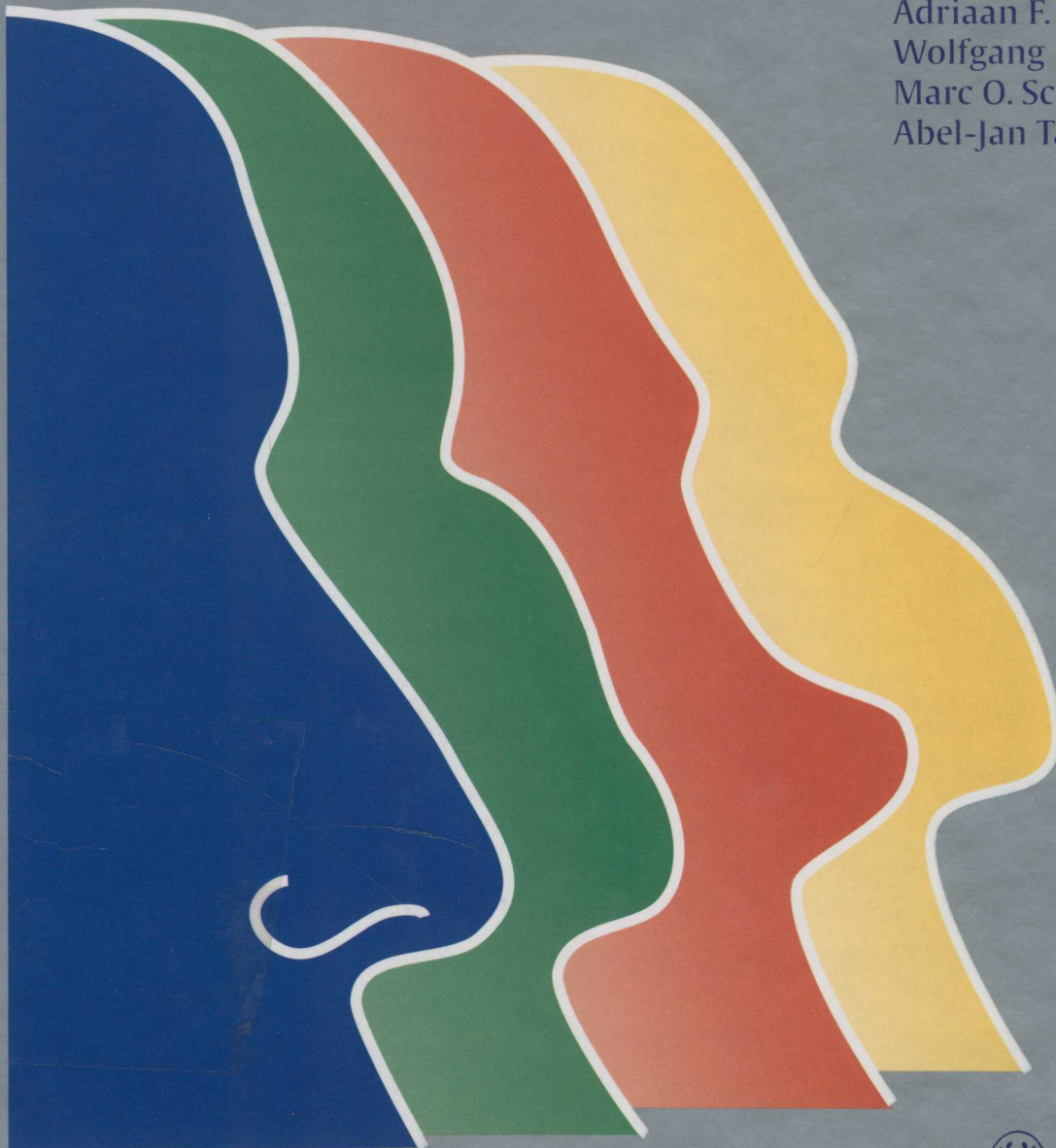


Functional Reconstructive Nasal Surgery

Egbert H. Huizing
John A. M. de Groot

2nd Edition

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Eugene B. Kern
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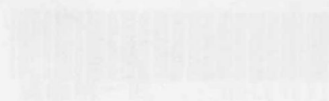
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Preface

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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Contents

