SURGICAL CORRECTION OF THE TRAUMATIZED NOSE

ESSAY

SUBMITTED IN PARTIAL FULFILLMENT

OF THE MASTER DEGREE IN

Otorhinolaryngology

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1990

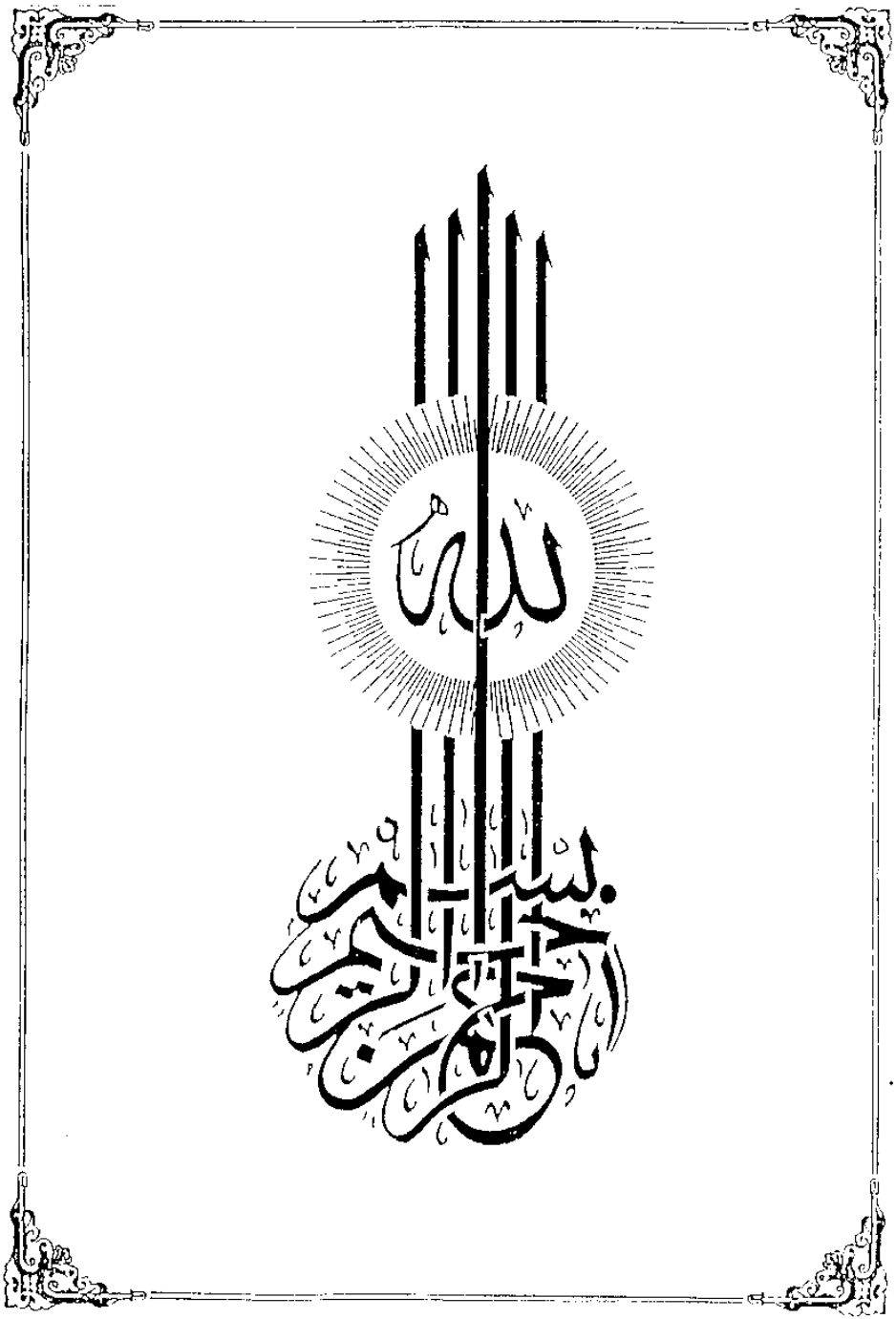
ACKNOWLEDGEMENT

I would like to express my sincere gratitude to **Professor Dr. Nabil Rabie,** Professor of E.N.T., Ain Shams University, for his generous supervision and continuous guidance throughout every step in this work. He did not refrain from offering any of his precious time to me. His sincere help and encouragement were indeed the main support to me throughout this work.

