Functional Reconstructive Nasal Surgery

Egbert H. Huizing
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2nd Edition

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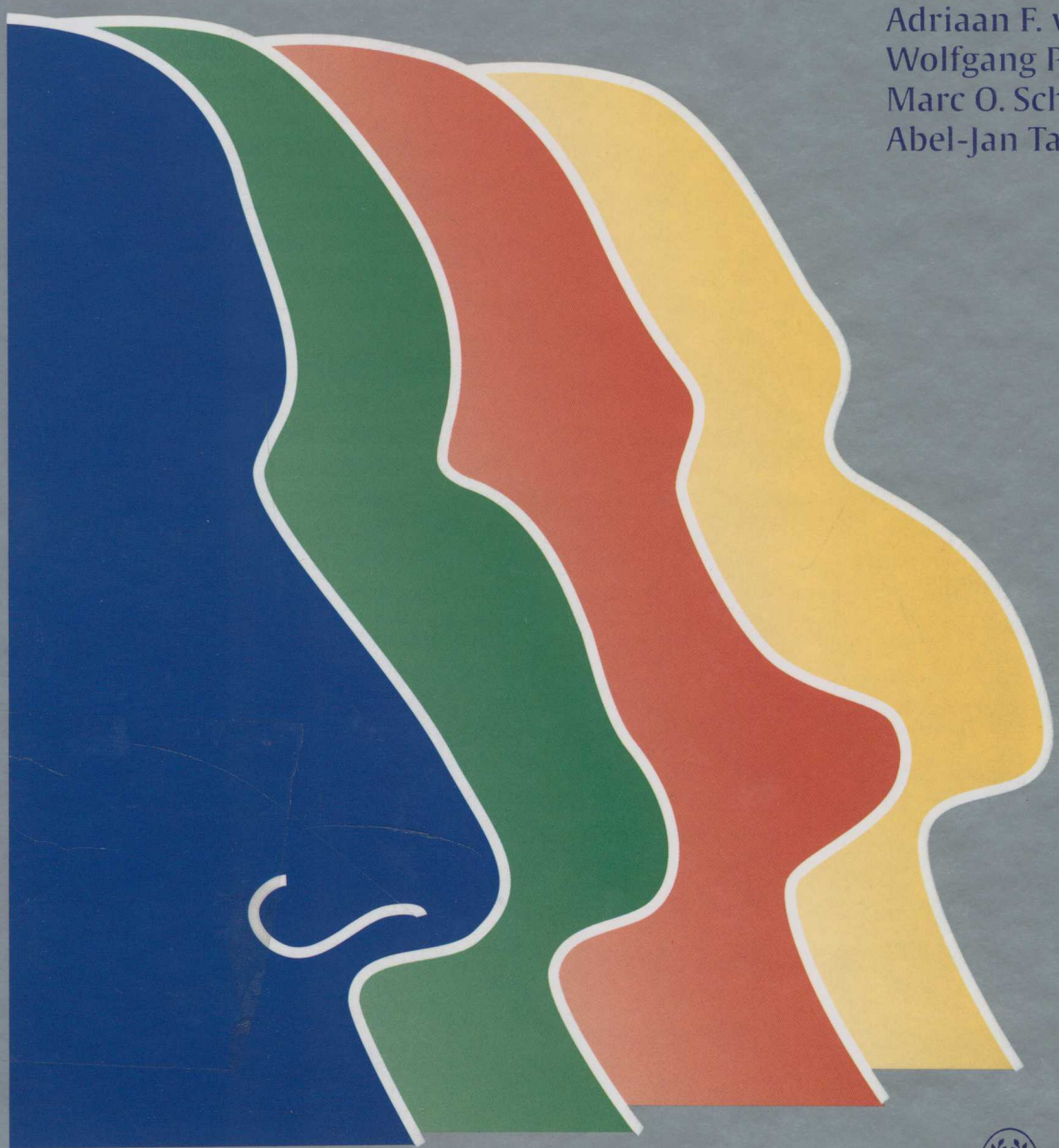

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869 illustrations

Thieme
Stuttgart • New York • Delhi • Rio de Janeiro

Library of Congress Cataloging-in-Publication Data
is available from the publisher.