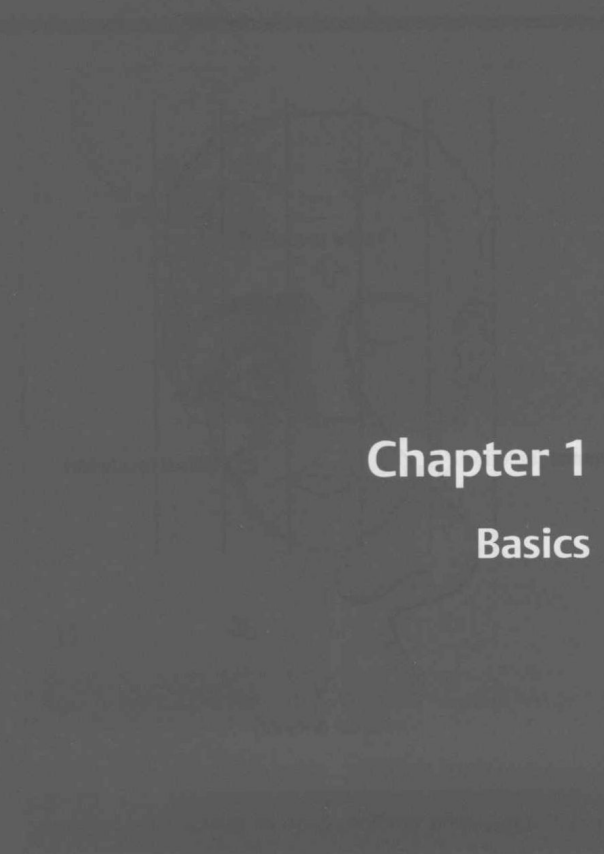
Preface	xi
Contributors	xii
1 Basics	2
1.1 Surgical Anatomy	2
1.1.1 Face	2
1.1.2 External Nose (External Pyramid)	8
1.1.3 Internal Nose	15
1.1.4 Vasculature of the Nose	23
1.1.5 Nerve Supply of the Nose	25
1.2 Histological Features of the Main Nasal Structures and Their Implications for Nasal Surgery	29
1.2.1 Septum	29
1.2.2 Turbinates	37
1.2.3 Bony Pyramid	38
1.2.4 Cartilaginous Pyramid	39
1.2.5 Lobule	41
1.2.6 Lobular Cartilages	42
1.3 Nasal Development and Growth	44
1.3.1 The Phases	44
1.3.2 Developmental Phase	44
1.3.3 Growth Phase	45
1.3.4 Disturbance of Development and Growth—Consequences for Nasal Pathology and Surgery	48
1.4 Surgical Physiology	49
1.4.1 Olfaction	50
1.4.2 Respiration	51
1.4.3 Air Conditioning (Heating and Humidification)	58
1.4.4 Defense	59
1.4.5 Speech	63
1.4.6 Facial Beauty and Facial Expression	63
2 Pathology and Diagnosis	66
2.1 Nasal Syndromes	66
2.1.1 Deviated Pyramid Syndromes	66
2.1.2 Hump Nose (Dorsal Nasal Deformity)	67
2.1.3 Prominent-Narrow Pyramid Syndrome (Tension Nose)	69
2.1.4 Low-Wide Pyramid Syndrome (Saddle Nose)	70
2.1.5 Ski-Slope Nose	71
2.1.6 Open Roof Syndrome	72
2.1.7 Lobular Inspiratory Insufficiency Syndrome (“Alar Collapse”)	73
2.1.8 Middle Meatus Obstructive Syndrome	73
2.1.9 Wide Nasal Cavity Syndrome (“Empty Nose”) Syndrome)	74
2.1.10 Dry Nose Syndrome	75
2.1.11 Cleft Lip— and Cleft Palate—Nose	75
2.1.12 Congenital Nasal Hypoplasia (Nasomaxillary Dysplasia, Binder Syndrome)	77
2.1.13 Facial Syndromes	78
2.1.14 Nasal Neuralgias	79
2.2 Nasal Symptoms—The Most Common Deformities, Abnormalities, and Anatomical Variations	80
2.2.1 Pathology and Variations of Nasal Dimensions	80
2.2.2 Humps	82
2.2.3 Saddling and Sagging	83
2.2.4 Bony and Cartilaginous Pyramid	86
2.2.5 Lobule	88
2.2.6 Valve Area	98
2.2.7 Septum	99
2.2.8 Turbinates	103
2.3 Diagnosis and Documentation	105
2.3.1 Making the Diagnosis	105
2.3.2 Examination	106
2.3.3 Examination of the Internal Nose	108
2.3.4 Analysis of Nose, Face, and Dentition	109
2.3.5 Imaging	110
2.3.6 Photographic Diagnosis and Documentation	111
2.4 Function Tests	114
2.4.1 Breathing Tests	114
2.4.2 Olfactometry	121
2.4.3 Measuring Air-Conditioning Capacity	121
2.4.4 Measuring Nasal Defense	121
2.4.5 Allergy and Hyperreactivity Testing	122

