IN-HOSPITAL MANAGEMENT AND RECONSTRUCTIVE TREATMENT OF DOG BITE WOUNDS OF THE FACE REGION

Postępowanie szpitalne oraz leczenie rekonstrukcyjne w przypadku ran kąsanych okolicy twarzy po ugryzieniu przez psa

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Abstract

Dog bite injuries typically require specialised treatment in a hospital setting. Bites in the facial area present a unique therapeutic challenge due to the complex nature of the injury, particularly when tissue loss is clinically evident. In the case presented, a 32-year-old patient was admitted to the plastic surgery department following a dog bite to the left cheek, upper lip, labial commissure, and vermilion on the left side. During hospitalisation, the patient received anti-tetanus prophylaxis and underwent an assessment for rabies risk, and the tissue defect was repaired using reconstructive techniques, resulting in a fully satisfactory outcome. The case illustrates one of the many techniques and approaches available for reconstructing tissue defects in the facial region. The treatment of facial injuries, particularly those involving the lips and oral mucosa, requires a multimodal approach. This includes rapid assessment of the situation, prevention of infectious disease transmission, careful selection of surgical and reconstructive techniques, and often psychological support.

Streszczenie

Rany kąsane twarzy spowodowane przez psy są zwykle wskazaniem do leczenia specjalistycznego w warunkach szpitalnych. Stawiają one przed lekarzami szczególne wyzwanie terapeutyczne z uwagi na wielopłaszczyznowy charakter takiego urazu, zwłaszcza gdy dochodzi do ubytku tkanek. Prezentujemy przypadek 32-letniej pacjentki, która została przyjęta na oddział chirurgii plastycznej z powodu pogryzienia przez psa lewej okolicy policzka, wargi górnej wraz z kątem ust oraz czerwieni wargowej po stronie lewej. W trakcie hospitalizacji zastosowano profilaktykę przeciwtężcową, oceniono niebezpieczeństwo transmisji wścieklizny, a następnie zaopatrzono ubytek tkanek, stosując techniki rekonstrukcyjne, uzyskując w pełni zadowalający efekt końcowy. Przedstawiony przypadek wskazuje na jedną z wielu możliwych technik w zakresie rekonstrukcji ubytków tkankowych okolicy twarzy. Leczenie urazów twarzy, zwłaszcza warg i błony śluzowej jamy ustnej, wymaga złożonego podejścia, obejmującego szybką ocenę sytuacji, zapobieganie transmisji chorób zakaźnych, odpowiedni wybór technik chirurgicznych, w tym rekonstrukcyjnych, oraz często również równolegle wsparcie psychologiczne.

Keywords: dog bite wound; face region; reconstructive treatment

Słowa kluczowe: rana kąsana po ugryzieniu przez psa; okolica twarzy; leczenie rekonstrukcyjne

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Introduction

Dogs are among the most popular pets worldwide [1]. In 2020, nearly half of the Polish population (42%) statistically owned at least one dog [2]. Dog bite injuries to the face typically require specialised treatment in a hospital setting [3]. In Poland, an estimated 13 out of every 100,000 inhabitants experience dog bites annually. Children are more frequently bitten than adults, and men are bitten more often than women. Facial bite injuries are particularly concerning and account for a significant portion of such incidents [4]. The facial region is involved in approximately 44–70% of dog bite cases, with the mouth being among the most frequently affected areas [1, 5]. Facial injuries resulting from dog bites present unique therapeutic challenges due to the intricate anatomy of the area and the critical importance of preserving both functionality and aesthetics. Furthermore, facial bites result in not only physical trauma but also significant psychological and emotional distress [6, 7]. Studies have shown that individuals with facial deformities experience reduced life satisfaction, lower self-esteem, and an increased risk of alcohol addiction and depression [8]. Given the multidimensional and multifaceted nature of treating such injuries, particularly in young patients, careful and appropriate selection of surgical techniques, including reconstructive approaches, plays a crucial role in determining the outcomes of subsequent treatment.

