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Battered Battery and Shattered Tooth: A Case Report

Anisha A*

Veer Surendra Sai Institute of Medical Sciences and Research, Odisha, India

Abstract

With the increasing usage of mobile phones worldwide, accidental injuries and lethal damages due to mobile phone or their battery explosions have been reported frequently. Although, mobile phone charger explosion related to dental trauma is extremely rare, they may cause severe damage to tooth and other complications such as burn injuries to face and loss of tissue mass leading to tissue defects. Tooth reconstruction can be done by fragment reattachment and this procedure is known as "Biological Restoration." The clinician can restore fractured teeth in single appointment with the advancements in restorative materials, placement techniques and preparation design. This case report describes a case of trauma due to a mobile phone charger explosion that resulted in coronal fragment fracture of maxillary anterior teeth which we treated using fibre posts, composite and lasers for fragment reattachment.

Keywords: Trauma • Biological restoration • Injury

Introduction

The use of electronic devices is increasing tremendously due to our maximized dependence on technology in our day to day lives. There has been a transformation in the way we live and communicate due to the increase in usage of mobile phones in recent years. As the electronic devices take a significant part of our life, the risks related to chemicals in batteries and cables carrying high tension current are an issue and present possible danger to ordinary life. The risk increases with low quality products and user negligence. However, the advantages of mobile phones outweigh the disadvantages.

The use of mobile phone causes unfavourable health effects including changes in brain activity, reaction times, and sleep patterns. Research continues to confirm these findings. When mobile phones are used very close to some medical devices (including pacemakers, implantable defibrillators, and certain hearing aids) there is the possibility of causing interference with their operation [1]. In the literature there is limited information about injuries caused by battery explosions. These type of injuries ranges from minor burns to explosions causing death. Mobile phone explosion causing facial burn injuries, corneal and orofacial soft tissue injuries, facial bone fractures, neck, upper trunk and upper extremity injuries, facial nerve palsies has been reported in the literature [2,3].

In this case report we present a case of a mobile charger explosion resulting in coronal fragment fracture of maxillary anterior teeth along with minor injuries to face; treated for fragment reattachment by biological restoration.

Case Report

A 25-year-old female reported to the Emergency Trauma Care Unit of VSS Institute of Medical Sciences and research, Burla at night with the complaint of fractured teeth in upper front region of the jaw. The patient stated that she plugged in her mobile charger and pressed the "answer" key to receive an incoming call leading to explosion of the charger.

Extraoral examination revealed superficial abrasions on orofacial region. Intraoral examination revealed an Ellis class-III fracture of 21 and 22 in an oblique direction from labial to palatal side with subgingival fracture line. However, the fractured segment was still attached with grade II mobility.

Local anaesthesia was administered and the mobile fractured segment was separated and removed in the emergency trauma care unit. The fractured coronal fragment was stored in saline to prevent dehydration. Immediate root canal therapy was carried out on 21 and 22 the next morning at OPD, Dept of Dentistry, VSS Institute of Medical Sciences and research . Because the fracture line was apical to the bony crest, crown lengthening using aser [PICASSO AMD Soft Tissue Diode Lasers, 980 nm]was carried out to expose the edges of the root surface on the palatal side. Post space was made on the two teeth with corresponding drills to receive light transmitting post. The prefabricated fibre post [COLTENE] was checked in the canal for adaptation. After isolation, root canal walls were etched with 35% phosphoric acid for 20 seconds, rinsed and dried with paper points. The pulp chamber and the fitting surface were similarly etched and primed in the fragments. The fractured tooth fragment was then verified for a fit with the tooth to ensure proper adaptation. Flowable composite was then applied to the pulp chamber area and the fragments were aligned to have a proper fit. The excess cement was removed and polymerization was done from all the sides of tooth.

The patient was instructed to avoid exerting heavy function on anterior teeth. Immediate postoperative clinical assessment presented adequate aesthetic results with restored functionality. Follow up appointment of 15 days, 1 month, 3 months and 6 months clinical and radiographic examination showed stable reattachments, good periodontal health and clinically acceptable results

Discussion

There are some anecdotal studies for mobile phone battery explosion [4]. The mobile battery explosion causes damage by 3 components: heat, acid and battery pieces [5]. Although 1.5 volt-batteries seem safe due to their small sizes, they can cause severe damages when explode [6]. Lithium-ion batteries are incredibly efficient but have issues with heat. These batteries may overheat during charging leading to "thermal runaway," an unregulated increase in internal battery temperature [7]. Thus the mechanism of injury from battery blast could be a combination of mechanical (battery pieces), thermal, and chemical injuries [8].

Akinbade AO et al., [9] reported orofacial soft tissue injury and mandible-maxilla fractures due to dry cell battery explosion. Neera Ohri et al., [10] reported a lethal case about battery explosion which resulted in burn injuries to the face, upper arms, trunk, and thighs of a 10-year-old primary schoolgirl. Inhalation injuries were also present and she was deceased approximately 5 days after admission. Mobile phone charger explosion causing fracture of teeth

***Address for Correspondence:** Anisha A, Veer Surendra Sai Institute of Medical Sciences and Research, Odisha, India, Tel: + 8763857895; E-mail: anisha.avijeeta@rediffmail.com*

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is a type of injury that is rarely seen in the literature. However, the similarity noted among the other cases of cell phone explosion is that the explosion occurred when the devices were plugged in for charging and were connected to an electric charger.

There are rarely any cases of tooth fracture by explosion of mobile phone battery in the literature. In our case, the patient suffered only superficial abrasions in the orofacial region; an Ellis class-III fracture of 21 and 22 affecting the enamel, dentin and the pulp. Such complex crown root fracture management requires multidisciplinary approach to achieve optimum results.

Reattachment of natural fragment is the most conservative approach in management of fractured tooth. It was reported that the prognosis for reattached crown fragment was better than composite resin restoration [11]. The success of fractured reattachment completely depends on the extension of the fracture line and the time of restoration. In this case, the endodontic therapy and the post space preparation with fibre post was completed in a single visit. Fibre post rendered advantage of similar modulus of elasticity as that of dentin, less chance of fracture and more esthetic. The use of fibre post with composite core forms monobloc effect that further reinforces the tooth [12]. Gingivectomy was done to expose the fracture line with soft tissue diode lasers to render a bloodless operatory field. No splinting was done in this case since tooth mobility was not elicited. The clinical results appeared to be positive and showed that this technique is easy to perform and standardized, inexpensive, and that it allows both functional and aesthetic recovery.

Conclusion

Although rare, the possibility of explosion of a mobile phone does exist. A common feature observed in similar cases is that the mobile phones were plugged in for charging when the explosion occurred. This case signifies the need to increase public awareness about the potential risks associated with mobile phone use, to adopt safe practices as per recommendations from the manufacturers and to avoid counterfeit products, to avoid such accidents. It is advisable that mobile phones should be used only when the device is unplugged from the charger. Any work with mobile phones or other batteries by children should be managed under the supervision of their parents.

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