Thieme Publishers Stuttgart
Rüdigerstrasse 14, 70469 Stuttgart, Germany
+49 [0]711 8931 421, customerservice@thieme.de

Thieme Publishers New York
333 Seventh Avenue, New York, NY 10001 USA
+1 800 782 3488, customerservice@thieme.com

Thieme Publishers Delhi
A-12, Second Floor, Sector-2, Noida-201301
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+91 120 45 566 00, customerservice@thieme.in

Thieme Publishers Rio, Thieme Publicações Ltda.
Argentina Building 16th floor, Ala A, 228 Praia do Botafogo
Rio de Janeiro 22250-040 Brazil
+55 21 3736-3631

Cover design: Thieme Publishing Group
Typesetting by Thomson Digital, India

Printed in Germany at Aprinta Druck, Wemding 5 4 3 2 1

ISBN 978-3-13-129412-8

Also available as an e-book:
eISBN 978-3-13-164122-9

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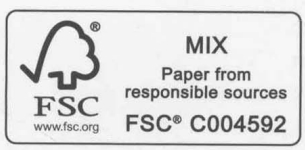

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Preface

It is rewarding that our book has been used and appreciated in so many teaching clinics in Europe, the United States, Asia, and South America. We were also pleased to witness publication of the first edition in Italian, Turkish, and Chinese—and even some illegal copies!

Some time ago, Mr. Stephan Konnry from Thieme Publishers Stuttgart persuaded us to bring out a second and revised edition of our book. This posed a problem, as we both resigned from the practice of Rhinology and Rhinosurgery several years ago. We felt that this made us unable to update a book like ours. Fortunately, many of our younger colleagues currently teaching in functional reconstructive nasal surgery were willing to update the various chapters without impairing the concept of the book. We are extremely grateful to all of our contributors for their loyalty and help.

Apart from the main contributors, we gratefully acknowledge the remarks given by Dr. René Poublon (Rotterdam) and Dr. Koen Ingels (Nijmegen).

Finally, we would like to thank our editors Mr. Stephan Konnry and Dr. Vicki Gregory (Cambridge, UK) as well as Ms. Nidhi Chopra, Mr. Immanuel Jäger, and Dr. Michael Wachinger for their support.

We hope that this second edition will be received as well as the first one.

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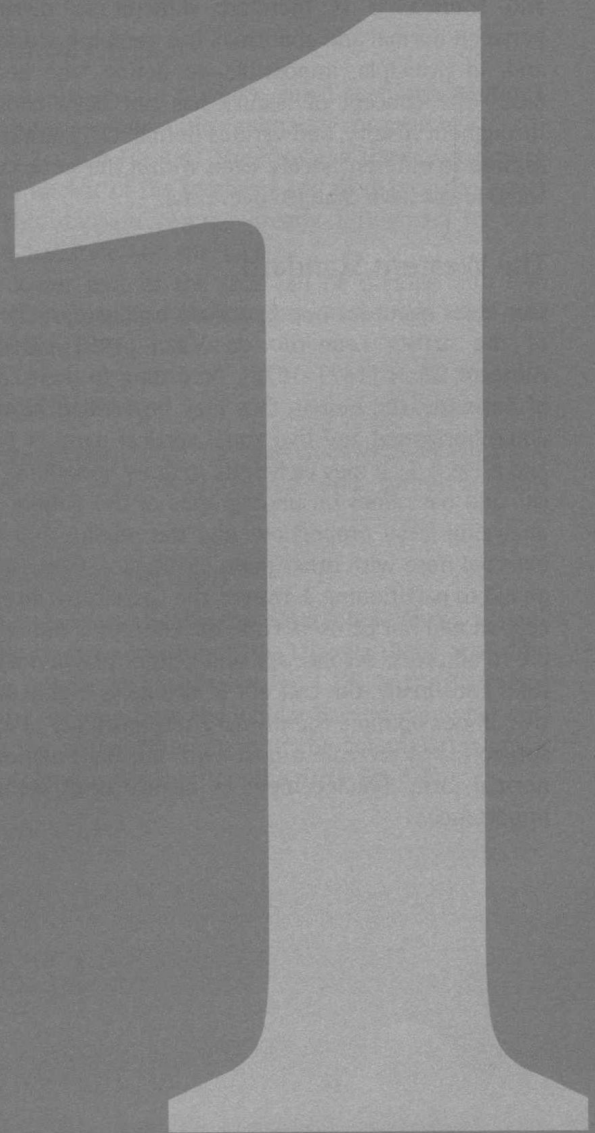
Basics



1 Basics

1.1 Surgical Anatomy

1.1.1 Face

Orientation

Both in diagnosis and surgery, the following terms should be used for orientation (▶ Fig. 1.1):

- Cranial (or superior)
- Caudal (or inferior)
- Dorsal (or posterior)
- Ventral (or anterior)

These definitions are to be preferred above others as they are universal and do not change with body position. In the American literature, the term "cephalic" is often used for "cranial."