It is great pleasure to record my indebtedness to **Dr. Hazem El-Mhairy,** Lecturer of E.N.T., Ain Shams University for his valuable advice and precious remarks.

It is a special pleasure to acknowledge the generous and kind support provided by **Dr. Osama Mahmoud,** Lecturer of E.N.T. Ain Shams University. His patience, helpful criticisms and suggestions have helped greatly in accomplishing this work. His unlimited help was behind all steps.

Deep feeling of gratitude are also due to all staff members of the department of E.N.T., for good protection and valuable help during my work.



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INTRODUCTION

Due to its rather exposed position, the human nose has always been predisposed to trauma with subsequent deformities. These deformities may affect the external nose, the nasal cavity, or both causing either cosmetic and/or functional disturbances (Hellmish, 1986).

Successful management of the bony and cartilaginous nasal dorsum requires accurate preoperative assessment and surgical planning. Proper knowledge about nasal anatomic relationships should form the basis for the preoperative evaluation and the postoperative goals (Sullivan and Krause, 1987).

Nasal fractures which are not associated with any displacement of the fragments do not require any surgical treatment as they heal well spontaneously. However, there is a nasal deformity in most cases, and here reduction of the fracture is indicated followed by adequate fixation in the corrected position. Recent fractures can usually be reduced by a closed manipulative technique, but where treatment is delayed for more than 3 or 4 weeks, a rhinoplastic procedure will be required (Brain, 1986).

AIM OF THE ESSAY

Nasal injuries with subsequent traumatic deformities is a common event. The major difficulty encountered in such situation is to select the most appropriate corrective surgical technique in order to get the most satisfactory results.

This essay aims at working out a relevant background to help the otorhinolaryngologist in order to choose the right decision with the best prognosis to restore shape and function of either recent or old nasal deformity with a special focus on the bony and cartilaginous nasal skeleton.

Chapter 1

ANATOMY OF THE NOSE

SURGICAL ANATOMY

An intimate knowledge of anatomy is the basis of any type of surgery. This statement is also valid of course, in nasal surgery (Wentges, 1980).

External nose:

The surface anatomy of the nose, full face and profile is shown in (Fig.1). The external nose projects from the face as an irregular three-sided pyramid and consists of a framework of bone and cartilage covered by muscles, sub-cutaneous tissue and skin. The nose is lined by skin and mucosa (Lewis, 1973). The root of the nose is above and its base in below, over-hanging the upper lip. The base has two openings which are separated by the columella. The alae terminate at the cheek surface in grooves known as the nasal sulci (Natvig, 1976).

The muscles:

The nose is covered by muscles which are inter-connected via aponeurosis (Fig.2). Four groups of nasal muscles have been described by Griesman (1944):

1- Elevator muscles involving the procerus, levator labii superioris alaque nasi, and anomalus nasi.

2- Depressor muscles involving alar nasalis and depressor or septi nasi.

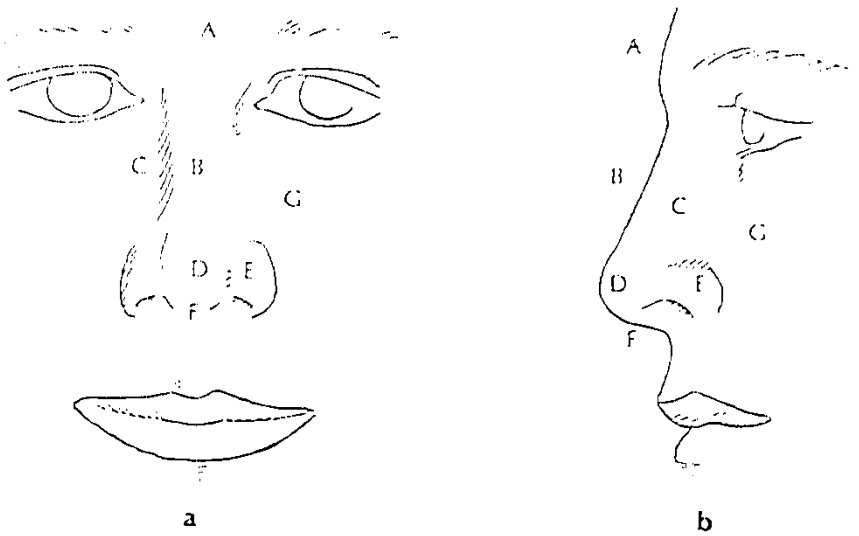

Fig. 1- The surface anatomy of the nose.
A = glabella, B = bridge, C = side wall, D = tip, E = ala, F = columella, G = cheek.