Case report

A 32-year-old female patient presented to the hospital emergency department following a dog bite. The patient reported being bitten by a neighbourhood dog which, according to the owner, had been vaccinated against rabies. Physical examination of the patient revealed tissue loss in the left cheek, upper lip, labial commissure, and vermilion on the left side (fig. 1). Before admission to the department, the patient was administered tetanus toxoid, and pain management was initiated.

Based on the clinical assessment, the patient was deemed suitable for bite wound debridement and reconstructive treatment of the soft tissue defect.

In the operating theatre, under general anaesthesia, the wound was disinfected through copious irrigation with an antiseptic solution. The tissue defect was reconstructed using local tissue reserves from the left cheek. Reconstruction of the upper lip and vermilion was performed with the inverted flap technique, using a flap from the inner cheek, to restore the continuity of the orbicularis oris muscle (fig. 2 and fig. 3).

The following day, after a scheduled dressing change and confirmation of normal wound healing, the patient was discharged from the hospital with instructions to change the dressings independently and to continue empirical oral antibiotic therapy with clindamycin 600 mg three times a day. The patient returned for a local follow-up approximately 60 days post-procedure. She did not report any symptoms indicative of complications from the injury. Satisfactory wound healing was achieved, and no significant deficits in facial expression were observed. Only a residual limitation in the maximum opening of the

Figure 1. Visible tissue loss in the left cheek area, upper lip (including the labial commissure), and vermilion on the left side

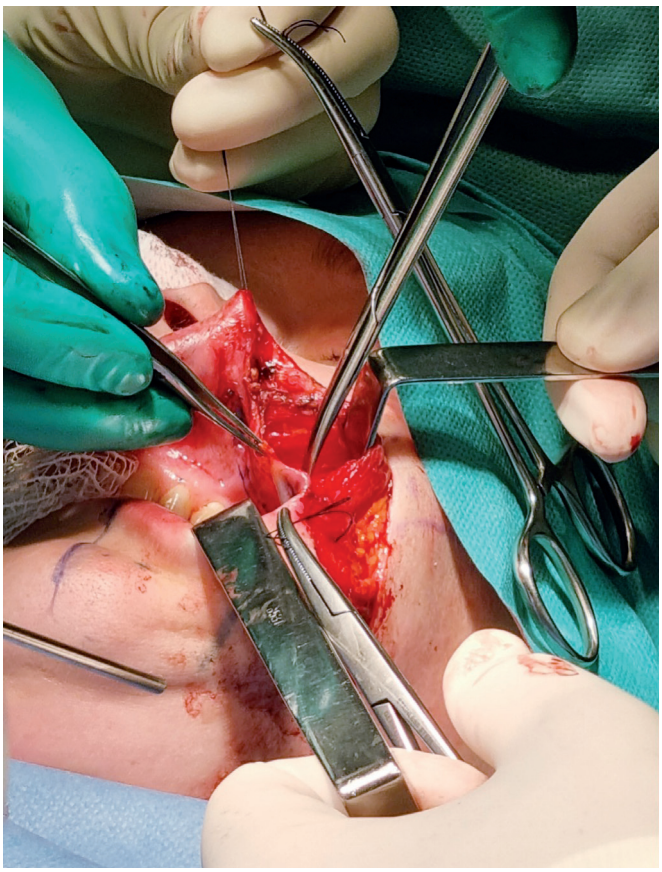

Figure 2. Intraoperative view during mucosal flap creation

Figure 3. Appearance of the lacerated wound following reconstructive management

mouth corner on the operated side was observed compared to the healthy side (fig. 4 and fig. 5).

Discussion

Approximately half of all individuals will experience an animal bite at some point in their lifetime. In 90% of cases, animal bites are inflicted by pets [9]. Given the high prevalence of animal bites, prompt and appropriate diagnostic and therapeutic interventions are essential. Treatment involves prompt and thorough wound irrigation, evaluating the need for post-exposure measures to prevent rabies and tetanus transmission, mechanical debridement, and assessing the feasibility of primary closure through simple suturing or reconstructive surgical techniques [10]. Most studies also highlight the significance of prophylactic antibiotic therapy in managing facial injuries resulting from dog bites [11]. In our patient, empirical treatment with clindamycin 600 mg three times daily was initiated. Importantly, inadequate or delayed intervention following a dog bite can result in complications documented in the literature, such as local wound infections, brain abscesses, hypertrophic scars, scar contractures, or infections like rabies and tetanus [12–14].

