

BUCCO-MAXILLO-FACIAL INJURIES CAUSED BY FIRE ARMS – A CASE REPORT

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ABSTRACT

The face is usually the most frequently stricken area in physical aggression cases. Due to the increasing urban violence, maxillofacial injuries caused by fire arms have become routine in emergency hospitals. The present report relates a particular case of physical aggression concerning a front-maxillary injury caused by a fire arm projectile.

Keywords: maxillofacial injury, multidisciplinary treatment, fire arm projectile.

RESUMO

Das agressões físicas, a face geralmente é a área mais atingida e devido ao aumento de violência urbana, as lesões maxilo-faciais causadas por arma de fogo têm se tornado rotina nos hospitais de emergência. Relata-se aqui o caso de uma vítima de agressão física por projétil de arma de fogo em região anterior da mandíbula.

Palavras-chave: lesão maxilo-facial, tratamento multidisciplinar, projétil de arma de fogo.

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INTRODUCTION

Fire arm wounds are the cause for extensive lesions on bone and soft tissue present in the face skeleton. Such lesions lead to sequels of aesthetic nature like dento-facial deformities; of functional nature like sensitive, motor and mastication alterations; and both can cause psychological sequels. These lesions and their sequels ask for various surgeries and long time treatment [12].

These lesions and their sequels ask for various surgeries and long time treatment. In Brazil, until recently, car accidents could be considered the main cause for bucco-maxillo-facial trauma, but, presently, on account of the increase in the number of weapons within reach of the population and in urban violence occurrences, a larger number of projectile-caused-lesion cases, has been observed [6]. Along the last decades, researches have shown an increase of 220% in death cases resulting from fire arms attacks or accidents. Considering trauma cases, fire arm wounds are the second factor in *causae mortis*, only behind car accidents [12]. According to Xavier et al. [11] the obligatory use of seat belts in cars, have reduced the number of facial traumas caused by car accidents. A corresponding reduction cannot be observed when the cause of trauma is a fire arm projectile. The kinds of wounds caused by fire arms differ according to the distance from the shot, the speed of the projectile and its shape and composition as well as the caliber of the gun. The destructive power of the projectile is determined by its size and shooting speed. Yet, it is the kinetic energy that is responsible for direct damages to the stricken tissues. On attending a victim of facial wound caused by fire arm projectile, the first concern must be his/her general condition, prior attention given to aural ducts as a bleeding wound and subsequent edema can compromise them significantly. Fire arm wounds on the temporo-mandibular joint can cause sequels as serious as any other resulting from a great impact on the same area. This is due to the great quantity of energy transferred to the articulation by fire arm shots. The injuries resulting from a projectile not only cause lesions on bone and cartilaginous structures but also are responsible for lesions on soft tissues like muscles, nerves and teeth. When such areas are affected there is an edema formation around the injury, being its apex observed 24 hours after the impact, lasting for as long as 7 days. In a study by Wulkan et al. [13] about facial trauma epidemiology of any intensity, 166 patients, regardless of sex, age or color, were selected. It was statistically observed that the most common target was the male sex (78%) between the ages of 20 and 39. Inter-personal violence was the main etiology (48,1%), followed by falls (26,2%), running-overs (6,4%), sports (5,4%) car accidents (4,2%), motorcycle accidents (3,1%), impacts not related to falls (2,4%), work accidents (1,8%). Fire arm wounds (1,2%) and non-specific (1,2%). Contusions were the lesions that occurred most (23,8%), followed

by mandible fractures (21,9%), LeFort/pan facial/ complex (17,8%), nose (11,6%), zygoma (10,3%), dental (9,1%), eye orb (4,9%) and maxilla (0,6%). The majority of associate traumas were caused by running-overs, but car accidents, falls and interpersonal violence were also appointed as causes for them.

Diagnosis and treatment of facial lesions have greatly improved along the last decades. This is a comprehensive multi-disciplinary kind of trauma that involves specialties like dental trauma, plastic surgery, bucco-maxillo-facial surgery and neurosurgery. An injury on the face does not involve only soft tissues and bones, but, for extension, it can reach the brains, facial sinus and teeth. multidisciplinary care is necessary, both at initial attendance and during the period of re-habilitation of the patient.

