

High impact oral trauma in patients with orthodontic treatment. Report of a case

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Summary

Oral trauma may involve facial and oral soft tissues. When the energy of trauma exceeds the ability of the person to stop the impact, serious injuries will occur in these tissues; called "High impact trauma" (HIT). When the patient is wearing orthodontic brackets and no mouth guard this creates a "sandwich" effect wherein the lip is entrapped between the impact and the orthodontic brackets.

The purpose of this paper is to illustrate, through a clinical HIT case, effective treatment and management.

Index words: Oral trauma – Soft tissue injuries – Orthodontics

Resumen

Los traumatismos bucales pueden producir lesiones en los tejidos duros, órganos dentarios, huesos de los maxilares y tejidos blandos circundantes (internos y externos). Cuando la energía del trauma supera las posibilidades del organismo de poder frenar el impacto, se producen lesiones graves en estos tejidos, los autores denominan a éstos: "Traumatismos de alto impacto". Si a esto se le agrega que el paciente es portador de ortodoncia, no usa el protector bucal adecuado y recibe un golpe de gran intensidad las lesiones son muy severas en los tejidos duros y sobre todo en los blandos, ya que los mismos sufren un efecto "sándwich" quedando afectados por el impacto y a su vez, en este caso por los "brackets" de ortodoncia.

El objetivo de este trabajo es mostrar a través de un caso clínico, los procedimientos operatorios a seguir.

Palabras claves: Traumatismo bucal – Lesiones tejidos blandos – Ortodoncia

Resumo

Trauma oral pode produzir lesões nos tecidos duros, dentes, ossos das mandíbulas e tecidos moles circundantes (internos e externos). Quando a energia do trauma excede as possibilidades do organismo de impedir o impacto, lesões graves ocorrem nesses tecidos, os autores os chamam de "trauma de alto impacto". Se você adicionar a este que o paciente ortodôntico não usou o protetor bucal direita é atingido lesões de alta intensidade são graves no tecido duro e especialmente macio, já que eles sofrem um efeito "Sandwich" sendo afetado pelo impacto e, por sua vez, neste caso por "colchetes" ortodônticos.

O objetivo deste trabalho é mostrar, através de um caso clínico, os procedimentos operativos a seguir.

Palavras-chave: Traumatismos vestibulares – Lesões dos tecidos moles – Ortodontia

Introduction

Oral trauma may involve soft tissues, teeth and bone^{1,2}. Soft tissue injuries may present traumatic lesions, some of them quite complex (i.e., external and internal).

The most common injuries of soft tissues include penetrating wounds, lacerations, contusions, abrasions, bruises, ecchymosis, ulcers and traumatic aphthae¹. Traumatized patients may suffer one or more of these injuries, especially a "High Impact trauma" (HIT). For example, a HIT occurs when the patient is wearing orthodontic brackets and no mouth guard thus creating a "sandwich" effect when struck in the mouth wherein the lip is entrapped between the impact and the orthodontic brackets³. Intraorally, the lips are most commonly affected with internal or external lesions, varying in depth according to the intensity of the trauma.

The lip wounds can be serious depending on the size and depth of dental fragments or other foreign elements. It is helpful to know the location and activity where the trauma occurred because this might suggest what foreign materials might lie within the wound².

In this HIT case, the young patient was wearing orthodontic brackets and she was not wearing her mouth guard when she was hit in the mouth while playing hockey^{4,5}. She was painfully reminded that orthodontic patients are instructed to always use the mouth guard when engaged in any contact sport⁶.

The protocol for thorough and delicate management of these soft tissue injuries is to provide appropriate emergency and follow-up treatment to minimize posttrauma sequelae (e.g., scar or deformities) especially when the injury involves the face⁷.

Immediate Treatment

If the patient presents while bleeding, use chilled sterile physiologic saline to induce vasoconstriction. Wash the face followed by applying frozen gauze over the wound to maintain hemostasis. Once a clean, bloodless field has been established we have prepared the site for repair. In some case when the patient is a child or adolescent it is helpful to engage the patient with a soft, soothing voice. Sometimes humor helps to relieve a child's anxiety.

Mediated Treatment

The administration of antibiotics is essential during a period of 8 days³. Consult with the patient (or parents) to confirm the patient had received a tetanus immunization; if not, arrange for this as soon as possible.

