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Case report

Multidisciplinary care in severe pediatric electrical oral burn

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ABSTRACT

Oral burns in pediatric patient are commonly due to electrical injuries, representing an important reconstructive issue even for functional than esthetic reason. Different classification, surgical management and even oral device were described to allow the best long-term result. In most case a multidisciplinary approach is necessary to achieve a satisfactory outcome. A severe case of pediatric oral burn with germinative teeth damage is presented, describing a multispecialist team approach that guarantee a satisfactory outcome by reconstructive surgery, careful progressive evaluation of dental and soft tissue healing and speech recovery. The use of acellular dermal substitute template within traditional reconstructive surgery had provided a good functional and esthetic result joint to valid preservation of germinative dental element as shown at long-term X-ray evaluation. Intensive rehabilitation speech program has also avoided phonetic impairment in an important speech develop period. It was so evident that the necessity of a multispecialist care in such difficult injury to achieve the best long-term result.

1. Introduction

Electrical burns of the mouth represents a surgical reconstructive challenge even because a frequent involvement of multiple different tissue and anatomical structures than because they particularly affected young children in the average age from 6 months to 3 years [1]. Severe case with hospitalization and surgical treatment are rare and fortunately decreasing in developing countries, representing a limited part of the total injuries due to electrical burn. In Europe electrical injuries account for 3–8% of the total burns [2] and trough them the incidence of oral burns it is quantified by some authors in a range from 2.2 to 3.5% [3,4]. Despite its rare presentation, the management and the necessity of a long-term rehabilitation permits to classify these injuries as a major problem in burn management [3]. Injuries mechanism commonly are due to the children attitude of sucking all objects they are interested in, so they can damage themselves in domestic accident by chewing on not isolated exposed

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electrical wires or grabbing the end of electrical cord or its junction when partially plugged in [5]. The damage presentation depending of multiple factors as the time contact, the electrical voltage and isolation, the sucking attitude of the child. Particularly important is knowing the amount of the voltage that directly correlate with the extension of the damage even for the joule effect than for the induction of tetanic muscle contraction with consequent prolongation of the exposure time [5]. Most frequently are involved the commissure, totally or partially, the superior and inferior lip and, in severe cases, are described injuries extended to gums area, alveolar chin, oral mucosa and tongue [6]. The lesions can be of 2 types: direct contact and voltaic arch. The second are particularly common around the mouth, and depended from saliva, rich in electrolytes, acting as high electric and thermic conductor. It is not uncommon consider temperatures till 3000 °C [7]. A clinical classification of the electrical burn of the mouth was reported by Ortiz-Monasterio and factor, dividing the damage in minor, moderate and severe, suggesting an early surgical approach [8]. Anyway a useful classification, particularly in pediatric case, is still lacking and it is particularly difficult to achieve for the wide presentation's variability and unpredictable daily progression of the damage. So its possible to observe injuries ranging from superficial burn to serious multiple tissue involvement and the literature attention in pediatric case reconstructive option must gone within a is focused both on reconstructive option than in the multidisciplinary approach to obtain the best and stable functional outcome [1,3]. A common reported sequelae is the possible occurrence of microstomia, go with evident alveolar deformity, consequence of scar retractions and were widely described all the possible preventing treatment [1,9]. Besides an important role in preventing functional bad outcome is the attention on swallow and speeching rehabilitation, if they are compromised from the damage and all about the possible sequelae depending from involvement of teeth structures [10]. In terms of reconstructive options were described multiple different techniques for any particular case, to get satisfactory results in esthetical and functional outcome. The different approach could easily been divided in two different forms. The first is the early surgery, often characterized of within an aggressive approach to the non viable or doubt tissue, especially for prevent edema and important inflammatory response to the necrosis, the second is waiting the complete definition of the damage and then planning the best reconstructive option, especially whit wide damage [10]. A variety of surgical different approaches were described, going from mucosal flaps, advance and rotation composite flaps to buccal mucosal tissue or rotation flaps from the inferior lip [11]. We report a case of severe oral electrical injuries in a 16 months child with multiple reconstructive stages with particular attention to trying to minimize the damage on germinative teeth structure involved in the trauma. The satisfactory functional and esthetic result was achieved by traditional reconstructive surgery and, moreover, the teeth damage and the bone growth was mostly preserved by using dermal substitute template to the difficult area of the gingival tissue. An important support to optimize the result was represented by the careful *The* multidisciplinary approach was conducted with oral surgeon and speech therapist.

2. Case report

A female children of 16 months, was transferred by helicopter to our hospital for burn of the mouth due to accidental sucking of a live electrical wire. The patient presented a third degree burn that affected the left superior upper lip with severe full thickness loss of substance, left superior gingival tissue of superior dental arch, left commissure, left cheek, left upper gum, half anterior left hard cleft, 2/3 anterior tongue with severe drooling and edema (Fig. 1). Emergency care in operating room provided appropriate cleaning and cooling of the lesions, anesthesiologists and endoscopic surgeons evaluation to assess control the pain and the patency of the airways control. Afterwards she was transferred to the Pediatric Intensive care Unit for strictly monitoring. An enteral nutrition was early provided and continued for the first hospitalization period. Health general conditions were established four days later so she was transferred to our Burn Centre. Needing of a multidisciplinary approach was necessary because the severe involvement of superior dental arch and the pre maxilla bone necrosis. At day 8 the patient underwent a general anesthesia, performing a combined surgical approach with oral surgeon. They removed a cortical bone necrotic area in the left premaxilla within gum, mucosal tissues and 6.1, 5.1, 5.2 decidual dental elements. Element 11 was evident and not removed because its insertion in healthy tissue. Alveolar bone with germinative teeth element was left mostly exposed. Reconstructive time consisted in an upper left lip surgical toilette with removal of necrotic tissue, including devitalized labial orbicular muscle followed by tongue toilette. Mouth vestibule, vestibular muscle and alveolar bone were covered with a dermal substitute template (Integra®), performing then an occlusive medication with a silicon sheet (Fig. 2). Following medications were then performed under general anesthesia with presence of oral surgeons to evaluate teeth condition. After three weeks a new surgical time was performed to reconstruct the upper lip on the left side by an Eastlander rotational flap from the lower left lip, in order to cover the loss of substance of the left upper lip and the upper vestibular arch (Fig. 3). The patient was discharged after one

Fig. 1 – Emergency evaluation of the trauma. Note the wide and severe third degree involvement of left superior upper lip, gingival tissue, maxillary bone and tongue.