

Incorrect terminology in nasal anatomy and surgery, suggestions for improvement*

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SUMMARY

This article discusses why nomenclature such as 'upper lateral cartilage', 'lower lateral cartilage', 'weak triangle', 'empty triangle', 'soft triangle', 'hemitransfixion', and 'marginal incision' should be abandoned and replaced by anatomically, linguistically, and surgically correct terms. Suggestions for better terminology are made. The division of the nasal organ into five anatomical areas and three physiological parts is questioned. The terms 'interdomal ligament', 'intercrural ligament', and 'septocrural ligament' should not be used, as histological studies have demonstrated that no such ligaments exist.

Key words: nomenclature, nasal surgery, nasal anatomy

Only after we have been speaking on terms are we on speaking terms.

Language has always been a weak point in medicine. While new developments call for new terms, these do not always have a sound anatomical, physiological, or linguistic basis. Although initial misnomers are corrected quickly, a name that is fundamentally wrong may remain in use for a variety of reasons.

This applies to some common terms in the field of nasal anatomy and surgery. In this article, we will discuss some major discrepancies and shortcomings of today's rhinological language and make some suggestions for improvement.

THE NASAL CARTILAGES

The latest edition of Terminologia Anatomica (1998) distinguishes six different cartilaginous structures in the nose: 1. the cartilago septi, 2. the cartilago nasi, 3. the cartilago major nasi, 4. the cartilagine minores nasi, 5. the cartilagine nasi accessoriae, and 6. the cartilago vomeronasalis. Apart from the cartilago septi (1) and the cartilagine accessoriae (5), none of the above names are used in daily rhinological practice. This illustrates the gap that exists at present between the basic anatomical nomenclature of the nose and the language used in clinical anatomy and surgery.

To complicate matters, nasal surgeons in different countries give different names to the same cartilage. For instance, the cartilago nasi lateralis is called 'upper lateral cartilage' in English-speaking countries, 'Seitenknorpel' in German-speaking countries and 'cartilage laterale' in French-speaking areas, while the cartilago alaris major is called 'lower lateral cartilage', 'Flügelknorpel', and 'cartilage alaire', respectively.

Triangular cartilage instead of 'cartilago nasi lateralis', 'upper lateral cartilage' ('Seitenknorpel', 'cartilage laterale')

Basically, the term 'lateral nasal cartilage' (cartilago lateralis) is anatomically correct as this cartilage is the lateral wing of the

septolateral (or dorsolateral) cartilage (Figure 1). However, there is another major cartilaginous structure in the lateral wall of the nose: the cartilage in the ala. Since the term 'lateral nasal cartilage' could apply to both structures, it is not an appropriate name. American rhinosurgeons and plastic surgeons prefer to speak of the 'upper lateral cartilage' (ULC) and the 'lower lateral cartilage' (LLC). However, this usage is anatomically incorrect, as the 'lower lateral cartilage' is not a cartilaginous entity but the lateral crus of a horseshoe-shaped cartilage that surrounds the nostrils and forms a part of the nasal vestibule (Figure 2). For this reason, the term 'lower lateral cartilage' should be replaced by a term that better suits the

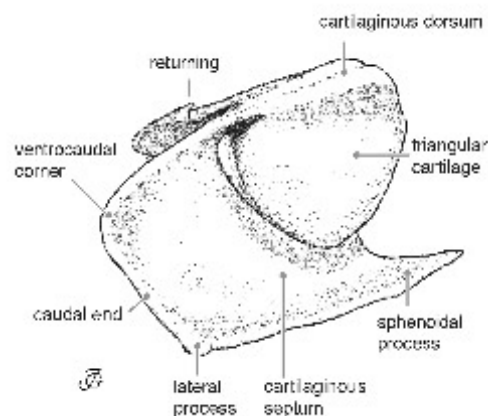


Figure 1. Septolateral cartilage with the triangular cartilage.

This paper was presented at the 20th Course in Functional Aesthetic Nasal Surgery held at the University Medical Center Utrecht on 21-06-02. It is dedicated to the senior teachers of this course, the late Prof. Helmut Masing, Prof. Wolfgang Pirsig, Prof. Robert Th.R. Wentges, Prof. Sigurd Hellmich, Prof. Eugene B. Kern, Dr. Adriaan F. van Olphen, and Dr. John A.M. de Groot.

