Orthofacial Surgery

Aesthetic & Functional Surgery of the Facial Skeleton and Mask

Federico Hernández-Alfaro
Adaia Valls Ontañón
Editors

Springer

Federico Hernández-Alfaro
Adaia Valls Ontañón
Editors

Orthofacial Surgery

Aesthetic & Functional Surgery of the Facial Skeleton and Mask

Springer

Editors
Federico Hernández-Alfaro
Department of Oral and Maxillofacial Surgery
International University of Catalonia
Barcelona, Spain

Adaia Valls Ontañón
Department of Oral and Maxillofacial Surgery
International University of Catalonia
Barcelona, Spain

ISBN 978-3-031-76184-3 ISBN 978-3-031-76185-0 (eBook)
https://doi.org/10.1007/978-3-031-76185-0

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Foreword

Reflecting to the past, I realized I met Federico Hernández-Alfaro for the first time at the 20th National Congress of the Spanish Association of Oral and Maxillofacial Surgery (OMFS) in Bilbao, Spain, in 2009. It was Domingo Martin, orthodontist from San Sebastian, who presented me at that time to Federico and his "bro" Mirco Raffaini. Both of them should be considered the pioneers of "orthofacial surgery" worldwide.

Since then, I had the pleasure to meet Federico at many scientific meetings and nice social events overall in the world and we became close friends. I am personally very proud that he proposed me to not only become an associate professor of his OMFS Department, Universitat Internacional de Catalunya, Spain, but also co-direct the first Spanish European PhD thesis by his resident and my fellow Raquel Guijarro Martínez on "Cone-Beam Computerized Tomography (CBCT) Evaluation of the Upper Airway in the Context of Orthognathic Surgery", May 2014.

Orthognathic surgery has been well developed in the past in the 1980s and 1990s to treat different types of maxillofacial deformities both functionally and aesthetically. In the new millennium, treatment strategies however went far beyond occlusal correction. The advent of CBCT, 3D virtual planning, minimally invasive (MI) surgical techniques, and simultaneous ancillary surgical techniques to enhance the aesthetics of the overlying soft tissue mask has definitely changed "orthognathic surgery" into "orthofacial surgery".

With "Orthofacial Surgery" by the editors Federico Hernández-Alfaro and Adaia Valls-Ontañón, the reader has a marvellous manuscript towards aesthetic and functional surgery of the facial skeleton and the overlying soft tissue mask in their hands. It provides a comprehensive, evidence-based overview of the latest advancements in orthognathic and orthofacial surgery, supported by state-of-the-art publications. It describes in a highly detailed way all aspects of "orthofacial surgery" in 15 consecutive chapters: Facial Diagnosis (Chap. 1); The Long Face (Chap. 2); The Short Face (Chap. 3); Transverse Problems (Chap. 4); Facial Asymmetry (Chap. 5); Surgical Orthodontics (Chap. 6); Clear Aligner Therapy in Orthognathic Surgery (Chap. 7); Three-Dimensional Planning in Orthofacial Surgery (Chap. 8); Minimally Invasive Surgery of the Maxilla (Chap. 9); Minimally Invasive Surgery of the Mandible (Chap. 10); Surgery of the Chin (Chap. 11); Simultaneous Bimaxillary Surgery and Rhinoplasty and Evolving Concepts in Orthofacial Surgery (Chap. 12); Ancillary Procedures in Orthofacial

Surgery (Chap. 13); Peroperative Surgical Management and Recommendations (Chap. 14); and finally, Airway and Skeletal Surgery (Chap. 15).

Both authors need to be congratulated on their standardized and systematized approach to "orthofacial surgery", which is truly unique.

Professor Federico Hernández-Alfaro is a distinguished and world-renowned authority in the field of OMFS. His profound scientific insights and innovative surgical treatment strategies have firmly established him as a pioneer in "orthofacial surgery". His extensive body of evidence-based research, groundbreaking peer-reviewed publications, and many national and international lectures serves as essential references for both established specialists and young "NextGen" surgeons who will further shape the future of OMFS. Our shared passion for innovation, precision, and interdisciplinary collaboration has pushed a relationship of mutual respect, marked by continuous academic and clinical exchange. Moreover, and last but not least, Federico Hernández-Alfaro is an inspiring mentor to the profession of both surgeons (including myself) and orthodontists. This book marks an absolute and important new milestone and is an absolute "must-read"!