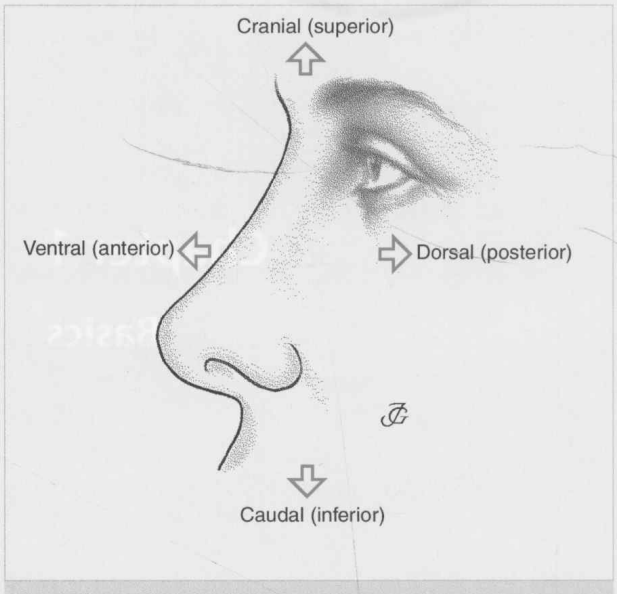


Fig. 1.1 Topographic terminology to be used in nasal surgery.

Proportions

The human face shows considerable variations in size, form, and proportions. The primary factors involved are race, gender, and age; the secondary factors are growth and trauma. It is therefore difficult to distinguish between normal and abnormal. It is even more difficult—and, in principle, impossible—to define "the beautiful face." The concept of beauty has not been consistent throughout history, and various human civilizations have aspired to different ideals. Even within the same culture, these ideals have changed over time.

The Western Standard

Our ideas about facial proportions originate in the work of the artists Leonardo da Vinci (1452–1519) and Albrecht Dürer (1471–1528). According to their concept of harmony, the human face may be divided into three equal horizontal and five equal vertical parts (▶ Fig. 1.2 and ▶ Fig. 1.3). It may be helpful to draw horizontal, vertical, and base lines on photographs of the patient when analyzing facial proportions and the relationship of the external nose with other parts of the face. Other than as an aid to partitioning, however, the Leonardo–Dürer concept should not be used. First, the concept is not applicable to all races; second, age and gender play a dominant role; and finally, the concept of beauty is highly subjective. In our opinion, the primary responsibility of a nasal surgeon is to recreate a nose with normal function and normal form. Enhancement of beauty is of secondary importance.

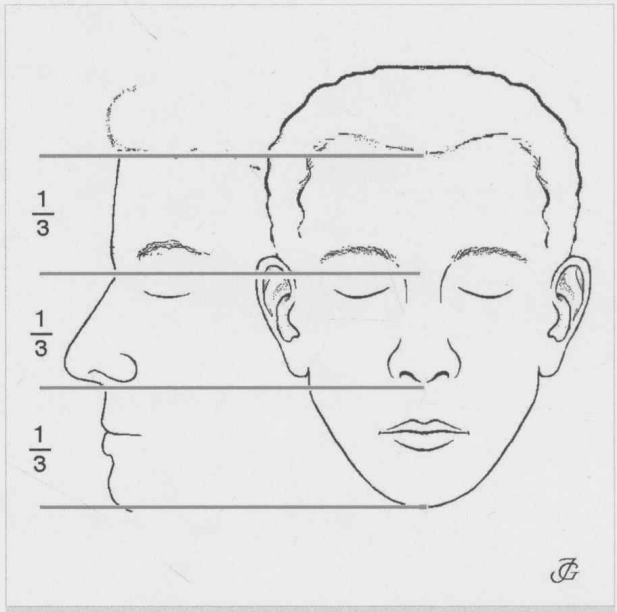


Fig. 1.2 Horizontal division of the face into three equal sections.

