

## Maxillary Artery Pseudo-Aneurysm Following Orthognathic Surgery: Case Presentation and Review Articles

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### Abstract

**Objective:** This paper aims to inform surgeons of a very rare complication may happen following an orthognathic surgery.

**Case Presentation:** 20 years old girl planned to Bimax surgery because of her malocclusion and had healthy recovery. She came back with surgery site bleeding which controlled, but intermittent facial swellings changed the idea and eventually CB CT demonstrated mandibular ramus expansion, and finally she came back operating room due to active bleeding and ligated distal maxillary artery pseudo-aneurysm.

**Discussion:** Orthognathic surgery is a common procedure for jaw deformities and malocclusions. Osteotomy especially Le fort osteotomy can be life threatening, because important structures located nearby and any unwanted extra instrument manipulation may led to vascular wall damage and resulted in pseudo-aneurysm, which response well to trans arterial embolization and here managed by surgical ligation.

**Keywords:** Le fort osteotomy; Maxillary artery; Pseudo-aneurysm; Orthognathic surgery

### Introduction

Le fort osteotomy as a common procedure in jaw deformities, can be assumed a safe surgery. Anyway, it may accompany complications like bleeding, sensory loss, maxillary sinusitis, unfixed internal fixation, infection, hemolacria, inadvertent fractures, and vascular accidents. The most severe complication of orthogenetic surgery is operative and post-operative bleeding [1].

During Le fort osteotomy, internal maxillary, sphenopalatine, and ascending palatine arteries are susceptible to trauma. Bleeding after Le fort osteotomy occurs mostly as epistaxis [2]. One of these complications is local artery pseudo-aneurysm, which called false aneurysm [3]. Pseudo-aneurysm is incomplete tearing of vessel wall. Though it is uncommon in maxillary artery. Various factors such as iatrogenic and infectious factors have role in pseudo-aneurysm formation. In head and neck, trauma is one of the most common causes of pseudo-aneurysm. Mostly, patients complain of pain and fullness. Moreover, palpating mass can be detected. Anyway, depending on trauma severity and expansion rate, paresthesia and paralysis happen following to internal pressure on adjacent structures [1].

Here is a presentation of a patient with maxillary artery pseudo-aneurysm following to orthogenetic surgery.

### Case Presentation

A 20 years old girl admitted to plastic and maxillofacial clinic due to upper and lower jaws deformity without history of diabetes, hypertension, or coagulopathy disorders. She had not history of smoking, alcohol or drug abuse. According to physical examination and x-ray documents, she was candidate to Bimax surgery when she finished her orthodontia.

While operation, she underwent bilateral bimax surgery and left side bone graft. Le fort osteotomy was done and both jaws fixed by screws. 27 days later she came back with operation

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**Figure 1:** 5 months after primary operation with left side unusual mandibular expansion in patient who had underwent orthognathic surgery.



**Figure 2:** The same patient after ligation of maxillary artery pseudoaneurysm and correction of facial fullness.

site bleeding and accumulated hematoma was evacuated. Because of continuous facial fullness, 5 months later, CBCT was taken (Figure 1).

As it shows, there is mild left side ramus expansion at the angle. Again she was admitted due to left side mandible bleeding and expanding mass. Differential diagnoses included infection, hematoma, and pseudo-aneurysm. She prepared for operation with sub mandibular incision. Under controlled condition for proximal main vessels, explore was accomplished. There was a hematoma source behind the maxilla and more concise manipulation explored that source as a pseudo-aneurysm of maxillary artery, which double ligated and left a dry clear scene of operation. Incisions were closed and patient discharged 2 days later in a good condition (Figure 2). Following workups demonstrated diminished swelling and interrupted bleeding.

## Discussion

Maxillary artery pseudo-aneurysm following. Trauma, is rationally a common cause in head and neck area. During Le fort osteotomy for maxilla repositioning, bony fragments can injure vasculature. Moreover, incorrect instrument utility may disturb vessels' wall integrity [2]. It is necessary to concise Pterygomaxillary disjunction to prevent adjacent vascular trauma [4].

Patients who underwent maxillofacial surgery previously, due to tissue scars require more forces during osteotomy which can predispose to vascular injury. Severe bleeding in operation can be stigmata of injured vessel that may resulted in pseudo-aneurysm. Pseudo-aneurysm is diagnosed via comprehensive history and physical examination. Patients often complain of palpating mass in the surgery site, while our case admitted with facial left side fullness.

Diagnostic parameters like CT scan, Doppler ultrasound, and angiography are helpful. In intermittent bleedings, CT angiography is recommended [4]. However, artifacts due to maxillary fixation mini

plates and small size vessels are diagnostic limitations.

Management of such cases include surgical exploration, packing, diathermy, internal carotid ligation, complete surgical excision, and trans-arterial embolization. Avelar treated a maxillary artery pseudo-aneurysm following an orthognathic surgery *via* trans-arterial embolization [1]. Bradley et al., (2002) presented a patient with Goldenhar syndrome who underwent Le fort surgery. 8 months later came back due to abruptly malar swelling. He underwent angiography that showed distal maxillary artery pseudo-aneurysm. They did selective embolization with coil [5].

Madani et al., operated a 22 years old man with malocclusion class 3 as Le Fort I Maxillary osteotomy, Sagittal split osteotomy, advancement genioplasty. One month later he experienced hemi facial mass that angiographic findings revealed facial artery pseudo-aneurysm. He was treated by embolization [6]. Park had a 30 years patient who returned with epistaxis 3 weeks after Le fort Surgery. She underwent nasal endoscopy and posterior lateral nasal artery- a branch of sphenopalatin artery- was cauterized [7].

The maxillary artery runs anteriorly passes around pterygoid muscle, and then can be divided into three segments: the mandibular segment, the zygomaticor pterygoid segment, and the pterygopalatine segment [8] which has significant bony adjacent structures that are prone to trauma during surgical manipulation. These events may occur in pterygopalatine fossa that can contain anatomic structures including the third maxillary artery segment, maxillary vein, maxillary nerve, and petrosal nerve, demonstrated as intermittent swelling or jaw claudication, or vague facial pain. However, our patient underwent open surgery due to recent acute bleeding. Though sudden rupture of pseudo-aneurysm can led to life threatening hemorrhage, all maxillofacial surgeons should be familiar with symptoms and treatments of such complication. On the other hand, wide spectrum manifestations of such sequel, like pain, swelling, and epistaxis can be seen in a various chronological durations which may be occur even months later [4].

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