I hereby extend my deepest appreciation to Professor Hernández-Alfaro for his tireless contributions to the OMFS and orthodontic field and I am more than confident that this book will set a new benchmark in the literature on orthognathic and orthofacial surgery. I wish the reader an enriching and inspiring journey through the pages of this outstanding and brilliant work.

Gwen R. J. Swennen

Division of Maxillofacial Surgery
and Facial Plastic Surgery,
Department of Surgery
AZ Sint-Jan Brugge AV
Bruges, Belgium
February 2025

Preface: From Orthognathic to Orthofacial Surgery

A decade ago, 90% of my surgical patients with dentofacial deformities were referred by orthodontists for a combined ortho-surgical approach to manage malocclusions. Today, 70% of our patients initially visit our office with concerns primarily about facial aesthetics and airway issues.

The term "orthognathic surgery", referring to skeletal surgery aimed at correcting malocclusions, is now obsolete. In its place, a new concept has emerged, signalling a paradigm shift in the contemporary management of facial deformities.

"Orthofacial surgery" is defined as aesthetic and functional surgery of the facial skeleton and its overlying soft tissues. This approach extends beyond traditional "orthognathic surgery" and "facial aesthetic surgery". Previously, orthognathic surgery focused primarily on correcting altered occlusions through 3D repositioning of the maxilla and mandible. Conversely, facial aesthetic surgery primarily deals with the management of facial soft tissues and often focuses on facial rejuvenation.

Modern orthodontics can often successfully correct malocclusions and achieve a proper bite; however, facial aesthetics and airway concerns have become major factors for many patients.

Orthofacial surgery aims to normalize the facial skeleton and the overlying soft tissues. It requires surgeons to be comprehensively trained in order to adopt a holistic approach to facial issues.

There are three primary reasons why patients might seek orthofacial surgery. Firstly, aesthetic concerns often involve the facial structure—including the maxilla, mandible, chin, nose, and/or malar areas—and the soft tissue mask. Secondly, patients often present with altered dental occlusions caused by abnormal sizes or positions of the maxilla or mandible; aesthetic concerns are almost always concurrent. Thirdly, an increasing number of patients suffer from obstructive sleep apnea syndrome (OSAS), which is often poorly managed with continuous airway pressure devices. Maxillo-mandibular advancement has proven to be the only curative method for patients with moderate and severe OSAS.

The management of dentofacial deformities has undergone significant changes recently. Clinical aesthetic diagnosis has replaced traditional cephalometric approaches in facial surgical planning: it is no longer just about measurements but about proportions and the subjective perception of beauty. Additionally, 3D planning enables the precise execution of the surgical plan in the operating room, minimizing the need for intraoperative improvisation.

Minimally invasive surgical principles have also transformed the field, fostering an empathic approach that reduces extensive surgical exposure and soft tissue disruption. The principle of "less is more" aptly describes this new approach.

Thanks to these innovations, "orthognathic surgery" is presently considered to be an outdated concept. Meanwhile, a new philosophy of "orthofacial surgery" has emerged. In subsequent chapters, we will explore all the procedures associated with orthofacial surgery and various clinical scenarios.

Barcelona, Spain Federico Hernández-Alfaro

Contents

Facial Diagnosis

1

Federico Hernández-Alfaro

1.1 Why Not Cephalometry?

Planning in orthognathic surgery has been and remains an open issue. We have evolved from two-dimensional (2D) classical cephalometric hard-tissue planning to 2D soft-tissue planning [1] and finally to three-dimensional (3D) and hard- and soft-tissue evaluation [2, 3]. In all cases, the goal has been to establish normative data that could be used by clinicians to diagnose and plan the treatment of dentofacial deformities.

There are two important limitations. Most of the "classical" cephalometric analyses reflect a norm derived from a limited number of average individuals not necessarily attractive and with normal occlusions. On the other hand, when different cephalometric analyses are applied to a particular individual, the diagnosis and thus the treatment plan may vary between them [4]. These analyses can at best enhance orthodontic diagnosis and treatment planning, but they are used mainly for descriptive purposes. Individual tracings are compared to an average facial pattern, and the difference between them requires considerable interpretation.

F. Hernández-Alfaro (✉)
Department of Oral and Maxillofacial Surgery,
International University of Catalonia,
Barcelona, Spain
e-mail: h.alfaro@uic.es

The studies of Farkas et al. [5] and posterior developments by authors such as Holdaway [6, 7], Merrifield [8], and Arnett et al. [9, 10] brought attention to the soft tissues (facial mask) in aesthetic diagnosis and planning.

