

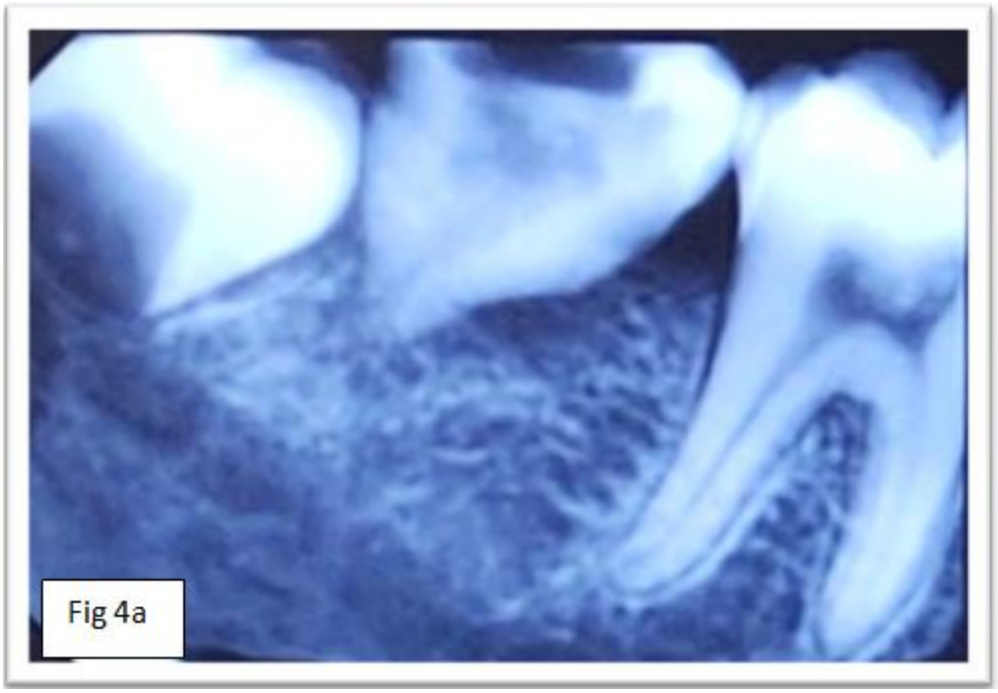

Fig. 4(a)-Carious mandibular permanent second molar(37) showing abnormal root morphology with fused root canals (funnel shaped pulp canal system)

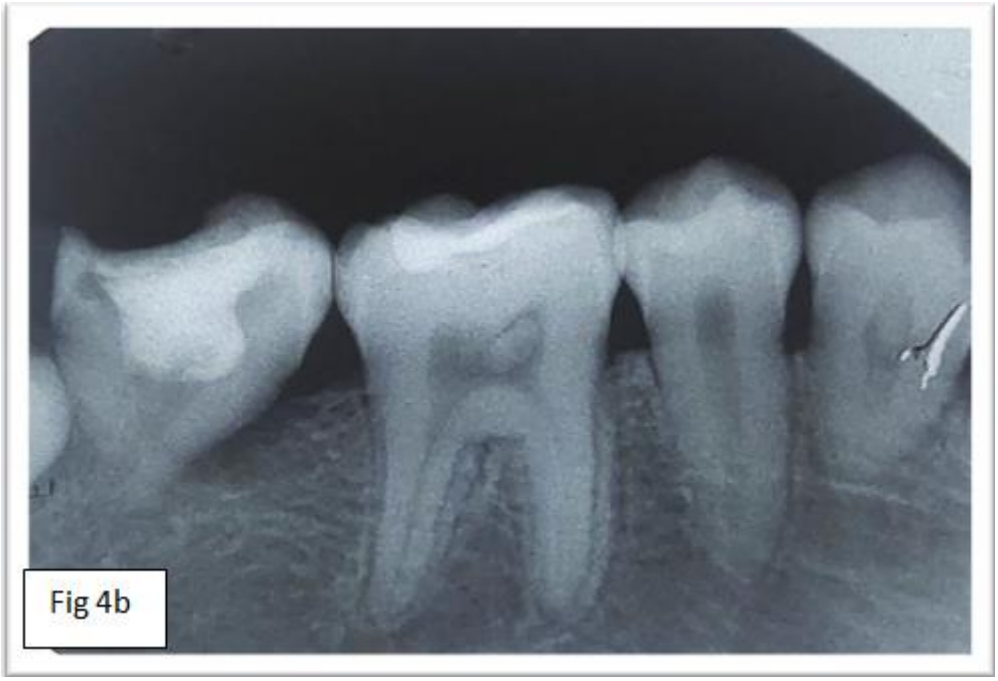

Fig.4(b)-MTA pulpotomy was done w.r.t37, composite restoration given

DISCUSSION

Toxic epidermal necrolysis (TEN) is a severeepisodic mucocutaneous reaction, classically descripted by Lyellin the year 1956. It islargelyfollowed by ingestion ofdrugs and/or occasionally to infections, wherein theskin rash rapidly coalesces to transform into awidespread dusky erythematous lesions, intense necrosis andepithelial detachment in sheets[1].Spies et al in 2001 done a study in 15 children with TEN and found antibiotics (sulphonamide, penicillin, cephalosporin,tetracycline) and anticonvulsants (phenobarbital, phenytoin) as the main etiological cause that is 100% drug involvement[5]. Ferradiz et al in2011 observed 16 patients with SJS/TEN and found that the main aetiology behind the disease was due to drug involvement (93%) and a smaller percentage due to M pneumoniae infection(7%)[6].Drugs, such as penicillin, cephalosporins, valproic acid, NSAID, anticonvulsants and paracetamol may pose a potential risk in the group of children[7].