3	Surgery—General	126
3.1	Concepts of Functional Reconstructive Nasal Surgery	126
3.1.1	Surgery for Function and Form	126
3.1.2	Concepts	126
3.1.3	Basic Principles	126
3.2	Endonasal versus External Approach	127
3.2.1	Historical Development	127
3.2.2	Advantages and Disadvantages of the Two Different Approaches	127
3.2.3	Which Approach to Use When?	127
3.2.4	Sequence of the Surgical Steps	128
3.3	Preoperative and Postoperative Care	128
3.3.1	Preoperative Care	128
3.3.2	Postoperative Care	129
3.4	Anesthesia and the Bloodless Surgical Field	132
3.4.1	Local or General Anesthesia?	132
3.4.2	Local Anesthesia	132
3.4.3	General Anesthesia	135
3.4.4	The Bloodless Surgical Field	135
3.5	Antibiotics and Corticosteroids in Nasal Surgery	136
3.5.1	Antibiotics	137
3.5.2	Corticosteroids	137
4	Incisions and Approaches	140
4.1	General	140
4.1.1	Terminology	140
4.1.2	External versus Internal Incisions	140
4.1.3	Basic Principles	140
4.2	Main Incisions	141
4.2.1	Caudal Septal Incision (Hemitransfixion)	141
4.2.2	Intercartilaginous Incision	142
4.2.3	Vestibular Incision	143
4.2.4	Infracartilaginous Incision	144
4.2.5	Transcolumellar Inverted V Incision	146
4.3	Special Incisions—External	147
4.3.1	Labiogingival Incision	147
4.3.2	Sublabial Incision	147
4.3.3	Paranasal Incision	148
4.3.4	Lateral Columellar Incision	148
4.3.5	Rim Incision	149
4.3.6	Alar-facial Incision (Long-Arm-U Incision; Alatomy)	149
4.3.7	V Incision of the Columellar Base	150
4.3.8	Dorsal Incisions—Horizontal Dorsal and Dorsal Reversed V Incision	150
4.4	Special Incisions—Endonasal	151
4.4.1	Transfixion	151
4.4.2	Transcartilaginous Incision	151
4.4.3	Incisions in the Turbinate Mucosa	152
4.4.4	Incisions in the Septal Mucosa	152
4.5	Stab Incisions	153
4.5.1	Vestibular Stab Incision	153
4.5.2	Paranasal Stab Incision	153
4.5.3	Nasion (Glabellar) Stab Incision	154
4.5.4	Alar-facial Stab Incision	154
4.6	Incisions to Avoid	154
4.6.1	Vertical Midcolumellar Incision	155
4.6.2	Horizontal Columellar Incision	155
4.6.3	Vertical Dorsal Incision	155
5	Septal Surgery	158
5.1	Septal Surgery—An Essential Element of Functional Reconstructive Nasal Surgery	158
5.1.1	Sequence of Surgical Steps in Functional Reconstructive Nasal Surgery	158
5.2	Basics of Septal Surgery—The Six Phases of Septal Surgery	159
5.2.1	Phase 1: Approach	159
5.2.2	Phase 2: Mobilization	161
5.2.3	Phase 3: Resection	169
5.2.4	Phase 4: Repositioning	171

5.2.5	Phase 5: Reconstruction	171	5.4	Septal Surgery in Children	192
5.2.6	Phase 6: Fixation	172	5.4.1	Indications	192
5.3	Special Problems of Septal Surgery	176	5.4.2	Age Factor	193
5.3.1	Dislocated (Fractured) Caudal End	176	5.4.3	Most Common Deformities	193
5.3.2	Missing (or Irreversibly Deformed) Caudal End	177	5.4.4	Surgical Techniques	194
5.3.3	Convexity of the Caudal End	178	5.4.5	Long-Term Effects	196
5.3.4	Convexity of the Whole Cartilaginous Septum	180	5.5	Septal Hematoma and Abscess	196
5.3.5	Basal Crest	182	5.5.1	Septal Hematoma	196
5.3.6	High Deviation	182	5.5.2	Septal Abscess	198
5.3.7	Vomer spur	183	5.6	Septal Perforation	200
5.3.8	Vertical Fracture	185	5.6.1	Classification	200
5.3.9	Horizontal Fracture	186	5.6.2	Prevention	202
5.3.10	Anterior Convexity	187	5.6.3	Treatment Options	204
5.3.11	Missing Septum: (Sub)Total Septal Reconstruction	188			
6	Pyramid Surgery	214	6.3.2	Surgical Techniques	233
6.1	Osteotomies—Mobilizing and Repositioning the Bony Pyramid	214	6.3.3	Complications	239
6.1.1	Mobilizing the Bony Pyramid	214	6.4	Saddle Nose Correction	239
6.1.2	Types of Osteotomy	215	6.4.1	Types of Saddling and Sagging	240
6.1.3	Repositioning the Bony Pyramid	216	6.4.2	Surgical Techniques	242
6.1.4	Instruments Used for Osteotomies	218	6.4.3	Complications	248
6.1.5	Techniques of Osteotomy	220	6.5	Valve Surgery	249
6.2	Wedge Resection	227	6.5.1	Pathology of the Valve Area	249
6.2.1	Principles	227	6.5.2	Surgical Techniques	249
6.2.2	Surgical Technique	229	6.5.3	Prosthesis	257
6.2.3	Complications	232	6.5.4	Complications	258
6.3	Hump Removal	232			
6.3.1	Types of Hump	232			
7	Lobular Surgery	260	7.3	Alar Surgery	280
7.1	Approaches to the Lobule	260	7.3.1	Deformities, Abnormalities, and Variations of the Ala and Their Surgical Correction	280
7.1.1	The Five Main Approaches: Advantages, Disadvantages, and Indications	260	7.3.2	Surgical Techniques	281
7.1.2	Surgical Techniques	266	7.4	Columellar Surgery	289
7.2	Tip Surgery	268	7.4.1	Deformities, Abnormalities, and Variations of the Columella and Their Surgical Correction	289
7.2.1	Characteristics of the Tip	268	7.4.2	Surgical Techniques	290
7.2.2	Mechanics of the Tip	270			
7.2.3	Deformities, Abnormalities, and Variations of the Tip and Their Surgical Correction ..	271			
7.2.4	Surgical Techniques	272			