For patients with dentofacial deformities, Sarver et al. [11] introduced the concept of centripetal construction of the face, whereby the soft tissues should guide skeletal correction.

Arnett must be mentioned for being the first author to truly systematize a comprehensive facial soft tissue analysis in both the frontal and sagittal planes. However, the normative data for the analysis of Arnett were extracted from a rather small sample of "attractive" subjects, according to the author. On the other hand, his facial measures are related to a vertical line through the subnasale. In our experience, this line does not constitute a stable reference, considering that a great majority of disharmonic surgical patients have varying degrees of maxillary hypoplasia (95%). These circumstances prevent the use of this line as an absolute reference.

In sum, no current cephalometric analysis can be used as an absolute road map for facial planning—the main reason being that no algorithm has been able so far to include a big enough population of normal/attractive individuals segmented by race, age, sex, geographical location, etc.

By no means am I condemning cephalometric analyses. They are perfect to analyze dentoskel-

F. Hernández-Alfaro, A. Valls Ontañón (eds.), *Orthofacial Surgery*,
https://doi.org/10.1007/978-3-031-76185-0_1

etal relations, hard/soft tissue relations, performing superimpositions, monitoring growth, evaluating relapse, etc.

My personal philosophy can be summarized as follows: "Frontal (symmetry) and occlusal parameters are objective and can be measured. Sagittal (vertical and anteroposterior) parameters are subjective and constitute the artistic part of this specialty, which, as from now, will be referred to as orthofacial surgery".

Also, when it comes to facial planning, we are not focusing on measurements or absolute dimensions but on harmony and proportions.

In the rest of this chapter, I will try to describe my personal approach to facial planning.

1.2 Two Rules of Facial Harmony

At this point, one might think that losing cephalometry as a strict guide for facial diagnosis and planning could be like navigating an uncharted sea. The truth is that it is indeed somehow that way. However, there are several aspects that should be considered when planning orthofacial surgery.

According to our personal "*3D Facial Aesthetic Design*," a harmonious face should abide with two rules which can be summarized as follows: symmetry and facial projection (i.e., vertical, transverse, and anteroposterior proportions). These generic concepts must accompany all therapeutic efforts in facial surgery. All faces which any of us may consider attractive include both of these rules.

1.2.1 Symmetry

Harmonious faces are symmetrical. But on the other hand, completely symmetrical faces do not exist. The goal should be to achieve enough symmetry for the patient to be perceived as symmetric by himself and by peers. We have a specific chapter dealing with the diagnosis and management of facial asymmetries. Three-dimensional planning has obviously contributed to better understand problems in the frontal plane and to more precisely evaluate levels of asymmetry in the face (Fig. 1.1).

1.2.2 Facial Projection

1.2.2.1 Facial Anterior Projection (FAP)

If we set a coronal plane through the soft tissue nasion with the patient at rest (natural head position), all elements of a harmonious face should basically be projected in front of this plane. This obviously depends on the relative projection of the maxilla and mandible and also involves the nose, lips, and chin support. We will later analyze

Fig. 1.1 Symmetry is a binary concept. Perfect symmetry, however, does not exist in human nature. We need to achieve enough symmetry for the patient to be perceived as symmetrical by him/herself and by others

Fig. 1.2 The upper incisor to soft-tissue plane or "Barcelona Line" is an absolute reference when it comes to determine an appropriate anterior facial projection

how we use this specific soft-tissue plane (STP) as an absolute reference in facial planning [1] (Fig. 1.2).

1.2.2.2 Facial Vertical Projection (FVP)

Vertical problems should not be analyzed cephalometrically. A face could impress us as being short, normal, or long, irrespective of any measures or tracings. Once we get this impression, identification of the cause for that impression will give us the clues to plan its correction (Fig. 1.3).

1.2.2.3 Facial Transverse Projection (FTP)

This concept has an occlusal component and a facial one. Transverse maxillomandibular discrepancy has important occlusal implications and will be dealt with in a separate chapter.

Transverse proportions between the middle and lower thirds of the face are also paramount to facial beauty and will be covered later in this book.