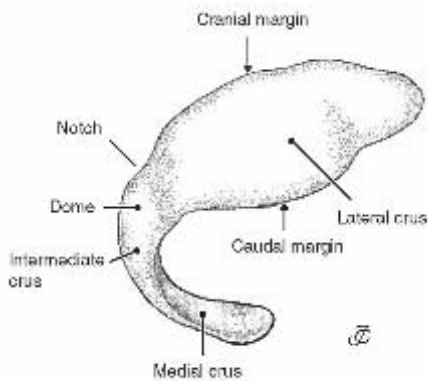


Figure 2. Lobular cartilage with its parts.

shape and position of this cartilaginous structure. And to be consistent, if 'lower lateral cartilage' is rejected then 'upper lateral cartilage' should be abandoned as well.

We suggest adopting another name for the lateral wings of the septolateral cartilage: the 'triangular cartilage' (Huizing, Sedee, Wentges, 1973).

Lobular cartilage instead of 'cartilago alaris major', 'lower lateral cartilage', 'alar cartilage', ('Flügelknorpel', 'cartilage alaire')

As noted above, it is anatomically incorrect to speak of a 'lower lateral cartilage', or 'alar cartilage', as there is no such anatomic entity. The cartilage present in the nasal ala is the lateral part or lateral crus of a large horseshoe-shaped cartilage that surrounds the naris. Because of its position and function, we prefer to call it the 'lobular cartilage'.

We suggest abandoning the terms 'lower lateral cartilage', 'alar cartilage', 'Flügelknorpel' and 'cartilage alaire'. Instead we recommend 'lobular cartilage' with a 'medial crus', 'dome', and 'lateral crus' (Figure 2).

THE SOFT-TISSUE AREA'S

There is some confusion about the names of the four most important soft-tissue areas of the external nasal pyramid. They are commonly called the 'weak', 'soft', or 'empty' area. In our opinion, these terms are confusing, as these regions are all weak, soft, and empty. In other words, they lack cartilaginous support. We therefore suggest adopting a nomenclature based on the anatomic region of these soft-tissue areas.

Paraseptal soft-tissue area instead of 'weak triangle'

The triangular supratip area (or supratip depression) is usually called the 'weak' triangle'. (Fomon: 'weak point'; Converse: 'weak triangle'; Ey, Rettinger: 'schwaches Dreieck'; Sulsenti: 'triangolo debole') (Figure 3).

As mentioned above, the supratip area is not the only weak area of the nasal pyramid. The word 'weak' could easily apply just as well to other soft-tissue areas as well. Therefore, 'weak triangle' does not seem to be the appropriate term. Since the supratip area consists of the two paraseptal clefts, we suggest using the term 'paraseptal soft-tissue area'. Another option would be the 'supratip area' or 'supratip depression'.

Lateral soft-tissue area or hinge area instead of 'empty triangle'

The most lateral part of the lower nasal wall contains another rather large, triangularly shaped soft-tissue area. It is bounded by the lateral margin of the triangular cartilage, the ventral margin of the piriform aperture, and the cranial margin of the lateral crus of the lobular cartilage (Figure 3).

It is sometimes called it the 'hinge area', because this region serves as a hinge for the mobile part of the lateral nasal wall during in- and expiration. Sulsenti speaks of the 'triangolo vuoto' (empty triangle); Ey and Rettinger call it the 'leeres Dreieck' (empty triangle). Both Rettinger and Bruintjes advocate use of the term 'hinge area', as it indicates the specific function of this soft-tissue area. We suggest using the term 'lateral soft-tissue area' and/or 'hinge area'.

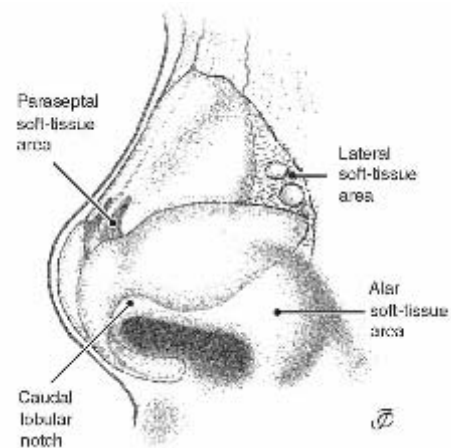


Figure 3. Soft-tissue areas.

Caudal lobular notch instead of 'soft triangle'

Just caudal to the dome the margin of the lobular cartilage has a small indentation or notch. Converse called this area the 'soft triangle'; Masing, Ey, and Rettinger use the term 'weiches Dreieck'; Sulsenti calls it the 'triangolo molle'. Thus most authors thus use the adjunct 'soft'. Although 'soft' does describe this area quite well, it is easy to confuse the 'soft triangle' name with the term 'weak triangle'. Again, we suggest adopting an anatomically more precise term: 'caudal lobular notch'.