7.5	Vestibular Surgery	295	7.5.2	Surgical Techniques	295
7.5.1	Deformities	295	7.5.3	Prosthesis	296
8	Surgery of the Nasal Cavity	298			
8.1	Turbinate Surgery	298	8.2.3	Surgical Techniques	310
8.1.1	General	298	8.3	Endonasal Surgery of the	
8.1.2	Inferior Turbinate	298		Infundibulum, Ethmoid Bone, and	
8.1.3	Middle Turbinate	305		Maxillary Sinus	313
8.2	Surgery of the Wide Nasal Cavity	308	8.3.1	Pathology of the Infundibulum and	
8.2.1	Pathology	308		Middle Meatus	313
8.2.2	Treatment	310	8.3.2	Surgical Techniques	313
			8.3.3	Complications	317
9	Special Subjects	320			
9.1	Acute Nasal Trauma	320	9.6.2	Treatment Modalities	339
9.1.1	Nasal Trauma in the Newborn	320	9.7	Special Approaches	340
9.1.2	Acute Nasal Trauma in Childhood	321			
9.1.3	Acute Nasal Trauma in Adults	323	9.7.1	Endonasal and Transseptal–	
9.2	Nasal Surgery in Children	327		Transsphenoidal Approach to the	
9.2.1	General	327		Hypophysis	340
9.2.2	Clinical and Experimental Evidence	327	9.7.2	Lateral Rhinotomy	344
9.2.3	When Should Nasal Surgery in Children		9.7.3	Sublabial Rhinotomy	346
	Be Performed?	328	9.8	Transplants and Implants	348
9.2.4	Conclusions	328	9.8.1	Terminology	348
9.3	Nasal Surgery in the Unilateral		9.8.2	Requirements for the “Ideal” Transplant	
	Cleft-Lip Nose	329		and Implant	348
9.3.1	Pathology	329	9.8.3	Materials	348
9.3.2	Treatment	331	9.9	Complications—Prevention and	
9.3.3	Surgical Techniques	331		Treatment	355
9.4	The Nose and Sleep Disordered		9.9.1	Complications or Mistakes?	355
	Breathing	334	9.9.2	General Recommendations on Prevention	355
9.4.1	Pathology and Causative Factors	334	9.9.3	Prevention and Treatment of Specific	
9.4.2	Treatment	335		Complications	356
9.5	Rhinopexy in the Elderly	336	9.10	Patient Complaints and Medicolegal	
9.6	Retrusion of the Mandible and			Problems	370
	Mentoplasty	338	9.10.1	Dissatisfied Patient	370
9.6.1	Diagnosis	338	9.10.2	Claims and Lawsuits	370
10	Appendix	372			
10.1	Materials	372	10.1.1	Sutures	372

