

Chapter 1

Introduction: Orthognathic Surgery – A Life's Work

Hugo L. Obwegeser

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Introduction

Dr Farhad B. Naini has asked me to write an introduction to this definitive textbook on Orthognathic Surgery. I am very grateful for the honour. My intention is to compose a commentary on the development of orthognathic surgery. Firstly, however, I must express my gratitude to my teachers. It is due to them that I developed the ability to produce new ideas (Figure 1-1). I initially received general surgical training for six months in the military services and an equivalent period in a country hospital in my native town. Following this I had the privilege to train for two years with Hermann von Chiari at his Viennese Institute for Pathology and Microbiology. I then spent six years training in dentistry and maxillofacial surgery with my teacher Richard Trauner at the Maxillofacial Unit of the Dental School of the University of Graz. I spent another five months training in plastic and reconstructive surgery with Sir Harold Gillies in Basingstoke, London, and later six months with Eduard Schmid in Stuttgart. Norman Rowe and Paul Tessier were very good friends and colleagues of mine, and we learned from each other. All I know I owe to my teachers.

Historical remarks

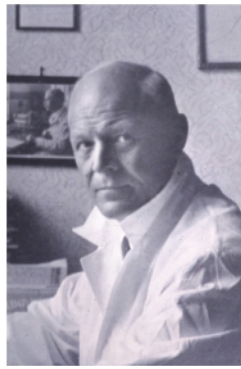
The wish to correct deformities of the maxillo-mandibular complex is an old desire. It was mainly mandibular anomalies that led to a desire for the development of corrective surgery. V.P. Blair (1907),¹ F. Kostečka (1934),² and others developed ideas and techniques to cut the body or the ramus of the mandible for repositioning into a planned new occlusion. Their procedures did not satisfy my teacher Richard Trauner, as the results had too many problems. He suggested that we needed to develop another osteotomy that would produce broad contacting bone surfaces and as such have better prerequisites for early bony union and reduce the likelihood for relapse.

How did the sagittal splitting procedure come into being?

Due to my teacher's request it was my obligation to develop an idea for a procedure that would fulfil his intentions. As I very much disliked skin incisions in the visible regions of the face for surgery on the facial

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My teachers



- Hermann Chiari
- Richard Trauner
- Eduard Schmid
- Harold D. Gillies
- Norman Rowe
- Paul Tessier

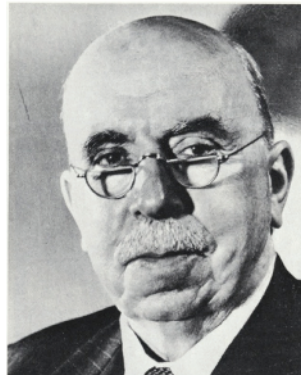
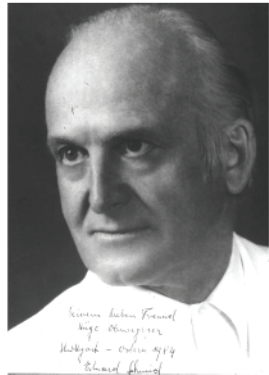
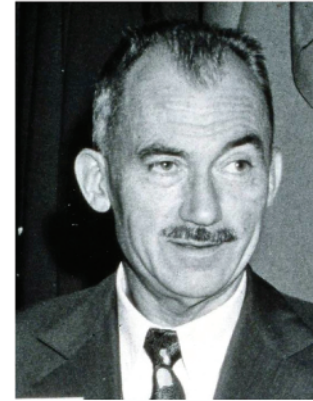
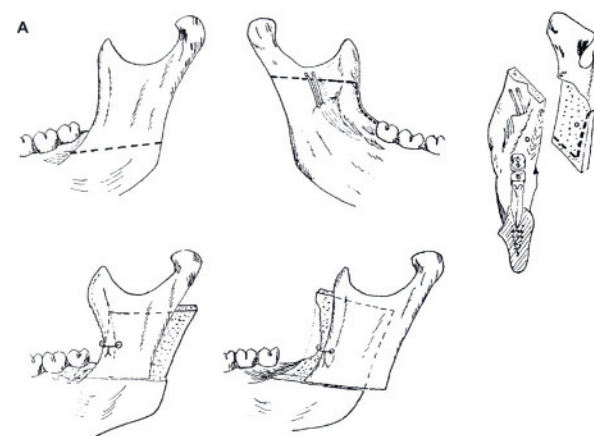