TEN shows close resemblance to Steven-Johnson Syndrome (SJS),the two conditions beingdiffering

only in the severity of epidermolysis and extent of body surface area(BSA) involvement[4,8]. SJS is classified as involving less than 10% of the body surface area while TEN presents as more threatening disease with more than 30% [9].The incidencein children is lower than in adults and has a betteroutcome.TEN has been observed worldwide with anannual incidence of 1–2 cases per million,and occurs in all age groups including children,infants and even newborns, which comprises10–20% of all reported cases[10].In affected sites, the epidermis undergoes necrosis, becoming loose and easily detachable, particularly at sites of pressure or friction (Nikolskysign)[6].Prodromal period usually varies between 1-7 days characterized by nonspecific symptoms, such as malaise, fever, ocularpruritus and dysphagia. As per this case report, patient experienced fever lasting 4-5 days before developing rash.

Oral mucosal involvement is common, with widespread and painful ulcerations. The buccal and palatal mucosa, along with the lips, are the most frequently affected areas, the entire oral cavity, pharynx, and even the oesophagus or trachea can also be involved. Clinically, the lesions present as severely painful ulcerated mucosa covered with necrotic debris and haemorrhagic crusts[11,12].In this case report also, rashes started appearing all over the body, after a week suffering from a high-grade fever. Painful oral ulcerations were reported with active bleeding from the sites. Apart from these, ocular lesions were also seen in the patient, due to which the patient was not able to open the eyes properly.

Drug-inducedlinear IgA, Staphylococcal scalded skinsyndrome (SSSS), Erythema multiforme (EM), drug rash with eosinophilia andsystemic symptoms (DRESS) falls into the category of differential diagnosis for the disease[13,14].The major pathological finding in thisdisease is a widespread apoptosis of keratinocytes.

The most critical aspect of managing TEN is the immediate discontinuation of all drugs that may have triggered the reaction[15]. Since the reaction is immune-mediated, pharmacological management should focus on reducing the severity of the reaction and limiting the involvement of the skin and internal organs. Recently, intravenous immunoglobulins, cyclosporine, plasmapheresis have been proposed as an alternative to the now less favoured corticosteroids[16]. Mangla et alin 2005 conducted anopenuncontrolled study in TEN patients on treatment with IVIG 0.05–0.1 g/kg/dayfor 5 consecutivedays, 0% mortality rate was seen with no systemiccomplications[17].Energy requirements of paediatricpatients with TEN are used to be high, and local wound treatment is important to avoid complicationsderived from the loss of barrier function, and includes gentledebridement of broken blisters, removal of necrotic epithelium,topical treatment with antimicrobials, and wound coverage. Equally important is supportive care, including fluid and electrolyte replacement, adequate nutrition, and proper care of the affected mucocutaneous areas[18].

Generalized shortening of tooth roots is a rare finding in clinical practice, but still there are some differential diagnoses for this clinical finding, as it has been reported in some metabolic disorders linked to altered calcium metabolism, such as hypoparathyroidism. It has also been observed in haematological conditions like thalassemia, which can indirectly cause calcium deficiency due to endocrine insufficiency, and in neurological disorders like epilepsy, particularly in patients on long-term phenytoin therapy, which can disturb calcium metabolism[19,20].Short root anomaly, primarily affects the maxillary central incisors and is often linked to genetic hypodontia. Two other hereditary autosomal dominant conditions commonly associated with shortened roots are dentinogenesis imperfecta and radicular dental dysplasia[21,22].In this case report, roots of permanent central incisors and first molars were found normal, affecting the root formation of other teeth indicated that disease has manifested after 6-7 years of age. Serum calcium levels were checked before and were found to be in the normal range ruling out the conditions associated with disrupted calcium metabolism.

Localized root shortening has also been attributed to factors such as trauma, local periapical inflammation, periodontal diseases, and as a side effect of orthodontic treatment.

The most plausible explanation for this arrested root development is that the Hertwig's epithelial root sheath, which is crucial for root formation in developing teeth, may have been damaged during the immune reaction. This aligns with the findings of Gautlier et al., who conducted oral and dental examinations of 16 patients with SJS/TEN and reported similar root abnormalities in three of them. They suggested that the acute apoptotic destruction of Hertwig's epithelial root sheath cells during such a reaction could lead to these root abnormalities[23]. And De Man first described a case of SJS in which nearlyall the teeth of the permanent dentitionhad short rootsand some were absent[24]. In this case report shortening of the roots are associated with toxic epidermal necrolysis (TEN), an exaggerated form of SJS.

CONCLUSION

Therefore, gaining a thorough understanding of both the clinical presentation and developmental dental issues is crucial for addressing the challenges faced by patients with these syndromes. Making slight adjustments to the dental management approach, including therapeutic techniques and behaviour management strategies for these medically compromised children, could significantly improve treatment outcomes.

CONFLICT OF INTEREST

None.

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