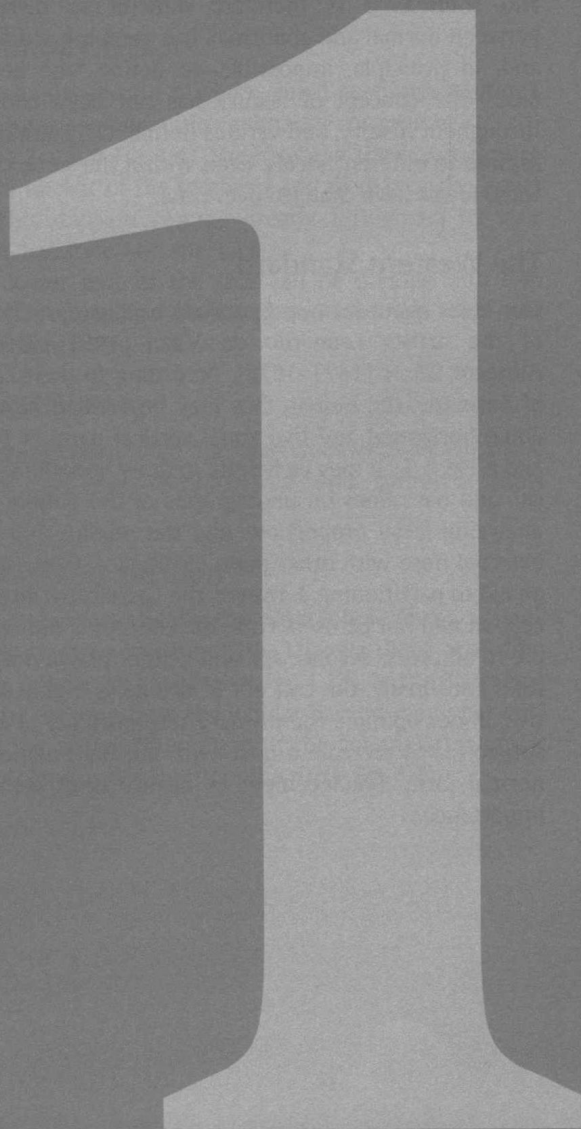
10.1.2	Needles	372	10.2.12	Various	387
10.1.3	Internal Dressings	372	10.2.13	List of Basic Instruments	390
10.1.4	Tapes	373	10.3	Physical Laws Governing Airstreams...	390
10.1.5	External Splints (Stents)	374	10.3.1	Bernoulli's Law	390
10.1.6	Septal Splints	375	10.3.2	Hagen-Poiseuille's Equation	390
10.1.7	Intranasal Sheets	375	10.3.3	Reynolds Number	391
10.1.8	Septal Prosthesis (Septal Button)	376	10.3.4	The Venturi Effect	391
10.1.9	Commercially Available Biological Materials	376	10.3.5	Starling Valve	393
10.2	Instruments	376	10.3.6	Rohrer's Equation	393
10.2.1	Instruments for Cleansing the Vestibules and Trimming the Vibrissae ("Trim Set") ..	376	10.4	Schemes of Vascularization and Nerve Supply	393
10.2.2	Instruments and Medications for Anesthesia and Vasoconstriction	376	10.5	Historical Development of Functional Reconstructive Nasal Surgery	393
10.2.3	Specula	377	10.5.1	"What's Past is Prologue"	393
10.2.4	Knives	378	10.6	Bibliography	397
10.2.5	Retractors	379	10.6.1	References	397
10.2.6	Hooks	380	10.6.2	Textbooks and Major Chapters on Nasal Surgery in Chronologic Order	402
10.2.7	Elevators	380			
10.2.8	Forceps	381			
10.2.9	Scissors	384			
10.2.10	Chisels, Osteotomes, Saws, and Mallets ...	386			
10.2.11	Rasps and Files	387			
	Index	405			



Chapter 1

Basics

1.1 Surgical Anatomy	2
1.2 Histological Features of the Main Nasal Structures and Their Implications for Nasal Surgery	29
1.3 Nasal Development and Growth	44
1.4 Surgical Physiology	49



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.”

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.

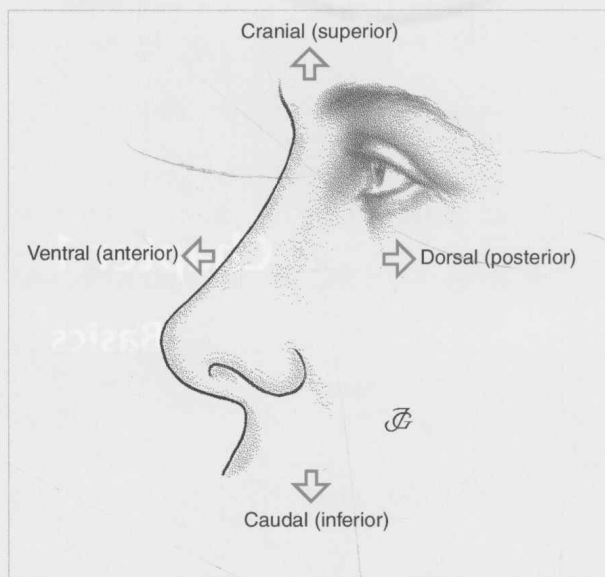


Fig. 1.1 Topographic terminology to be used in nasal surgery.