1.2.2.4 Soft-Tissue Support

This concept somehow summarizes and is a consequence of the previous concept. No matter how

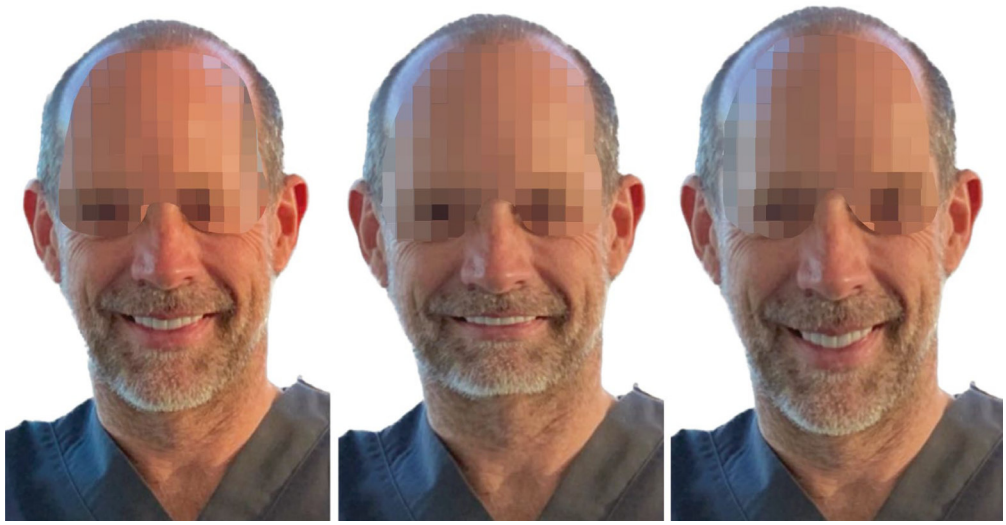

Fig. 1.3 The perception of "short" or "long" is not always related to the proportion of the facial thirds

we plan a face, its volume at the end of surgery must be equal to or greater than the preoperative volume. The reason for this is to maintain or (even better) increase support for the facial mask. The opposite results in premature aging. This means that contracting or posteriorly repositioning some skeletal parts has to be compensated by the expansion or anterior repositioning of others. Besides aesthetic reasons, there is a fundamental functional reason: skeletal contraction might provoke reduction of the airway and thus sleep apnea.

It is obvious that most dentofacial deformities present different combinations of problems, but at any rate, all five traits should be collected and implemented when planning for facial skeletal surgery (orthofacial surgery).

In the end, when diagnosing and planning facial correction, we have to consider that occlusal and frontal (symmetry) problems can be accurately objectivized, whereas sagittal ones cannot, and should remain in the subjective (artistic) arena.

References

1. Hernández-Alfaro F. Upper incisor to Soft Tissue Plane (UI-STP): a new reference for diagnosis and planning in dentofacial deformities. Med Oral Patol Oral Cir Bucal. 2010;15(5):e779–81.
2. Paredes de Sousa Gil A, Guijarro-Martínez R, Haas OL Jr, Hernández-Alfaro F. Three-dimensional analysis of nasolabial soft tissue changes after Le Fort I osteotomy: a systematic review of the literature. Int J Oral Maxillofac Surg. 2019;48(9):1185–200.
3. Incrapera AK, Kau CH, English JD, McGrory K, Sarver DM. Soft tissue images from cephalograms compared with those from a 3D surface acquisition system. Angle Orthod. 2010;80:58–64.
4. Wylie GA, Fish LC, Epker BN. Cephalometrics: a comparison of five analyses currently used in the diagnosis of dentofacial deformities. Int J Adult Orthodon Orthognath Surg. 1987;2:15–36.
5. Farkas LG, Eiben OG, Sivkov S, Tompson B, Katic MJ, Forrest CR. Anthropometric measurements of the facial framework in adulthood: age-related changes in eight age categories in 600 healthy white North Americans of European ancestry from 16 to 90 years of age. J Craniofac Surg. 2004;15:288–98.
6. Holdaway RA. A soft-tissue cephalometric analysis and its use in orthodontic treatment planning. Part I. Am J Orthod. 1983;84(1–28):5.
7. Holdaway RA. A soft-tissue cephalometric analysis and its use in orthodontic treatment planning. Part II. Am J Orthod. 1984;85:279–93.
8. Merrifield LL. The profile line as an aid in critically evaluating facial esthetics. Am J Orthod. 1966;52:804–22.
9. Arnett GW, Bergman RT. Facial keys to orthodontic diagnosis and treatment planning. Part I. Am J Orthod Dentofacial Orthop. 1993;103:299–312.
10. Arnett GW, Bergman RT. Facial keys to orthodontic diagnosis and treatment planning. Part II. Am J Orthod Dentofacial Orthop. 1993;103:395–411.
11. Sarver DM, Rousso DR. Plastic surgery combined with orthodontic and orthognathic procedures. Am J Orthod Dentofacial Orthop. 2004;126:305–7.

