International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

From Road Traffic Accidents to the Road to Aesthetics - A Clinical Case Report

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Abstract: ***Aesthetics in dentistry plays a huge role in not just restoring the patients smile but also, the beauty, health and majorly the function as well. Traumatic injuries are described as injuries resulting from external or internal forces that can affect the quality of life of the patients. Different types of facial structures are injured due to traumatic forces. Various types of management techniques have been advocated for comprehensive treatment of traumatic injuries. In this case report we discuss about the management of traumatic injury to anterior teeth in a road traffic accident patient following which periodontics, endodontic and prosthodontic rehabilitation (interdisciplinary management) was done to restore patients' aesthetics using "splints, LASER, and CAD-CAM".***

Keywords: Aesthetics, splints, LASER, CAD-CAM, splinted crowns

1. Introduction

Aesthetics in dentistry plays a huge role in not just restoring the patient's smile but also the beauty, health and function. Road traffic accidents affect the patient's quality of life by hindering the not just the patient's smile but also the function.

2. Case Report

A 29-year-old male patient was referred to the dental clinic from the emergency ward after a road traffic accident for the management of subluxation in relation to right maxillary central incisor and fractured teeth.

Extra oral examination revealed lacerations and post traumatic edema on the lips and chin as seen in *Figure 1a*.
Intra oral examination as shown in *Figure 1b* revealed:

- Subluxation with extrusion, Ellis class II fracture and Grade III mobility in relation to maxillary right central incisor
- Ellis class III fracture in relation to maxillary right lateral incisor
- Ellis class II fracture in relation to maxillary left central incisor

Radiograph revealed widening of periodontal ligament space along with extrusion from the socket in relation to the maxillary right central incisor as seen in *Figure 1c*.

Figure 1: Patient's initial visit to the dental clinic. 1a) Depicts the extra oral photograph of the patient showing lacerations and post traumatic edema on the chin and lips. 1b) Intra-oral photograph showing initial ligature wiring done in the emergency ward; extrusion and fracture i.r.t. 11 and fracture of 12 and 21. 1c) Intra-oral periapical radiograph showing extrusion of 11 from the alveolar socket.

Initial treatment included using a 0.7mm stainless steel wire as a passive splint placed labially extending from the right maxillary central incisor involving the maxillary left central incisors, lateral incisors and canine to immobilize the mobility in relation to 11[(1)]. The splint did not involve 12 and 13 because of the deficient crown structure in relation to 12 and the severe laceration on the lip would cause discomfort to the patient.

Following splinting access opening and obturation was done in relation to 12 and access opening was done in relation to 11 followed by placement of Ca $(OH)_2$ placement as an intracanal medicament for a period of 1 month[(2)].

Figure 2: 0.7mm stainless steel wire placed over 11 21 22 23, without involving 12 and 13. Following which access opening and obturation was done i.r.t. 12 and access opening and intracanal medicament was placed i.r.t 11 which was then assessed after 1 month

21 had a delayed response to the vitality test while 22 remained vital so we decided to re-assess the teeth after 1 month.

At the 1-month re-visit, it was found that 11 had a grade I mobility, 21 was nonvital and 22 was vital.

A treatment plan was devised which consisted of:

- Access opening and obturation i.r.t. 21
- Post and core i.r.t. 12
- Gingivoplasty
- Tooth preparation
- Gingival retraction
- Intra-oral Scanning and CAD-CAM milling of splinted crowns

Access opening and obturation was done i.r.t. 21 and 11. Because of insufficient crown height i.r.t. 12 for support, post and core was placed using a fiber optic post.

Gingival assessment showed that the tangents along the gingival zeniths of 13 12 11 21 22 and 23, all lay at the same level with the interdental papilla between 11 and 21 being flat. LASER assisted gingivoplasty was done using a 980nm diode LASER at a power setting of 1.4W in a continuous contact mode with a 400µm diameter-initiated tip. The gingivoplasty helped in achieving the contour of the gingiva such that the level of the gingival zeniths of the canine and central incisors were now higher than the laterals and a knife edge interdental papilla was achieved interdentally between 11 and 21[(3)].

Figure 3: Laser assisted gingivoplasty done using a 980nm diode LASER at a power setting of 1.4W in a continuous contact mode with a 400µm diameter-initiated tip from 13 to 33

The crowns were prepared using diamond burs and the margins were placed subgingivally i.r.t. 12 11 and 21. Gingival retraction was done using LASER to visualize the sub-gingivally placed margins of the prepared teeth [4].

Figure 4: Gingival retraction using Laser using a 980nm diode LASER at a power setting of 0.8W in a continuous contact mode with a 400µm diameter-initiated tip

Intra-oral scanning of the upper and lower arch was done and the bite was registered as well, following which the STL files were sent to the milling unit [5].

Figure 5: Intraoral scanning of upper and lower arch and bite registered

CAD-CAM milled splinted zirconia crowns were received, tried and cemented in the patient's oral cavity [6].

Figure 6: Milled splinted zirconia crowns received

Figure 7: Crown Delivery

Figure 8: Pre and Post – Operative Results

3. Discussion

Splinting should be done in cases of trauma to re-align the tooth to its initial position, favour initial healing, to prevent patient discomfort and to provide a controlled function to the traumatized teeth. IADT recommends the use of flexible splints over rigid splints [7]. According to a study done by Mirza et al in 2019, they concluded that up to 0.7mm stainless steel wires could be used for splinting in case of dental trauma as it is more rigid and better tolerated mechanical stresses caused due to biting forces.

International Association of Dental Traumatology have stated that intracanal medicaments like calcium hydroxide or antibiotics can be used following traumatic dental injuries to prevent external and internal root resorption and decrease the microbial load in the root canal [2].

LASER gingivoplasty when compared to the conventional scalpel gingivoplasty had increased benefits such as causing less surgical trauma, decreased postoperative pain, decreased post-operative edema, minimized bleeding at the surgical site, no coronal migration of the gingiva and better patient acceptance [8].

Recently LASER has been as a gingival retraction technique as it causes lesser bleeding, faster healing, no scarring, and has better patient compliance as there is minimal trauma to the patient although there is a learning curve for the operator and it is technique sensitive.

As 11 in this case still persisted with grade I mobility after the splint removal intra oral scanning was used as the use of conventional impression techniques would cause injury to the said tooth. CAD-CAM was used to mill splinted crowns for more stable, accurate and rapid prosthesis delivery with lesser patient visits to the dental clinic [9].

4. Conclusion

Road traffic accident patients require a multidisciplinary approach for a holistic treatment to manage the complications that arise as a result of trauma thereby affecting their quality of life. In this case report the patient initially reported to the dental clinic with fractured teeth and lacerated lips and the patient left the clinic with aesthetic teeth and a happy smile by incorporating an interdisciplinary approach involving the fields of periodontics, endodontics and prosthodontics to treat the patient.

Acknowledgements
I would like to extend my heartfelt thanks and gratitude to the Heads and Professors of the Department of Endodontics (Dr. Prabhath Singh and Dr. Sapna) and the Department of Prosthodontics (Dr. Manju V. and Dr. Tony) whose support helped in the timely completion of this case.

I would like to extend my gratitude to my fellow postgraduates Dr. Ranjithkumar S., Dr. Elizabeth M., Dr. Raghu P., Dr. Vijaynaveen for all the support they provided.

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