(Quoted from Lewis, 1973).

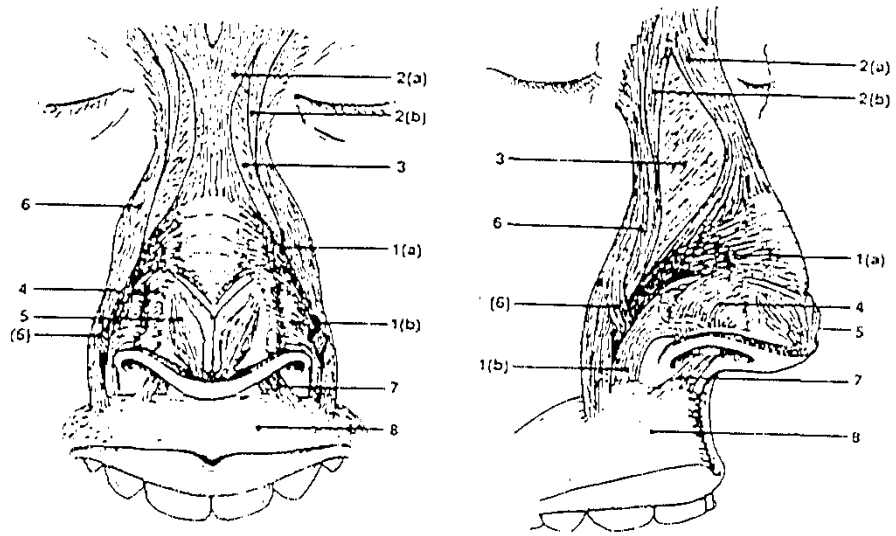

Fig. 2- External muscles of the nose. (left) Anterior, (Right) Oplique. [1, nasalis;(a) transverse nasalis, (b) alar nasalis (dilator naris posterior); 2,procerus: (a) medial fascicle, (b) lateral fascicle; 3,anomalus nasi muscle; 4, dilator naris anterior; 5, compressor narium minor; 6, levator labii superioris alaque nasi (nasal fascicle); 7, depressor septi nasi; and 8,orbicularis oris].

(Quoted from Letourneau and Daniel, 1988).

3- Compressor muscles involving the transverse nasal is and compressor narium minor.

4- Minor dilator which is the dilator naris anterior.

The majority of the nasal muscles assist in widening the nasal opening.

The cartilaginous portion:

The upper lateral cartilages are paired structures which meet the dorsum of the septum edge to edge. There may be a mutual perichondrium but there is never continuity. Distally at the septal angle which corresponds to the anterosuperior angle of the septal cartilage, the upper lateral cartilage are separated from the septum by a narrow cleft (Sherlock, 1973). However, histological studies demonstrated that the quadrangular cartilage is in continuity with the upper lateral nasal cartilages but they separate at their diverging inferior margins (Kern, 1980).

The alar cartilages are paired structures which form the cartilaginous framework of the tip of the nose. Each alar cartilage consists of two portions, a medial crus and a lateral crus, joined at an area called the dome of the alar cartialge. The dome which corresponds to the highest point of the tip of the

nose, is separated from the margin of the nostril by a triangular shaped area, the soft triangle, which consists of the covering skin of the nose and the lining vestibular skin, separated by loose areolar tissue (Fig.3). Post-operative notching of the nostril border is prevented by avoiding an incision close to the nostril border. The lateral crura of the alar cartilages diverge one from the other in the supra-tip area, leaving between them a triangular-shaped area into which is fitted the septal angle. Because the dorsum in this area is supported only by the septal angle, it is referred to as the weak triangle (Converse, 1955) (Fig.4). In the tip region, a transverse fibrous layer interconnects the two medial crura, called the inter-domal ligament. It also continues along the media border of the lateral crura and may represent the transverse fibres reinforcing the weak triangle (Letourneau and Daniel, 1988). The tip of the nose droops when the support of the septal angle is lost by injury or operative removal (Converse, 1955).