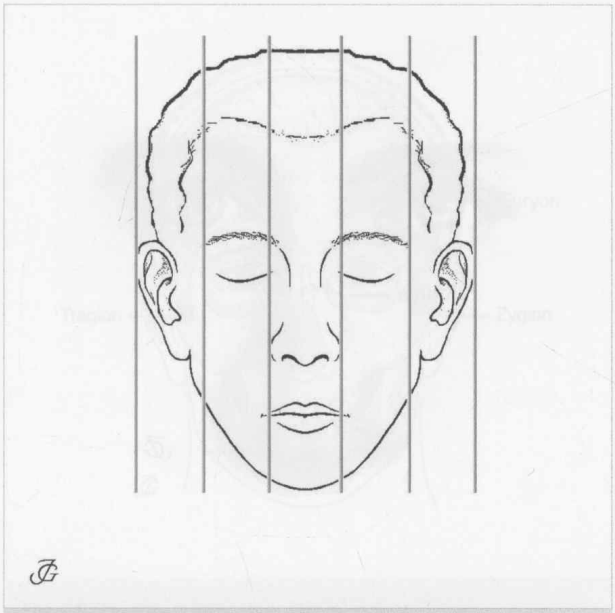


Fig. 1.3 Vertical division of the face into five equal sections.

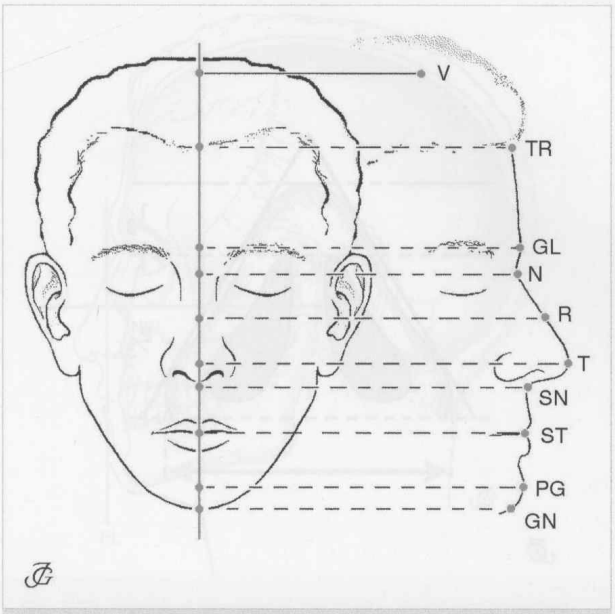


Fig. 1.4 The most important midline points of the face and the nose.
GL = glabella; GN= gnathion; N = nasion; PG = pogonion; R = rhinion; SN= subnasale; ST = stomion; T = tip; TR = trichion; V = vertex.

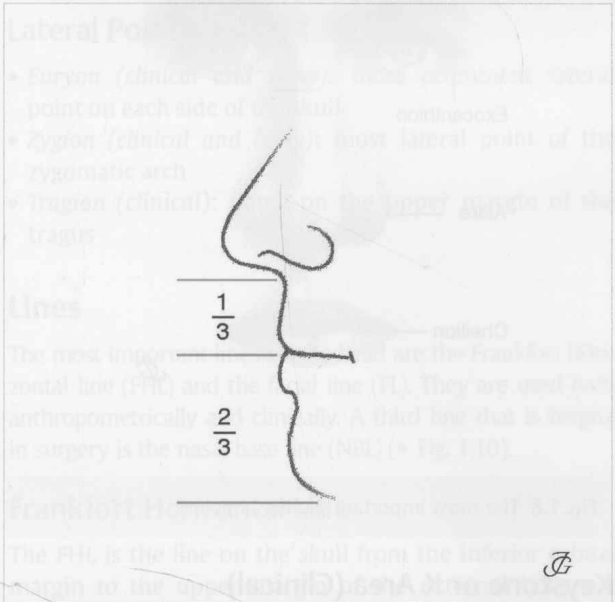


Fig. 1.5 The height of the upper lip is about half the distance from the gnathion to the stomion.