Despite appropriate management and the expertise of medical personnel, the extent of facial trauma often prevents simple wound closure and necessitates the use of advanced reconstructive techniques, either during the initial surgery or as part of secondary repair procedures in cases of complications or failures [15, 16]. Reconstruction of the cheek, vermilion, and oral mucosa must take into account the complex anatomy and the primary functions these structures serve, such as speech, facial expression, and food intake [17].

There are numerous techniques and approaches available for reconstructing tissue defects in this area of the face [18–20]. Local flaps are frequently the preferred option for facial reconstruction due to their uniform skin colour and tissue structure, which are essential for achieving optimal aesthetic outcomes. Rotation flaps, offset either anteriorly or laterally, are effective for repairing defects by providing adequate tissue with a reliable blood supply. They are particularly useful for smaller, localised defects within a single anatomical area [21].

In vermilion reconstruction, the choice of surgical technique primarily depends on the depth of the injury. For less extensive and shallow injuries, local flaps, particularly mucosal flaps, are typically used, as demonstrated in the reported case. For larger defects that extend beyond one-third of the lower lip or one-fourth of the upper lip,

Figure 4. Follow-up of healing and appearance of the scar approximately two months post-surgery

Figure 5. Dynamic (functional) effect two months post-surgery

including those involving full-thickness loss of the vermilion, reconstructive procedures can be categorised into three groups. One comprises the Abbé-Estlander flap surgery, i.e. a cross-lip procedure involving rotation flaps using tissues from the lower lip. A disadvantage of this method is the motor denervation of the created flaps. Another group of techniques uses fan-shaped flaps rotated around the angle of the mouth, such as the Karapandzic method, in which symmetrically created flaps maintain both motor and sensory innervation. Finally, it is worth mentioning the option of buccal flaps, as described in the Bernard-Burrow lip reconstruction technique modified by Webster, which involves preparing buccal flaps and positioning them medially to the defect area [22, 23].

Standard treatment for patients following dog bites also involves prophylaxis for tetanus and rabies. The approach to preventing tetanus transmission varies based on the patient's current vaccination status, the animal involved, and an assessment of the risk of transmission, which includes evaluating the macroscopic appearance of the wound. Management involves passive immunisation (administering tetanus immunoglobulin) and/or active immunisation (administering a vaccine) [24]. In the reported case, the patient received one dose of tetanus antitoxin following an evaluation by the emergency department team.

If a patient is bitten by an animal with an unknown or questionable vaccination status, they should be promptly referred to an infectious diseases outpatient clinic for a thorough assessment of the need for further post-exposure treatment. Post-exposure procedures can be delayed until rabies is confirmed in the animal if it showed no symptoms of the disease at the time of exposure. In such cases, a 15-day veterinary observation is conducted (this applies only to pets) [25]. In the described case, following the observation of the dog and confirmation of its rabies vaccination, no further measures were deemed necessary.

Conclusions

Management of facial trauma resulting from a dog bite always requires an individualised approach. The choice of therapy depends on the severity of the injury, the patient's overall health and vaccination status, as well as the desired aesthetic outcomes. The primary goal is to restore both the function and appearance of the damaged tissues, thereby enhancing the patient's overall quality of life.

Conclusions

Dog bites are relatively common and present a considerable therapeutic challenge. Treatment of facial injuries, particularly those involving the lips and oral mucosa following a bite, requires a comprehensive approach. This includes prompt assessment, prevention of infectious disease transmission, appropriate selection of surgical techniques (including reconstructive procedures), and often additional psychological support. The reported case illustrates a comprehensive approach to treating a dog bite injury in a young adult woman, emphasising the complexity of the condition and the challenges associated with in-hospital management and surgical reconstruction of post-traumatic tissue defects.

The patient provided consent for the publication of photographs.

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