Alar soft-tissue area

The lobular domain has a fourth soft-tissue area located caudally to the lateral part of the lateral crus. Sulsenti named this area the 'triangolo fibroso'; Tardy calls it the 'alar lobule'. Again, we suggest adopting an anatomically more correct term: 'lateral alar soft-tissue area'.

THE VALVE AREA

Over the past century various names have been introduced for the internal nasal ostium and the adjacent anatomical structures. The following terms appear in textbooks and other publications:

Ostium internum- introduced by the Viennese anatomist Zuckerkandl (1882) to denote the entrance to the nasal cavity. The term was coined as a counterpart to the ostium externum, i.e., the naris or nostril.

Isthmus nasi- synonymous with ostium internum indicating that this area is the narrowest part of the nose (isthmus Gr = narrow area).

Plica nasi- (plica Lat. = ply) the lower margin of the triangular cartilage.

Limen nasi- (limen Lat. = border) synonymous with plica nasi.

Valve- term coined by Mink (1902, 1903, 1920) to indicate that the ostium internum is not an opening but a dynamic structure that “regulates the inflow of ambient air” in Mink’s words.

Valve area instead of ‘internal ostium’ or ‘isthmus nasi’

Like others (e.g., Kern, 1978) we suggest adopting the term ‘valve area’ for the relative stenosis that forms the transition between the skin-lined nasal vestibule and the mucosa-lined nasal cavity. Anatomically, the valve area is bounded medially by the cartilaginous septum and the premaxillary wing; laterally it is bounded by the lower margin of the triangular cartilage, the caudolateral fibro-fatty tissue, and the head of the inferior turbinate; and caudally it is bounded by the skin-covered floor of the piriform aperture (Figure 4). Physiologically, the valve area is the narrowest region of the breathing pathway. The narrowing causes a tremendous increase in velocity of the inspired air, thereby enhancing the transition of laminar airflow into turbulent airflow, which is necessary for climatization of the air.

AREAS OF THE NOSE

For the purpose of diagnosis and documentation and as to help correlating pathology and symptomatology, Cottle (1961) suggested to dividing the internal nose into five areas: area 1, the external ostium or naris; area 2, the valve area; area 3, the area underneath the bony and cartilaginous vault, also called the attic; area 4, the anterior part of the nasal cavity, including the heads of the turbinates, the infundibulum or ostiomeatal complex; and area 5: the dorsal part of the nasal cavity, including the tails of the turbinates (Figure 5).

Although this division was widely applied it is becoming more and more obsolete. This may be due to the fact that others (Masing, Ey) have introduced a slightly different system. In their classification, the areas 1, 2, 4, and 5 are the same as in Cottle’s, whereas they named the region of the premaxilla ‘area 3’.

We suggest using either the original Cottle-classification to avoid any misunderstanding or (perhaps better) the anatomical nomenclature: nostril, vestibule, valve area, anterior nasal cavity, and posterior nasal cavity (the latter two divided in inferior, middle and upper meatus). Physiologically, we prefer to divide the nasal organ into three functional elements: anterior segment or adapter (upstream area), middle segment or functional area and posterior segment (downstream area) (Figure 6). (Huizing, De Groot, 2003).

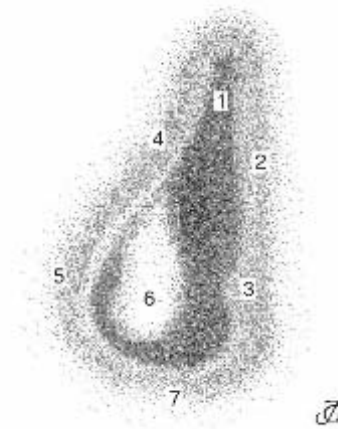


Figure 4. Valve area, formerly called internal ostium or isthmus nasi.

1. Valve angle. 2. Cartilaginous septum. 3. Ventrolateral process of the cartilaginous septum and premaxillary wing. 4. Caudal margin of the triangular cartilage. 5. Fibrofatty tissue area. 6. Head of the inferior turbinate. 7. Nasal floor.

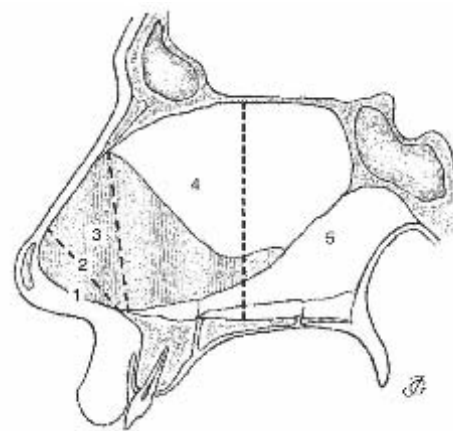


Figure 5. Areas of the nose according to Cottle. Area 1: nostril. Area 2: nasal valve. Area 3: area underneath the bony and cartilaginous vault, also called the attic. Area 4: anterior part of the nasal cavity including the heads of the turbinates and the infundibulum. Area 5: the posterior part of the nasal cavity, including the tails of the turbinates.