Horizontal Division

The face is made up of three equal sections: hairline–nasion = nasion–subnasale = subnasale–pogonion (▶ Fig. 1.2 and ▶ Fig. 1.4). The height of the external nose is equal to that of the forehead and to that of the lower face. This division can be greatly influenced by hair growth, hairstyle, and spectacles.

The lower part of the face can be divided into two parts: the upper lip (one-third) and lower lip with chin (two-thirds) (▶ Fig. 1.5).

Vertical Division

The face can be divided into five equal sections: the nasal section, two eye sections, and two lateral sections (▶ Fig. 1.3).

Lobular Base Division

When looked at caudally, the nasal lobule forms a triangle. The height and base of this triangle differ according to race, gender, and age (see ▶ Fig. 1.17). In the Caucasian race, the distance from the lobular base to the upper corner of the nostril (the length of the columella) is about twice as long as the length of the tip (▶ Fig. 1.6).

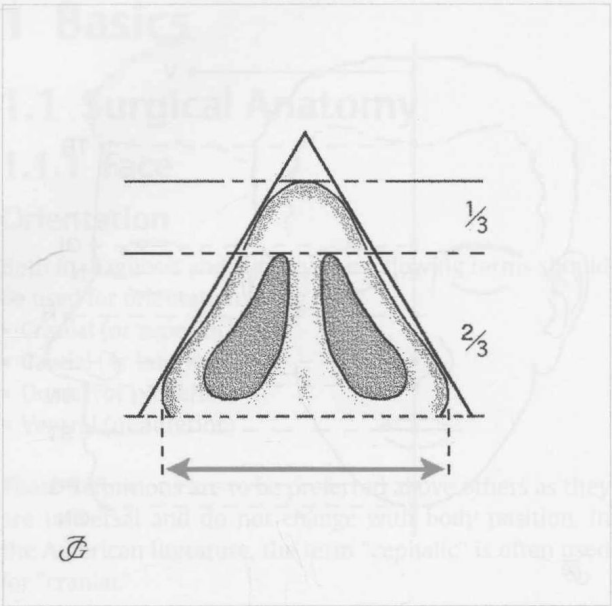


Fig. 1.6 Triangular shape of the lobule. In the Caucasian nose, the distance from the lobular base to the upper corner of the nostril is about twice as long as the length of the tip.

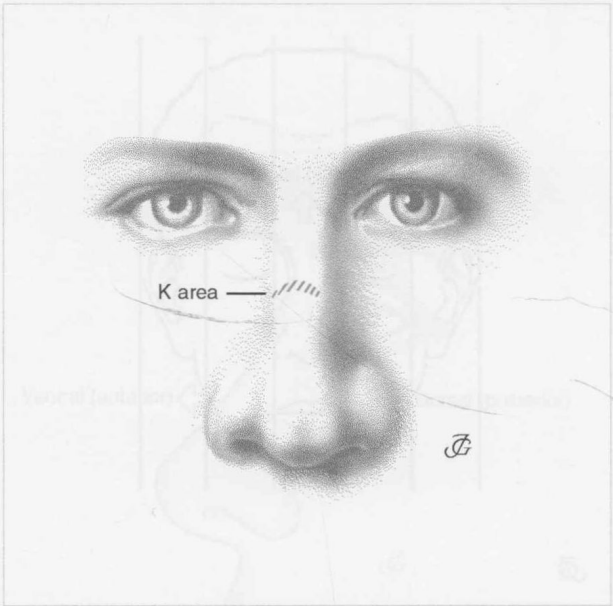


Fig. 1.7 K area or Keystone area.

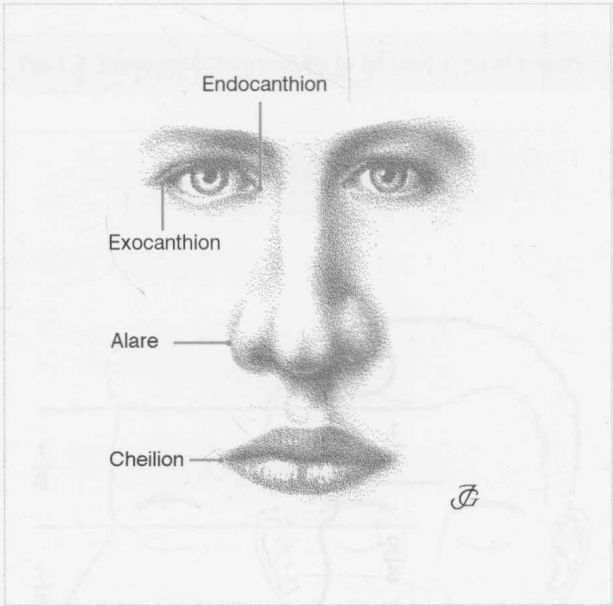


Fig. 1.8 The most important paranasal points.