The bony nose:

It is formed by the nasal bones, which are joined in the midline where they articulate with the upper septum. Posteriorly, they are supported by the nasal process of the frontal bone and laterally by the frontal

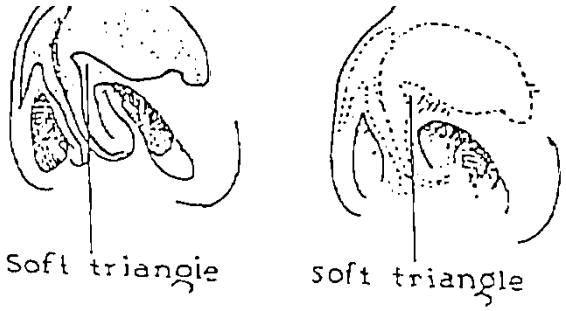

Fig. 3- The soft triangle. A. A triangular-shaped area consisting of two juxtaposed layers of skin separates the dome of the alar cartilage from the nostril border. B. the soft triangle is represented by the shaded area.

(Quoted from converse, 1955).

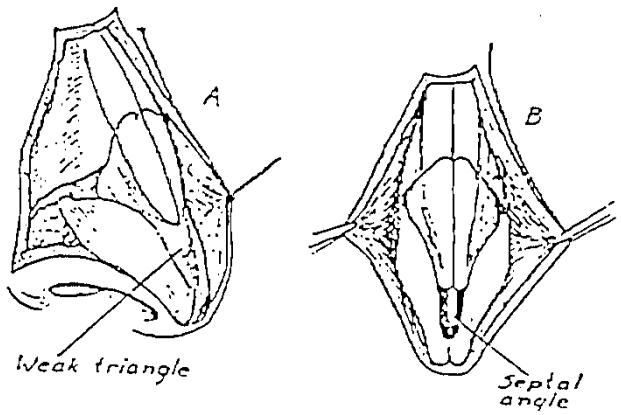

Fig. 4- The weak triangle. A. Dissection showing structures after the skin, subcutaneous tissue and muscular layer are raised. The aponeurosis covers the triangle between the alar and lateral cartilages, over the septal angle. B. Septal angle exposed after removal of the aponeurosis.

(Quoted from Converse, 1955).

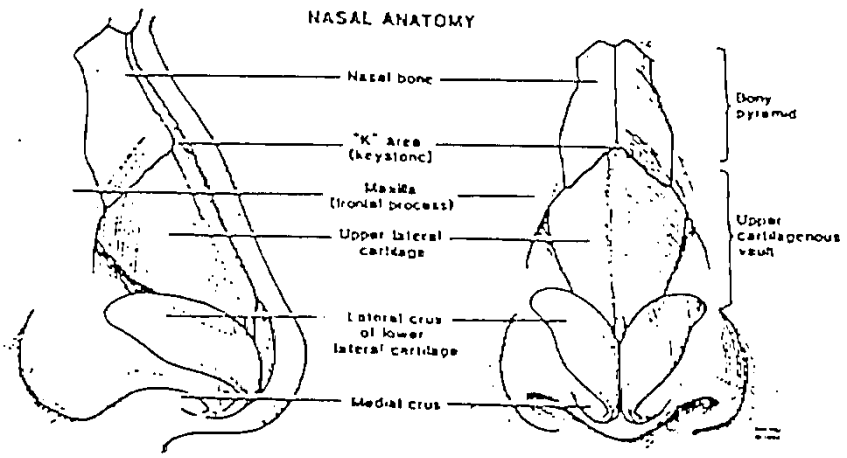

Fig. 5- Important anatomic structures and relationships of the external nasal skeleton.

(Quoted from Parkes et al., 1988).

process of the maxilla. The lateral articulation is specially strong since the nasal bone is beveled on its inner surface in the upper portion and on its outer surface in the lower portion (Sherlock, 1973). The cartilaginous pyramid is attached to the bony pyramid by a fibrous junction. This area of contact between the two pyramids has been called the "key stone area" (Fig.5). It has surgical importance since a disruption by severe trauma or surgery may cause an ugly step-like deformity (Wentges, 1980).

Internal nose:

The vestibule which is immediately inside and above the rims of the nostril, is a skin lined cavity rich with sebaceous glands and numerous hairs known as vibrissae. The upper borders of the lateral crura of the major alar cartilages coincide with the inferior borders of the lateral nasal cartilages where there is a fold knows as the limen nasi. It is the transition between the skin and the mucosa. The rest of the nasal cavity is lined by mucous membrane. It is pseudo-stratified ciliated columnar epithelium. In the roof of the nasal cavity, lies the olfactory area, which extends for a short distance down into the septum and the lateral walls. The olfactory mucous membrane has a yellowish