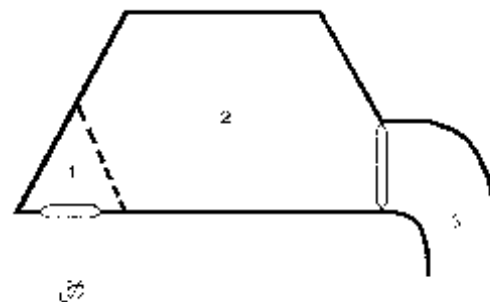


Figure 6. Division of the human nasal organ into three functional elements: (1) anterior segment or adapter (upstream area), (2) middle segment or functional area and (3) posterior segment (downstream area).

INCISIONS

Several incisions used in nasal surgery are unfortunately known by anatomically and/or linguistically incorrect names. In our opinion, these terms should be abandoned and replaced by appropriate ones.

Caudal septal incision (CSI) instead of 'hemitransfixion'

The term 'hemitransfixion' is both anatomically and linguistically incorrect. This incision is made in the skin overlying the caudal end of the cartilaginous septum. It is not a half transfixion. Because of its location and purpose, we suggest using the term 'caudal septal incision' (CSI) (Figure 7).

Both 'transfixion incision' and 'hemitransfixion incision' are linguistic misnomers. As the word 'transfixion' itself implies that the tissues are cut through (Latin: figo, fixi, fixum = to stab), transfixion is the correct word.

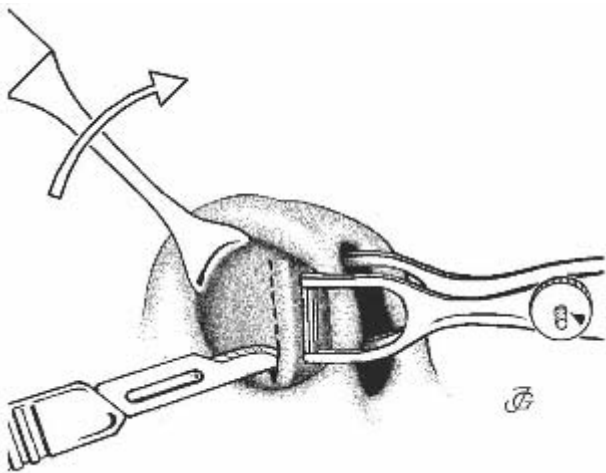


Figure 7. Caudal septal incision (CSI), formerly called hemitransfixion.

Infracartilaginous incision instead of 'marginal incision'

The term 'marginal incision' frequently causes confusion. Many surgeons use it to refer to the incision along the caudal border of the lobular cartilage. However, marginal is often mistakenly understood to mean along the margin of the nostril.

We suggest calling an incision at the caudal margin of the lobular cartilage (as in the external approach and the delivery technique for lobular surgery) an 'infracartilaginous incision' (Figure 8a). This term is anatomically more correct and corresponds to the terms 'intercartilaginous incision' and 'transcartilaginous incision'. It is best to abandon the term 'marginal incision' and call an incision at the rim of the nostril a 'rim incision' (Figure 8b).

'Glabellar incision' is an anatomically incorrect term for the incision made for a transcutaneous transverse osteotomy of the bony pyramid, as this incision is not made at the glabella. Actually, it is made in a horizontal wrinkle at the depth of the frontonasal angle.

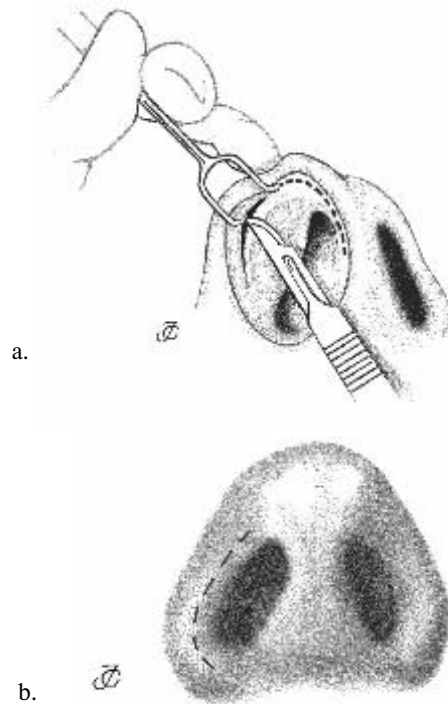


Figure 8. (a) Infracartilaginous incision (formerly called marginal incision) as used in the external approach and the delivery technique. (b) Rim incision as used (in special cases) to approach the soft tissues of the ala.