The patient and parents should be instructed in how to maintain good oral hygiene. A Waterpik^{RM} device filled with chlorhexidine-based mouthwash used 2x/day is highly recommended because flossing and toothpicks may be too uncomfortable due to the nature of the wound. A Sonicare^{RM} toothbrush would be most helpful too if it can be used without disturbing the wound. Chlorhexidine-based antiseptic mouthwashes are administered to minimize the bacterial count⁷.

Case report

A 12 years old female, was referred to our clinic 5 hours after she had sustained oral trauma in a hockey game. First she was transferred to a Private Hospital by the Emergency Service of the club. She underwent a CT scan of the head, no significant findings were identified. The maxillofacial surgeon sutured the deep wound in the lower lip (**Figure 1**).



Figure 1. Initial appearance of the patient 5 hours after having sustained the trauma. Note the edema of the lower lip. It was sutured by the maxillo facial surgeon.

Clinical examination

The clinical examination was conducted with careful visual observation, since the lower soft tissues presented very deep wounds (Figures 2, 3 and 4). The surgeon preferred not to suture the

lesion shown in figure 4 at that time. But deep wounds should be sutured as soon as possible to prevent bacterial contamination⁹⁻¹¹. She also presented with a wound called a “crater”, which was closed just with medical cyanoacrylate (Figures 3 and 5).



Figure 2. Appearance of one of the internal wounds.



Figure 3. Observe the diversity of internal injuries.



Figure 4. Examination of the "crater" wound. This wound was closed only with cyanoacrylate.

Technique for closing wounds with cyanoacrylate

To close a “cráter” wound with cyanoacrylate, the following steps must be considered: 1- The

edges of the wound are sharp², so they should be gently palpated into place¹²⁻¹⁵ (Figure 5).



Figure 5. Previous aspect of the wound filled with cyanoacrylate before being sutured. Note how the edges of the wound are approximated.

Wound healing

Figures 6 to 10 show the edges of the “cráter” wound sutured with cyanoacrylate observed one week later.



Figure 6. 24 hours after closing the wound with cyanoacrylate.



Figure 7. 3 days later.



Figure 8. 5 days later, healing is progressing well.



Figure 9. One week later.



Figure 10. Appearance of the lip 7 days later. There are only a few sutures. The maxillo facial surgeon removed them.

The patient had an additional wound in the right cheek causing traumatic aphthae. Ointments

containing chlorhexidine and aloe vera were prescribed^{16,17}. (Figure 11).



Figure 11. Traumatic aphthae in the cheek.

Radiographic examination

Radiographic examination of the lip begins with careful visual observation. When the lip

presents with an edema along with a deep wound, expose an X-ray (with half of the exposure time) image is mandatory to see if any dental fragments or other elements are embedded² (Figure 12).



Figure 12. This lip haven't any fragments included.

Discussion

The purpose of this paper is to show how to manage one type of soft tissue injury when the patient is undergoing orthodontic treatment. Unfortunately the patient was not able to wear the mouth guard that was provided because it was poorly fitted^{4,6}. When these types of injuries present, the clinician must carefully search for possible multiple wounds beyond the most observable wound.

Cyanoacrylates, which have been available for many years, are remarkably effective in closing "cráter" wounds. Additionally, when oral tissues are sutured, cyanoacrylates placed over sutures adds strength to securing the thin sutures^{2,9,12,13,14,15}. The medical cyanoacrylate or tissue adhesive may be used in lieu of a suture with-

out the addition of a conventional suture; this is a decision that is taken according to how the wound presents. It can also be a complement to a conventional suture. One or two drops of this material are placed in the bottom of the wound and then the suture chosen by the clinician is performed². This approach offers many benefits including the intrinsic antibacterial properties. The literature shows that cyanoacrylates destroy gram-positive bacteria, such as *Staphylococcus* and *Pseudomonas*, as well as gram-negative bacteria such as *Escherichia Coli*. For these reasons, the "cráter" wound was sutured after cyanoacrylate had been placed⁹⁻¹¹.

The clinician must know how to assess each of the presenting injuries for an appropriate treatment plan. This mindful approach will ensure uneventful complete healing¹⁷.

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