Vertical Problems: The Long Face

2

Federico Hernández-Alfaro

2.1 Diagnosis

The diagnosis of a long face follows exactly the same sequence as that described for a short face [1]. Once we get the "impression" of a long face, we need to break down the problem, and again there are four traits, alone or combined, which can give that impression: vertical excess of the maxilla, vertical excess of the chin, open bite, and narrow face (Fig. 2.1).

Correction of a long face entails a therapeutic dilemma, however: we should theoretically shorten the face, but this inevitably would provoke loss of soft tissue support and thus premature facial aging.

2.1.1 How Can We Solve This Conflict?

There are basically two strategies: first, to always undershorten the face, meaning staying on the "long" side, and, second, to project the face anteriorly, thus maintaining adequate support for the facial soft tissue mask.

F. Hernández-Alfaro (✉)
Department of Oral and Maxillofacial Surgery,
International University of Catalonia,
Barcelona, Spain
e-mail: h.alfaro@uic.es

A long face needs to stay long. If you check on the Internet for models, actors, and appealing harmonious faces, you will realize that most attractive individuals have the lower third of the face which is longer than the middle third.

When I am planning for correction of a long face, I like to vertically undercorrect the maxilla, limiting my impactions and, particularly in young women, maintaining some degree of lip incompetence. Besides preserving soft-tissue support, this strategy will avoid excessive lip competence or the absence of incisal display some years down the road. The bottom line is that when correcting a long face, it is more about changing the components and correcting negative traits than about actually shortening the face (Fig. 2.2).

There is a second strategy to overcome the therapeutic dilemma which appears when shortening a face but still willing to maintain an adequate soft-tissue support. It consists of projecting the face forward. More specifically, whenever we need to either impact the maxilla, close an open bite, or vertically reduce the chin, we need to compensate this vertical reduction with anterior repositioning of the maxillomandibular complex (Fig. 2.3). This forward repositioning in our protocol follows the Barcelona Line as an absolute reference [2] (Fig. 2.4).

The typical and more prevalent "long face syndrome" usually presents with an open bite, maxillary excess, and a posteriorly rotated

F. Hernández-Alfaro, A. Valls Ontañón (eds.), *Orthofacial Surgery*,
https://doi.org/10.1007/978-3-031-76185-0_2

Fig. 2.1 A long face can be the result of one of the following traits, alone or combined: vertical maxillary hyperplasia, vertical chin excess, narrow face, and open bite

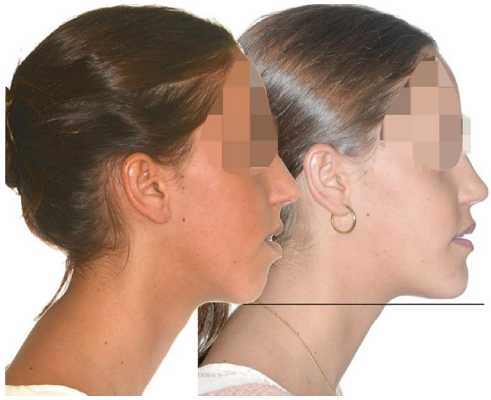

Fig. 2.2 Pre- and postoperative view illustrating that a long face should stay "long"

Fig. 2.3 Shortening of the face should be accompanied by anterior projection (face push) to preserve soft-tissue support

mandible [1]. It can be accompanied by Angle class II (Fig. 2.5) or class III occlusion. In addition to the aforementioned characteristics, a class III long face usually presents with a hypoplastic maxilla in the anteroposterior dimension (Fig. 2.6).

In contrast to what we have mentioned in relation to short faces, long face management typically includes counterclockwise rotation of the occlusal plane. The reason for this is the fact that most long face patients present with a posteriorly rotated mandible, which provokes lengthening of the face and a lack of jawline and chin–neck definition (Fig. 2.7).

