

## Case Report Article

# Gillies temporal access surgical technique for closed zygomatic arch reduction

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### Abstract

**Introduction:** Fracture of the zygomatic arch is one of the most common facial bone fractures. By means of minimally invasive surgeries it is intended to preserve anatomical structures to the maximum, without extensive incisions or dissections, providing the best functional results with less operative trauma, the Gillies approach being widely used in this regard. **Objective:** To report a clinical case of a patient with a zygomatic arch fracture, in which a reduction was used through the temporal access of Gillies, as well as, guide the surgeon in treatment planning. **Case report:** Patient AFL, 62 years old, male, was referred to the Maxillofacial Surgery and Traumatology Service of the Restauração Hospital (Recife / PE), with a history of falling from a height, evolving with fracture of the left zygomatic arch, treated by closed reduction through the temporal access of Gillies. **Results:** In this way, the Gillies approach proved to be a rather traumatic technique, effective in our case, restoring esthetics and function with minimally invasive surgery. **Conclusion:** It is effective in our case, restoring aesthetics and function with minimally invasive surgery.

## Introduction

The zygomatic arch is the connection between the zygomatic process of the temporal bone and the zygomatic bone, forming the most salient contour of the face [8]. It plays an essential role in the stability of the middle third of the face and in the support of the masticatory load [4, 13].

The isolated fracture of the zygomatic arch corresponds from 5% to 10.5% among all facial fractures, with a greater involvement among men of 20 and 30 years [8]. The relevant fracture rate of this bone can be explained by its position and contour, as well as its fragility compared to other structures [3, 13]. Under the action of direct trauma, when fracture, loses its convex curvature [13].

The identification of this fracture is essentially clinical and through imaging studies [5]. Sinking of the face, trismus and severe pain are commonly found [1]. The radiographic diagnosis is given for the anterior posterior of Waters and submental-vertex (Hirtz) [2]. Computed tomography can also be used, providing images with greater clarity of detail [16].

Surgical restoration of this type of fracture can be performed through the transcutaneous access, Keen's intrabuccal, Gillies' temporal, coronal, and the preauricular incisions [11, 12].

Given the relevance of this bone segment for face aesthetics and function, and the discussions about the best approach to reduce it, this study aims to report a clinical case of a patient with a zygomatic arch fracture, in which a reduction was used through the temporal access of Gillies, as well as, guide the surgeon in treatment planning.

## Case report

Patient A.F.L., 62 years old, male, was referred to the Department of Maxillofacial Surgery and Traumatology, in the Restauração Hospital (Recife / PE), with a history of falling from a height.

The physical examination showed ecchymosis and swelling in face, flattening of the middle third of the face to the left, and limitation in mouth opening (figure 1). Computed tomography may show a hypodense line suggestive of a fracture of the left zygomatic arch (figure 2).

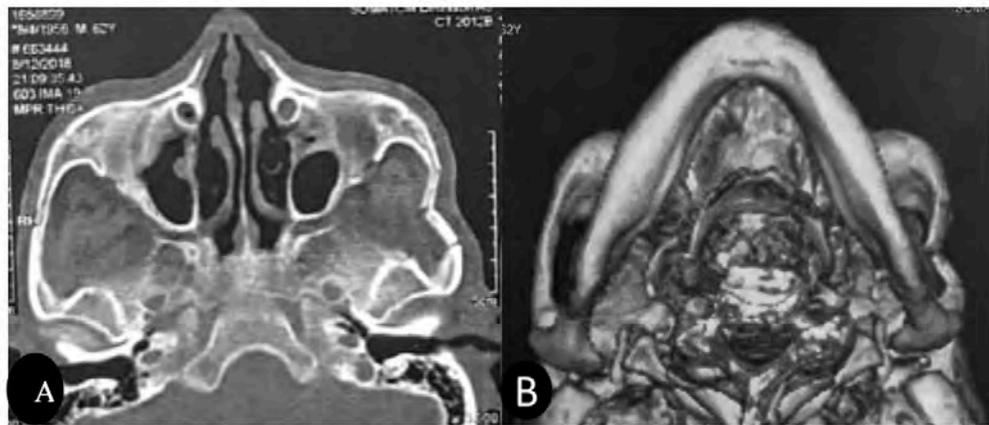
The proposed treatment was the closed reduction through the access of Gillies with

intravenous sedation of Midazolam 5 mg and local anesthesia with lidocaine 2% 1: 100.000. After tricotomy in the left temporal region and antisepsis with 2% Chlorhexidine in the region, skin marking was performed showing the frontal and parietal branches of the superficial temporal artery (figure 3). A 45° oblique incision was made on the scalp, between frontal branch and parietal of the superficial temporal artery, just above its bifurcation, the superficial temporal fascia was then exposed and incised (figure 4), a long and curved scissors was inserted below the zygomatic arch between the deep temporal fascia and the temporal muscle, a force was applied firmly up and out, reducing the bone segments. The synthesis of the surgical wound was performed with an intradermal suture.