Points

When analyzing the face, several anthropometric points may be used. Some of these are on the skull (bony landmarks), while others are on the skin (clinical points). The following points are important in nasal analysis.

Midline Points (▶ Fig. 1.4)

- *Vertex (clinical)*: highest point of the head when it is oriented in the Frankfort horizontal plane
- *Trichion (clinical)*: midpoint of the frontal hairline
- *Glabella (clinical and bony)*: midline elevation above the nasal root at the level of the eyebrows
- *Nasion (clinical and bony)*: midpoint of the frontonasal sutures; deepest point at the transition between the forehead and the nose
- *Rhinion (clinical and bony)*: most caudal point of the internasal suture
- *Tip (pronasale; clinical)*: most prominent point of the lobule
- *Subnasale (clinical)*: midpoint of the nasolabial angle overlying the anterior nasal spine
- *Stomion (clinical)*: imaginary point at the crossing of the vertical facial midline and the horizontal labial fissure between the lips
- *Pogonion (clinical and bony)*: most ventral midpoint of the chin
- *Gnathion (clinical and bony)*: midpoint of the caudal margin of the chin

Keystone or K Area (Clinical)

The keystone or K area is the region where the nasal bones, triangular cartilages, and cartilaginous septum unite. (see ▶ Fig. 1.7) The term was coined by Cottle to emphasize that the nasal vault resembles a Gothic arch closed by a keystone.

Paranasal Points (▶ Fig. 1.8)

- *Nasal canthus (medial canthus, endocanthion; clinical)*: inner commissure of the eye fissure
- *Temporal canthus (lateral canthus, exocanthion; clinical)*: outer commissure of the eye fissure

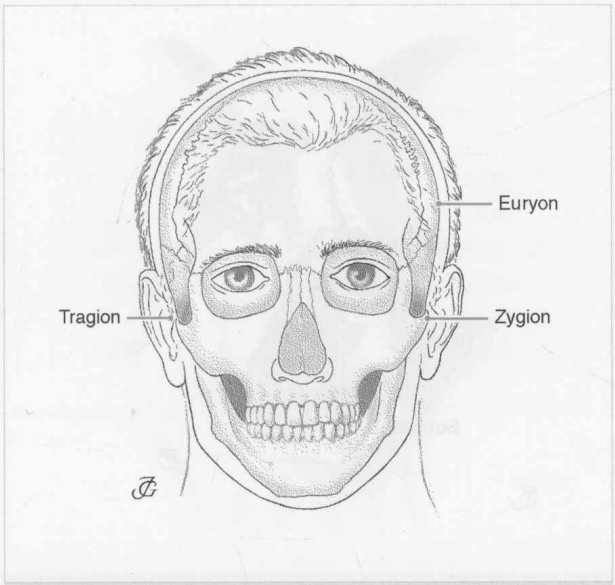


Fig. 1.9 The most important lateral points.

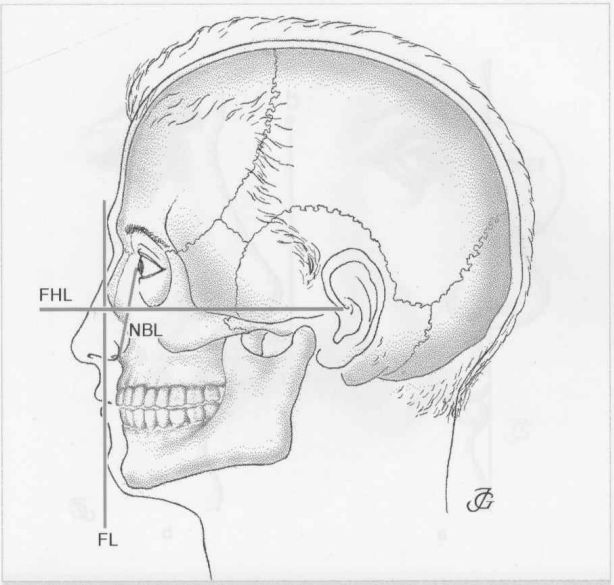


Fig. 1.10 Frankfort horizontal line (FHL), facial line (FL), and nasal base line (NBL).