General therapeutic goals in long face management could be summarized as follows:

- To achieve class I occlusion and adequate overbite, correct incisal exposure, anterior projection of the face, definition of the labiomental fold, and the maintenance of soft-tissue support.

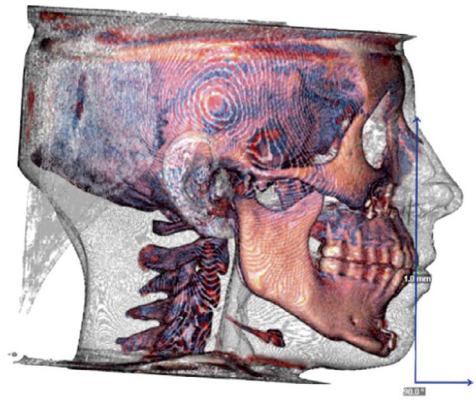

Fig. 2.4 Forward repositioning of the maxillomandibular complex following the Barcelona Line as an absolute reference

Closing the open bite tends to be the most important occlusal goal in long face patients. The orthodontist needs to evaluate transverse and vertical intra-arch problems. When a pronounced curve of Spee is present in the maxilla, orthodontic preparation should proceed with a two-level segmental preparation [3, 4]. With the aid of sectional or utility arches, a step should be generated between laterals and cuspids. Then, upper arch leveling is achieved surgically by segmenting the maxilla [5] (Fig. 2.8a and b).

Fig. 2.5 Counterclockwise rotation of the occlusal plane is indicated in most cases of long face

Fig. 2.6 Class III occlusion is also frequently associated with a long face and should be managed with the same principles

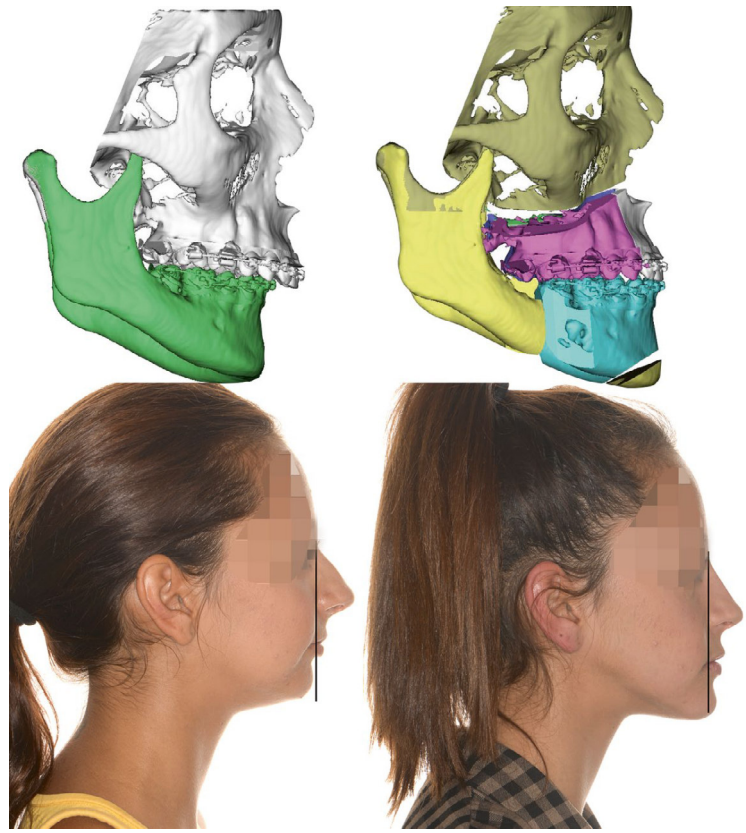

Fig. 2.7 The Barcelona Line serves as an absolute reference for anterior maxillomandibular repositioning

Fig. 2.8 (**a** and **b**) Long face secondary to vertical maxillary excess and open bite, corrected with double jaw surgery

2.2 Gummy Smile

This is one of the most prevalent characteristics of a long face [6]. When analyzing a gummy or gingival smile, it is of utmost importance to establish an adequate differential diagnosis and rule out the possible altered passive eruption as well as lip hypermobility [7, 8]. The former is managed with periodontal surgery and the latter with botulinum toxin [6, 9].

The third and probably the most frequent cause of gummy smile is vertical maxillary excess.