The patient was instructed to avoid pressure or major impacts on the fractured site for a period of about 45 days. A prescription of nimesulide 100 mg 12/12h for 3 days, Dipirone 500 mg 6/6h, and cephalexin 500 mg 6/6h for 7 days. On the 7<sup>th</sup> postoperative day, the patient had a good buccal opening, restored aesthetics with projection of the zygomatic arch, and painful complaints (figure 5). The patient remains in the postoperative period for about 3 years, with no aesthetic or functional changes or complaints.



**Figure 1** - Flattening of the middle third of the face to the left



**Figure 2** - A) Computed tomography shows the hypodense line, these fractures can be classified as a fracture of the left zygomatic arch. B) 3D reconstruction of computed tomography



**Figure 3** - Skin marking can be observed before incision



**Figure 5** - 7<sup>th</sup> postoperative day, aesthetics restored with projection of the zygomatic arch



**Figure 4** - The incision shows a superficial temporal fascia



**Figure 6** - 3D reconstruction of computed tomography postoperative

## Discussion

Zygomatic arch fractures are relatively rare [14]. Although the treatment method is simple, soft tissue swelling can mask the fracture site, making this treatment difficult [9]. In addition, its reduction requires skill and experience of the surgeon, since it is an irregular and curved bone [8].

These fractures can be classified in to: I) isolated fractures of the zygomatic arch and II) fractures combined, or associated with other facial bones. With regard to the number of fractures, can be classified into subgroups: A) two fractures in the arch and B) more than two fractures [12].

Among the symptoms, trismus is usually associated with zygomatic arch fractures, since interference is produced in the movement of the coronoid process of mandible, for the fractured segment [12]. While, severe pain is usually not associated unless the fractured segment is mobile [4, 15].

Treatment is a challenge since the zygoma provides contour to the face and its symmetry is cosmetically relevant [11]. Surgical therapy is indicated if there is: 1) comminuted or displaced fracture; 2) trismus; 3) significant esthetic deformity [15, 16, 9]. In the present case there was an esthetic assigned to sinking the lateral region of the midface, and functional due to decreased buccal opening of the patient.

A huge variety of surgical approaches has been used, ranging from approaches for closed reduction with Keen intraoral access, Gillies temporal access, to preauricular or bicoronal incisions for open reduction. It must be chosen according to the type of displacement and the stability required after the reduction [11, 12].

In 1927, Sir Harold Gillies described a closed approach for the reduction of zygoma fractures where an oblique incision is made into the temporal line and an anterolateral force is performed to reduce fracture [5, 12]. In the case presented here, Gillies' access was chosen because, when comparing this access to the oral cavity, for example, there was greater potential for bacterial contamination [16], and the pre-auricular access, can cause paralysis of the muscles involved [4]. This technique preserves adjacent structures, such as the branch of the facial nerve, is a simple and fast procedure, with minimal aesthetic risk because the scar remains covered by hair [8, 12]. It is indicated for isolated fractures of the arch [16].

Satisfactory aesthetic results and adequate stability were demonstrated using the Gillies approach [15].

Fractures with a greater degree of dislocation or comminution should be treated more invasively, with open reduction and plate with screw fixation. In this type of approach there is better stability in the established facial contour, but there is a greater soft tissue morbidity [5].

Pure fractures of the zygomatic arch are treated in closed form, while the zygoma fractures associated with the arch must be treated in open form, which corroborates with the previously clinical case, inasmuch as there was an isolated fracture of the zygomatic arch without zygoma involvement [6].

Long-term studies have demonstrated reliable stability and excellent aesthetic results of this approach [7, 11].

The late postoperative period should be monitored because a force exerted by the masseter muscle can come to remove the arch reduction. A liquid or pasty diet is indicated to the patient as a way of reducing masticatory movements and minimizing postoperative deformations [3,7].

## Conclusion

For the planning and resolution of these types of cases, the surgeon should make effort to avoid the noble structures of the region, respecting the correct location for the incision, the amount of zygomatic arch fractures must also be considered so that an instability in the reduction do not take the need for a new approach, it is important to pay attention to imaging tests and patient complaints. The environment for the surgical procedure should also be taken into consideration. Its realization under local anesthesia is easily performed by a trained professional, but when sedation is used a better comfort is offered to the patient. The isolated fracture of the zygomatic arch is easily reduced through the Gillies approach since it saves operational time and cost, avoids neurovascular injuries, eliminates the need for fixation, decreases the chances of infections occurring in addition to decreasing morbidity. In this case, the execution of this procedure was essential for success, restoring aesthetics and function in a minimally invasive way.

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