In the present case, we report the attendance given to a victim of fire arm aggression, who was submitted to multidisciplinary treatment involving the disciplines: Endodontics, Dentistics, Surgery, Implantodontics, Periodontics and Prosthesis, all necessary to esthetic and functional recovery.

CASE REPORT

A twenty-eight-year-old melanodermic male patient was first attended at emergency in a hospital in Rio de Janeiro. The affected area was cleaned and stitches were made to put together the torn soft tissues. Following, X-rays of the area were taken to establish the position and place where the projectile was found (Fig. 1). The patient was prescribed a series of antibiotics and anti-inflammatory medicine to be continued for seven days.

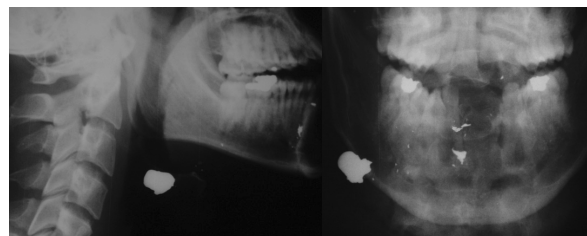


Figure 1 – Patients initial radiographic image showing the bullet inserted in the mandible angle.

Subsequently, the patient was directed to the Trauma Project at Estacio de Sá Dental School, Rio de Janeiro, Brazil. At initial anamneses and examination, the patient reported that he had been victim of a fire-arm hold-up. The clinical and X-ray examination revealed a cross-fracture on element 21 involving enamel-dentine structures and pulp exposure; there was also cross-fracture on element 22 but the pulp was not exposed. The elements 41, 31 and 32 had been severed (Fig. 2).



Figure 2 – First radiography and image of lower teeth and remaining bullet image.

Provisory restorations were made with compound resin class IV on elements 21 and 22. Following, an enlargement of the clinical crown was surgically made on element 21 (Fig. 3).

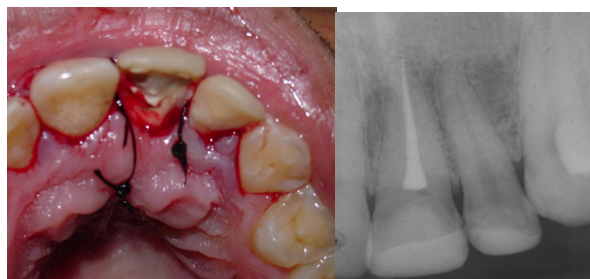


Figure 3 – Periodontal surgery of element 21 clinical crown for the performance of multidisciplinary treatment.

In order, to favor thorough isolation of surgical area during endodontic treatment. Damage to the pulp and necrosis on element 21 was detected at the first visit. Vitality tests applied to elements 11, 12, 22, 43 and 33 revealed positive pulp reactions.

The root-canal of tooth was instrumented according to the Alternative Continuous Movement Technique proposed by Siqueira Jr. [10]. After the hand made chemical-mechanic preparation, the canal was filled with the help of a Lentullo's spiral using sodium hypochlorite at 2,5% for irrigation, a compound of calcium hydroxide glycerin and para-monochlorophenol-canphor medication (HPG paste) which by diffusion process acts on micro organisms distributed along root canal system that may have escaped the anti-microbial action during chemical-mechanic preparation [2]. After this, the canal was filled with Epoxy Cement Sealer 26 (Dentsply, RJ, Brazil), with McSpadden technique.

The projectile was surgically removed from the angle of the mandible. After the patient had recovered from the surgery, about twelve months later, definitive aesthetic restorations were made with resin compound color A3 (Suprafill – SSWhite, Tj Brazil). Mono-component adhesive system was applied with humid technique, photopolymerizing for 60 seconds, and afterwards the insertion of restoring material was made in incremental form, sculpturing the tooth anatomy. Each element was photo-activated by means of a photo-polymerising unit for 40 seconds (Fig. 4).



Figure 4 – Last image after definit restorations.