Surgical management of the smile basically consists of either impacting, downgrafting, or leveling the maxilla (Fig. 2.9) in order to modify incisal/gingival exposure, both at rest and when smiling [10]. Long faces are frequently associated with an excessive anterior display (Fig. 2.10).

Fig. 2.9 Segmental orthodontic preparation of the upper arch allows for surgical correction of the curve of Spee through maxillary segmental surgery

Fig. 2.10 Gummy smile secondary to vertical maxillary excess is corrected with maxillary impaction

In any case, it is very important to take into consideration the fact that forward repositioning and/or counterclockwise rotation of the maxilla may have an impact on the amount of incisal display. This means that vertical changes measured intraoperatively with the caliper should not be accepted as absolute when a simultaneous advancement and/or counterclockwise rotation of the maxilla takes place. Instead, clinical intraoperative judgment must accompany vertical fine-tuning, and it should be related to lip reaction.

2.3 Labiomental Fold

The labiomental fold is usually absent in long faces. There are two possible causes, alone or combined. First, lack of torque in the lower incisors (the incisor–mandibular plane angle (IMPA) should be orthodontically placed at approximately 90° in relation to the mandibular plane) [4] (Fig. 2.11). Second, lack of chin projection, typically associated with posteriorly rotated mandibles, and which will require an advancement genioplasty (Fig. 2.12).

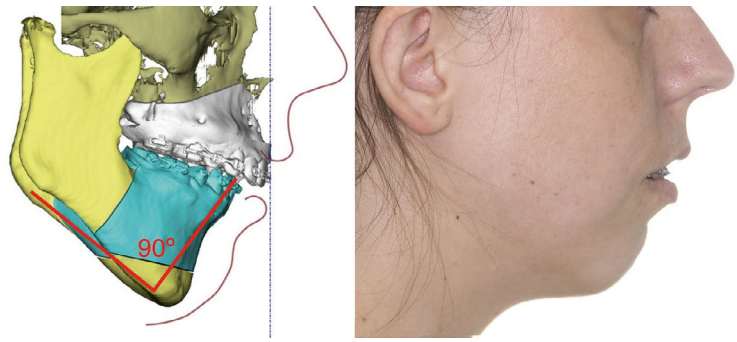

Fig. 2.11 The labiomental sulcus can be defined by adequate torque in the lower incisors and/or adequate chin projection

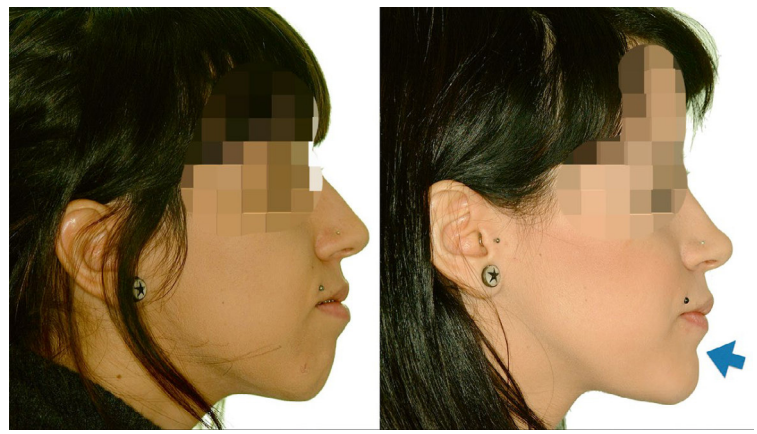

Fig. 2.12 The "long face impression" is enhanced when jawline definition is absent and disappears when it is recovered

A lack of mandibular/chin definition in the frontal view further enhances the "long face impression." In a way, it is as if we were unable to identify "the end of the face." Achievement of an adequate projection of the mandible, usually via counterclockwise rotation, typically provokes this "end of the face" effect, which visually eliminates the "long face impression" (Fig. 2.13).

Fig. 2.13 "Long face appearance" is associated with a lack of definition of the "end of the face." Pushing the face forward improves this definition

2.4 Key Points

- Vertical evaluation of the face relies on perception rather than on measurements. The "impression of short or long" is what matters.
- There are four components causing vertical problems: maxillary height, chin height, bite, and transverse dimension of the face.
- Short faces need lengthening. Clockwise maxillomandibular rotation and maxillary downgrafting are the typical movements associated to correction.
- Long faces often do not need shortening but rather the redistribution of components. In the case of shortening of a long face, compensation should be achieved by anterior projection.
- Gummy smile must be carefully analyzed to determine which of the three causes (vertical maxillary excess, lip hypermobility, or altered passive eruption) are implicated.
- The labiomental fold is often absent in long faces because of a lack of incisor torque and/or a receded chin.