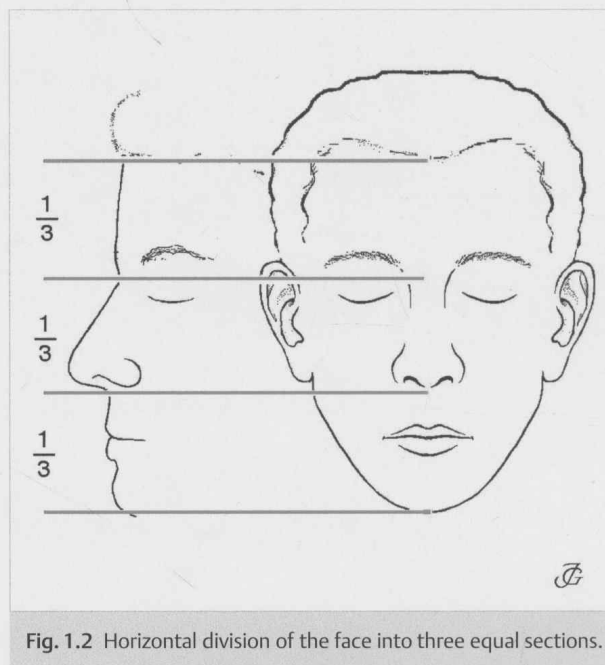


Fig. 1.2 Horizontal division of the face into three equal sections.

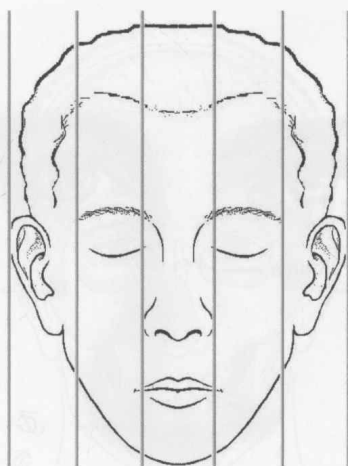


Fig. 1.3 Vertical division of the face into five equal sections.

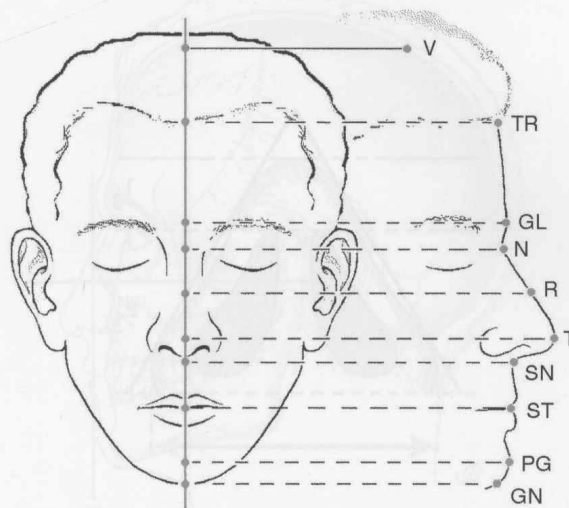


Fig. 1.4 The most important midline points of the face and the nose.

GL = glabella; GN = gnathion; N = nasion; PG = pogonion;
R = rhinion; SN = subnasale; ST = stomion; T = tip; TR = trichion;
V = vertex.

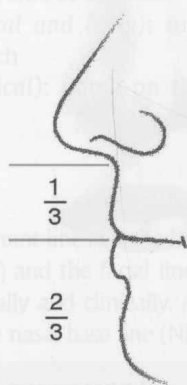


Fig. 1.5 The height of the upper lip is about half the distance from the gnathion to the stomion.

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).

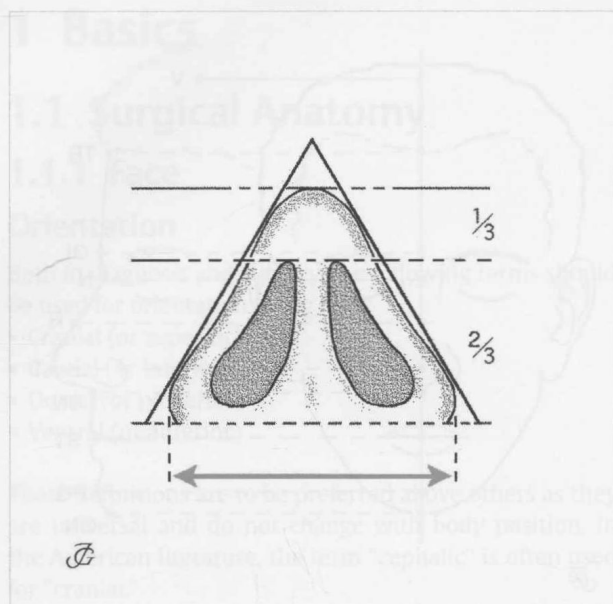


Fig. 1.6 Triangular shape of the lobule. In the Caucasian nose, the distance from the lobular base to the upper corner of the nostril is about twice as long as the length of the tip.