The next step was regarding the toothless space that remained in the mandible. Two implants were made (Neodent), size 3.5 × 13 and a provisory fixed screwed prosthesis was placed. The patient was instructed not to chew hard on the teeth in the area for a period of two months. The definitive prosthesis mold was made six months after the implants had been placed. The definitive fixed prosthesis was type PF3 (Partial Fixed retained implant prosthesis – Screwed implant supported) (Fig. 5).

The choice of the material obeyed the circumstance of having the patient lost much bone and mucous structure, which made impossible the insertion of a graft.

DISCUSSION

Increase in urban violence has been taking to hospitals a large number of patients wounded by fire arm attacks [6, 12]. This has made the involved professionals in the area to prepare themselves accordingly to provide such victims the best care [8]. Considering the case reported in this study, it is demonstrated how important a multidisciplinary treatment is for patients presenting maxillofacial lesions, mainly caused by fire arms, diminishing aesthetic and functional sequels so as to allow them to resume their normal activities. Interpersonal violence is the aggression etiology more frequent in both sexes totaling 48,8% [13]. The present case confirms the studies of Wulkan et al. [13] about the occurrence of wounds resulting from fire arms, observed in larger number in male patients aged between 20 and 39 years, which has become more common in our society nowadays.

Coronary fractures are the most frequent lesions in permanent teeth. Besides presenting loss of hard tissue, such lesion may represent a danger to the pulp. The most common cause for a coronary fracture is a frontal impact of great energy, enough to tear enamel and dentin. On the face, the mandible is the area most subject to lesions caused by



Figure 5 – Images of partial fixed retained implant prosthesis Screwed implant supported.

fire arm wounds [1, 11]. The mandible bone is compact and dense and therefore presents a particular reaction to trauma. The wounds caused by fire arm differ according to the distance from the shot, the caliber of the gun and the shape and composition of the bullet [1, 9]. Fire arm wounds on the temporo-mandibular joint generate sequels as serious as those caused by any other kind of impact, like boxing strikes, for example, because not only bone structures are stricken but cartilaginous and soft tissues as muscles and nerves are affected as well as the teeth [5].

Thanks to Buonocore's [4] technique for acid conditioning of the enamel, in 1955, and the appearing of resin composites, the development and improvement of adhesive systems, added to modifications in the composition of compost resins the aesthetic restorations that can rely on these materials have become excellent alternatives for the recovery of traumatized teeth [3]. Provisory restorations with photopolymerising resin of class IV kind were immediately made after trauma, for aesthetic and functional care and to enable the patient to undergo a surgery to remove the projectile from the angle of the mandible. This was also necessary because as a result of the impact, the teeth had suffered crown alterations.

Fire arms are those which use rapid expansion of gases obtained by controlled burn of a propeller, generally solid, gun powder in most cases, inside a completely closed chamber except for one cylindrical hole called pipe or tube, to fire solid projectiles, technically called wounding element. The main mechanism of injury caused by low speed projectile (less than 2000 f/s speed, approximately 650/m/s) is tearing and crushing of tissues and possible temporary cavitation added to shock and pressing waves caused by the impact of the bullet. This is explained when the variety of muscle insertions present in the area is observed and the prominent position of the face makes it more vulnerable [7].

In the present clinic case report a simultaneous multidisciplinary treatment was chosen, including implantodontics procedures, in order to almost immediately re-establish mastication function and aesthetic appearance for the patient so that he could resume his social and professional activities. Until recently, for the patients that had suffered

red loss of dental elements there was the option of fixed or removable prosthesis only.

Presently, the media, the patients and the professionals in the dental area have been giving great importance to dental aesthetics and to the keeping the patient's teeth the most conservative way, if possible. This is the reason for the endodontic treatment, followed by re construction with resin composite or even gluing the dental fragment in cases of trauma with pulp exposure. When by any unavoidable chance the teeth must be removed, they should be replaced by bone-integrated implants that work like dental roots preserving the space of dental loss between the adjacent teeth.

CONCLUSION

Recently, due to their increasing complexity, dental trauma cases require the attendance of professionals of various specialties working together for successful treatment. This makes it clear that it is necessary for the dental professionals to be able to make diagnosis and implement specific treatment for any kind of trauma and its consequences.

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