References

1. Hernández-Alfaro F, Rozencweig G. Syndrome d'hyperdivergence faciale. [The long face syndrome]. L'Orthodontie Française: Orthod Fr. 2016;87:479–489.
2. Hernández-Alfaro F, Vivas-Castillo J, de Oliveira, Rogerio B, Haas Junior OL, Giralt-Hernando M, Valls-Ontañón A. Barcelona line. A multicenter validation study of a facial projection reference in orthognathic surgery. Br J Oral Maxillofac Surg [Internet] 2022. Available from: https://www.sciencedirect.com/science/article/pii/S0266435622002819.
3. Prittinen JR. Orthodontic diagnosis of long face syndrome. Gen Dent. 1996;44(4):348–51.
4. Prittinen JR. Orthodontic management of long face syndrome. Gen Dent. 1997;45(6):568–72.
5. Haas Junior OL, Guijarro-Martínez R, de Sousa Gil AP, da Silva Meirelles L, de Oliveira RB, Hernández-Alfaro F. Stability and surgical complications in segmental Le Fort I osteotomy: a systematic review [Internet]. Int J Oral Maxillofac Surg Elsevier. 2017;46:1071–87. [cited 2017 Jul 2]. Available from: http://www.ncbi.nlm.nih.gov/pubmed/28601432.
6. Zardawi FM, Gul SS, Fatih MT, Hama BJ. Surgical procedures reducing excessive gingival display in gummy smile patients with various etiologic backgrounds. Clin Adv Periodontics. United States. 2020;10:130–4.
7. Younespour S, Yaghobee S, Aslroosta H, Moslemi N, Pourheydar E, Ghafary ES. Effectiveness of different modalities of lip repositioning surgery for management of patients complaining of excessive gingival display: a systematic review and meta-analysis. Biomed Res Int. 2021;2021:9476013.
8. Dym H, Pierre R 2nd. Diagnosis and treatment approaches to a "gummy smile". Dent Clin N Am. 2020;64(2):341–9.
9. Duruel O, Ataman-Duruel ET, Tözüm TF, Berker E. Ideal dose and injection site for gummy smile treatment with botulinum toxin-a: a systematic review and introduction of a case study. Int J Periodontics Restorative Dent. 2019;39(4):e167–73.
10. Bastidas JA. Surgical correction of the "gummy smile". Oral Maxillofac Surg Clin North Am [Internet]. 2021;33(2):197–209. https://doi.org/10.1016/j.coms.2021.01.005.

The Short Face

3

Federico Hernández-Alfaro

3.1 How Do I Diagnose a Vertical Problem?

Vertical analysis is an essential aspect of aesthetic facial diagnosis and planning [1, 2]. Classical cephalometric analyses have proposed a number of methods to vertically diagnose the face (Fig. 3.1) [3–6]. All of them are based either on numbers or on proportions between different thirds of the face. The most widely accepted norm, coming from the Renaissance masters, is that all three facial thirds should be equal [7].

My personal approach is an aesthetic one and is based on the "impression" of facial length rather than on "measurements" of the facial thirds [8]. Hence, I will define a face as being short, normal, or long, based on my impression [2] (Fig. 3.2).

This approach might seem too naive or subjective, but it is not. Over the last years, in my university seminars and congress lectures worldwide, I have had the opportunity to see that there is a high level of agreement when it comes to subjectively evaluating a face in the vertical dimension, classifying it as normal, short, or long [9].

Looking at all the faces in Fig. 3.3, most readers will agree that they "impress" us as being "short faces." However, if we measure them and apply the classical equal-third cephalometric concept, we will find that they are not. Hence, at this point, we need to agree that it is the first impression, more than a numerical analysis, that prevails when describing a vertical face imbalance [2]. However, this first decision does not say much regarding the cause of and/or solution to the problem. So, what is next?

F. Hernández-Alfaro (✉)
Department of Oral and Maxillofacial Surgery,
International University of Catalonia,
Barcelona, Spain
e-mail: h.alfaro@uic.es

F. Hernández-Alfaro, A. Valls Ontañón (eds.), *Orthofacial Surgery*,
https://doi.org/10.1007/978-3-031-76185-0_3