- *Alare (clinical)*: most lateral point of the alar curvature; used to measure the lobular width
- *Cheilion (clinical)*: the point located at each labial commissure

Lateral Points (▶ Fig. 1.9)

- *Euryon (clinical and bony)*: most prominent lateral point on each side of the skull
- *Zygion (clinical and bony)*: most lateral point of the zygomatic arch
- *Tragion (clinical)*: notch on the upper margin of the tragus

Lines

The most important lines on the head are the Frankfort horizontal line (FHL) and the facial line (FL). They are used both anthropometrically and clinically. A third line that is helpful in surgery is the nasal base line (NBL) (▶ Fig. 1.10).

Frankfort Horizontal Line

The FHL is the line on the skull from the inferior orbital margin to the upper margin of the external bony ear canal (tragion). In clinical practice, the line between the inferior orbital margin and the upper border of the tragus is used. The FHL should be horizontal when side-view photographs are taken.

Facial Line

The FL is the line from the glabella to the pogonion. It serves as the baseline for calculating the nasofrontal and the nasolabial angles. The FL helps to analyze and define the dimensions of the nasal pyramid in relation to the midface, forehead, and chin.

Nasal Base Line

NBL is a slightly oblique line on the skin at the nasal base from the medial canthus to the alar-facial groove. The prominence (*projection, salience*) of the bony and cartilaginous pyramid and the lobule is measured from this line. In performing lateral osteotomies and wedge resections, the NBL is used as a line of reference.

Angles

The following text describes the most important angles in nasal analysis.

Nasofrontal Angle

The nasofrontal angle is the angle between the FL and the line over the dorsum of the bony pyramid (▶ Fig. 1.11**a**). Its magnitude depends on race and age. In Caucasian adults, it measures about 150°. In Asians and blacks, it is larger. The magnitude of the nasofrontal angle has no relation to nasal function. From an aesthetic point of view, a large variation is generally acceptable, reflecting ethnic differences.

Nasolabial Angle

The nasolabial angle is the angle between the base of the columella (subnasale) and the upper lip (▶ Fig. 1.11**b**). In Caucasian males, this angle measures 80 to 90°, in females 90 to 110°. In Asians and blacks, it is usually larger.

The nasolabial angle is, to a certain extent, related to nasal function. The smaller this angle, the more vertical the inspiratory airstream that enters the nose and the higher in the nasal cavity the air will reach. Also, aesthetically, the nasolabial angle is considered more important than the nasofrontal angle.

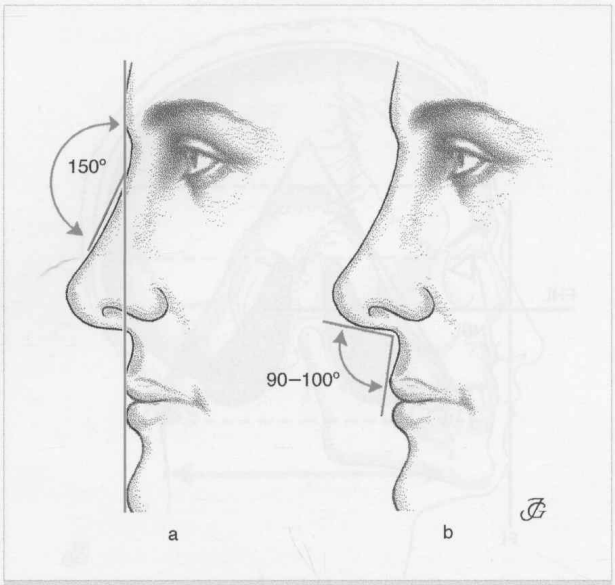


Fig. 1.11 **(a)** Nasofrontal angle. **(b)** Nasolabial angle.