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

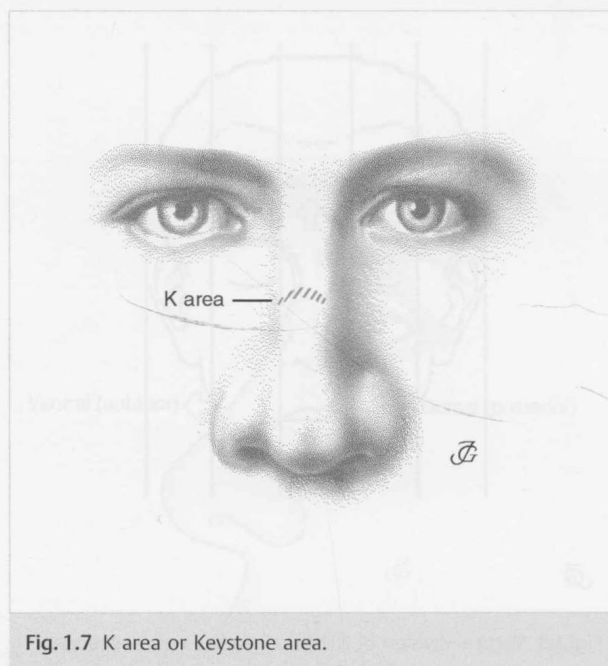


Fig. 1.7 K area or Keystone area.

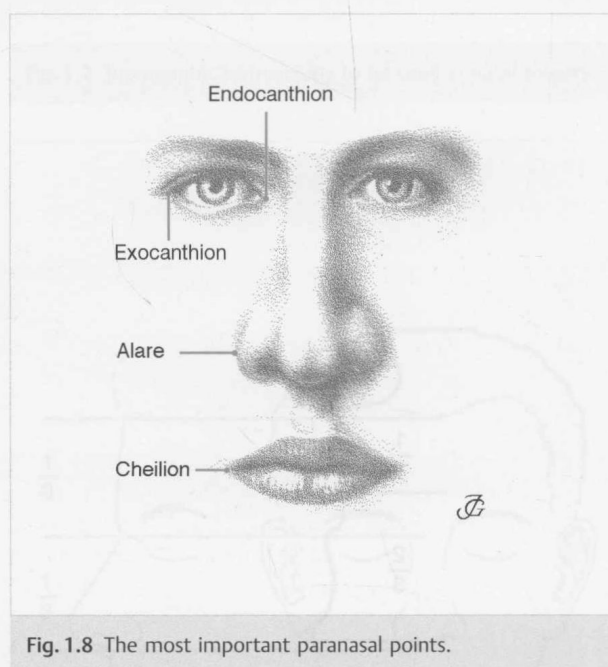


Fig. 1.8 The most important paranasal points.

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

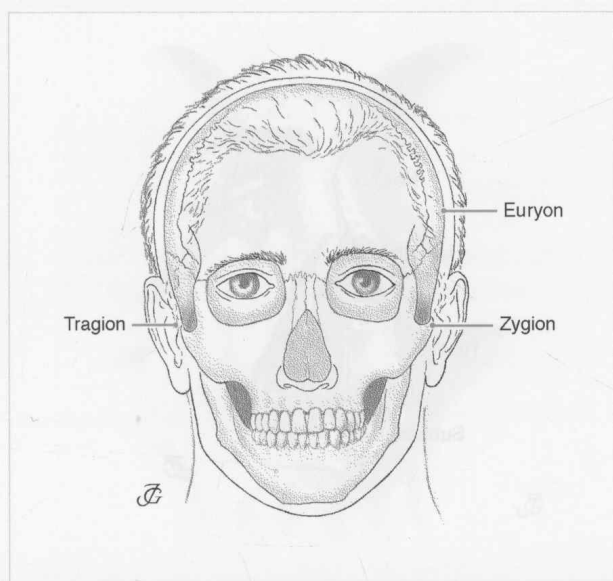


Fig. 1.9 The most important lateral points.

- *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.

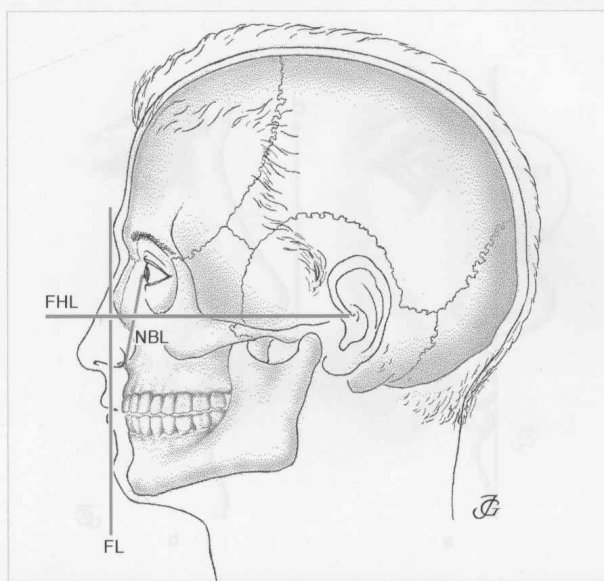


Fig. 1.10 Frankfort horizontal line (FHL), facial line (FL), and nasal base line (NBL).

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. 1.11a). 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. 1.11b). 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.