INTERDOMAL, INTERCRURAL, AND SEPTOCRURAL LIGAMENTS?

These ligaments do not exist, as there are no transverse running fibres between the domes, between the medial crura, and between the septum and the medial crura.

Several textbooks on nasal surgery present drawings of an 'interdomal ligament' (also called 'Pitanguy's ligament'), an 'intercrural ligament', and a 'septocrural ligament'.

Studies of 25 mm thin sections of deep-frozen human nasal specimens performed in our department by Zhai, Bruintjes et al., have shown that none of these structures exist. All connective tissue fibers in the interdomal, intercrural, and septocrural area run parallel to the cartilage (Figures 9 a,b,c). There are no transverse running fibres "that keep the domes and the medial crura together" as several authors have suggested. This confirms to expectations as the external nose is a fusion of a right and left maxillary process.

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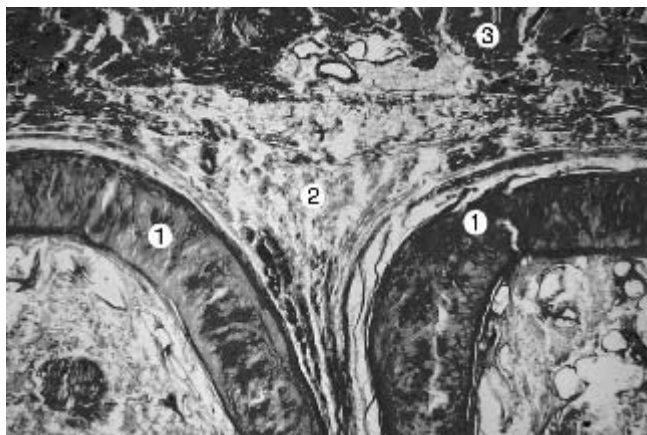


Figure 9.a Interdomal area (transverse section through the lobular tip). There are no horizontally running fibers between the domes. i.e., there is no interdomal ligament. (1) domes, (2) interdomal area consisting of loose connective tissue, (3) muscle fibers.



Figure 9.c Intercrural and septocrural area (coronal section through the lower part of the columella). There are no transverse fibers between the medial crura and between the septal cartilage and the medial crura: i.e., there is no intercrural nor a septocrural ligament. (1) medial crura, (2) loose connective tissue.

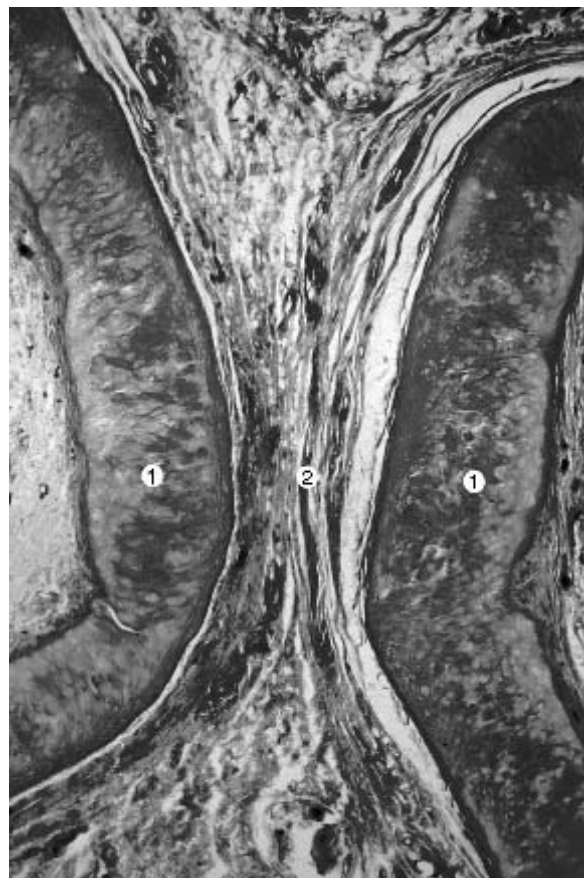


Figure 9.b Intercrural area (transverse section at the level of the columella). There are no transverse fibers connecting the crura. All fibres run parallel to the cartilage, i.e., there is no intercrural ligament. (1) medial crura (2) intercrural area.

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