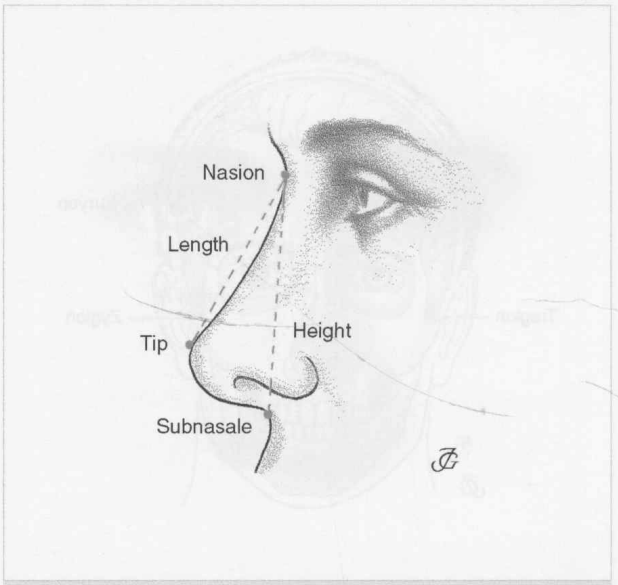


Fig. 1.12 Height and length of the nose.

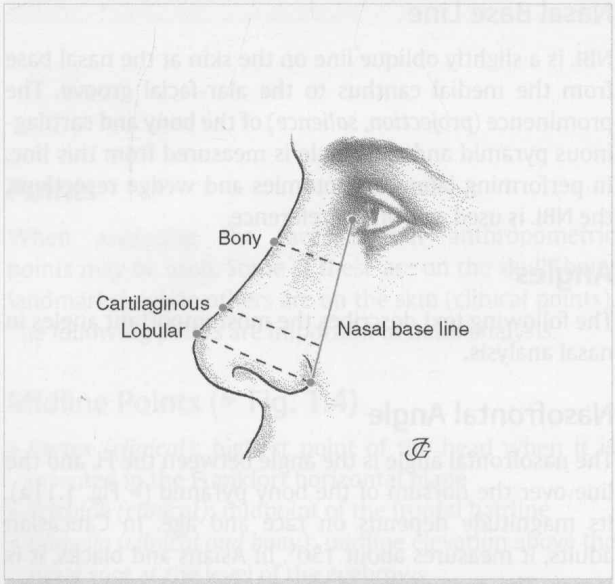


Fig. 1.13 Prominence of the bony pyramid, cartilaginous pyramid, and lobule.

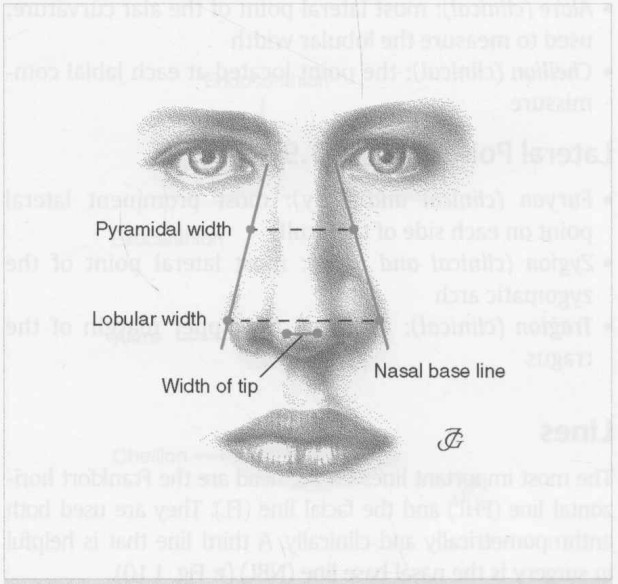


Fig. 1.14 Width of the pyramid, lobule, and tip.

Dimensions

- *Height of pyramid*: distance between nasion and subnasale (columellar base) (▶ Fig. 1.12)
- *Length of pyramid*: distance between nasion and tip (▶ Fig. 1.12)
- *Prominence (projection, salience)*: ventral projection of the pyramid measured from the NBL (▶ Fig. 1.13)
- *Bony prominence*: distance between the NBL and most prominent part of the bony dorsum
- *Cartilaginous prominence*: distance between the most prominent part of the cartilaginous dorsum and the NBL
- *Lobular (tip) prominence*: distance between the tip and the NBL at the alar-facial groove
- *Width of pyramid*: horizontal dimension of the base of the pyramid and of the tip (▶ Fig. 1.14)
- *Pyramidal width*: distance at the base of the bony cartilaginous pyramid between the left and right NBL