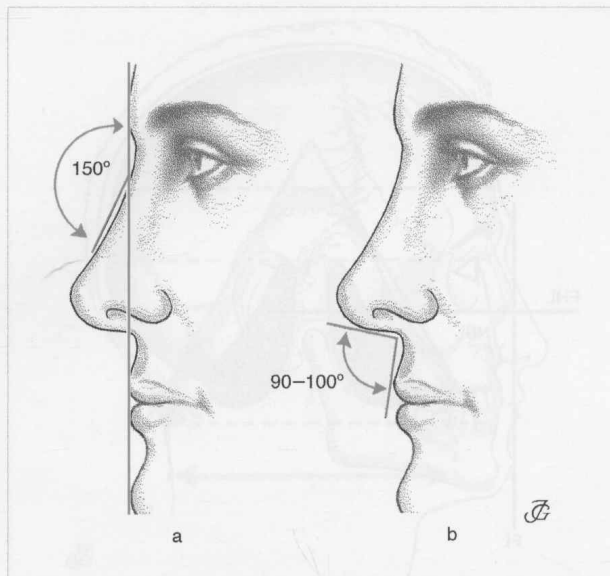


Fig. 1.11 (a) Nasofrontal angle. (b) Nasolabial angle.

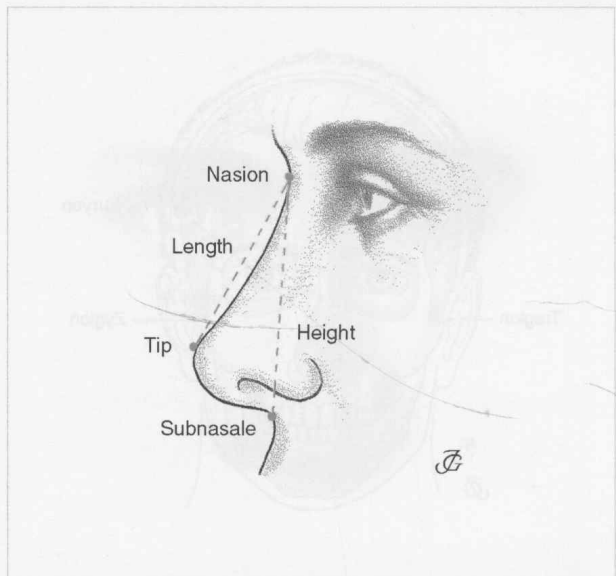


Fig. 1.12 Height and length of the nose.

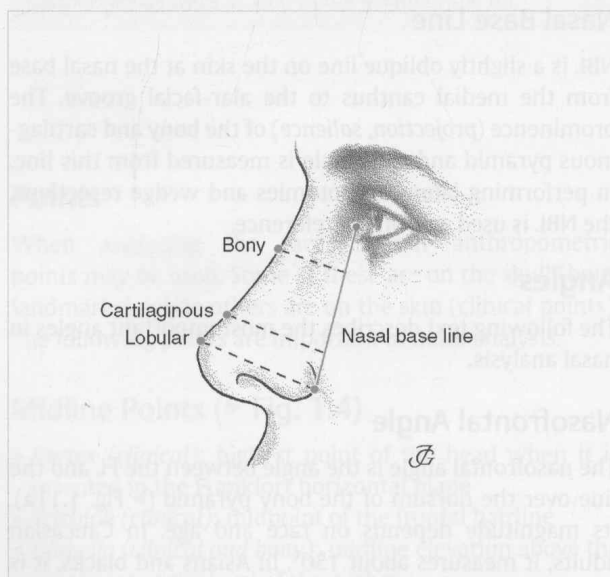


Fig. 1.13 Prominence of the bony pyramid, cartilaginous pyramid, and lobule.

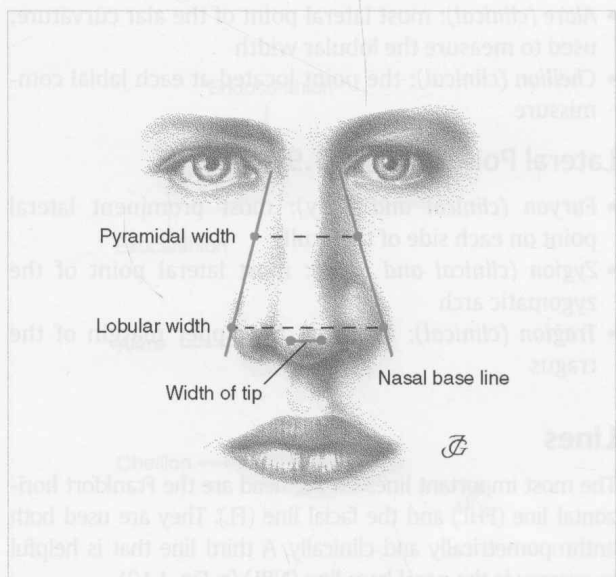


Fig. 1.14 Width of the pyramid, lobule, and tip.

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