Fig. 1-1 My teachers (anticlockwise): Professor Hermann von Chiari, Chief of the Institute of Pathology and Microbiology of the University of Vienna. Professor Richard Trauner, Chief of Dentistry and Maxillofacial Surgery, University of Graz, Austria. Professor Eduard Schmid, Chief of the Klinik für Gesichtschirurgie, Marienhospital, Stuttgart. Sir Harold Gillies, International founder of Plastic and Reconstructive Surgery, Basingstoke, England. Mr Norman Rowe, Chief of Department of Oral Surgery, Basingstoke, England. Dr Paul Tessier, Chief of the Department of Plastic Surgery, Military Hospital, Paris.

skeleton, I had to find a transoral procedure. I took a cadaveric mandible and turned it around in my hands in order to view it from every direction. By doing so I realised that the vertical splitting of the ramus would produce the ideal situation in relation to the desired goal. However, how could it be split without damaging the mandibular nerve in its canal? In order to find that out I decided to make horizontal cuts about every five millimetres in the ramus. The resultant findings proved very promising. No instrument should touch the area of the mandibular canal. It became obvious that I had to cut the lingual cortical plate of the mandible just above the entrance of the mandibular nerve into the mandible. Another cut of the lateral cortical plate had to be placed somewhere close to the angle, either above or in front of it, but towards the angle in order to correct an unpleasant angle anomaly. That would provide enough raw bone surface contact for fast bony union, independently of whether the mandible would be repositioned in a posterior or an anterior position, or even when a rotation of the mandible was necessary (Figure 1-2).



from J. O.O.O. 10:677,1957

Fig. 1-2 Drawings of my sagittal splitting technique (from: Obwegeser, 1957).³

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Trauner's inverted L-shaped osteotomy of the ramus

My chief, Richard Trauner, liked my idea. He himself had the intention to perform his idea, an inverted L-shaped osteotomy of the ramus. Trauner's technique required both a transoral and a transfacial approach. The first patient in whom we attempted to produce our ideas was an edentulous young lady, on 17 February 1953. Due to the use of the acrylic splints fixed to the jaws for intermaxillary fixation, the surgery became rather chaotic and somewhat of a mess.

My first successful sagittal splitting of the mandibular ramus

The next case was a 24-year-old female with an intact dentition, but with a protruding position of the mandible. We operated on her on 22 April 1953. This time the procedure went very well (Figure 1-3). The patient's right side was operated using Trauner's technique of the inverted L-shaped osteotomy; it was satisfactory.

I now had the opportunity to perform my first sagittal splitting procedure of the mandibular ramus on the patient's left side. My operation proceeded without any problems. The segments of the split ramus fitted together nicely after the mandible was fixed in the new occlusal position by intermaxillary fixation. It did not require any further fixation. So I proceeded to close the soft tissues tidily over the anterior ramal rim. The result was very pleasing and remained stable over 33 years (Figure 1-4).

My final technique for many years (Figure 1-5)

In the early days, when I was forming my ideas into practical procedures, we operated under sedation and local anaesthesia. General intubation anaesthesia was, in those days, only available for the radical surgery required in cancer cases. Nowadays, the orthognathic patient almost invariably receives general anaesthesia, usually with nasal intubation. A rubber prop is placed between the upper and lower teeth on one side, which keeps the mouth open while operating on the contralateral side. The vestibular mucosa is infiltrated with a 1% local anaesthetic solution plus vasoconstrictor, from the premolar region up to the coronoid process. The incision goes through the mucosa and the periosteum, almost in the depth of the vestibulum, and follows cranially along the anterior crest. The periosteum is elevated in the areas of the bone cuts to be performed, inferiorly above the angle and cranially above the lingula back to the posterior border. Next, the cortical cuts are undertaken. For that I cut on the lingual side the anterior rim with a carbonate burr in order to allow good vision further posteriorly. I use a 3 mm fissure burr to cut the lingual cortical bone above the lingula, to the depth that blood points appear, as far back as the posterior border. The lateral cut is normally performed in the angle area; however, in cases of severe retromandibulism I may go forward to the extent that I will be close to the mental foramen. To connect both osteotomies I produce a vertical cut. For that I use, for safety reasons, a rose burr, making one perforation after the other on the lingual side of the crest, just through the cortical plate. Finally, they are

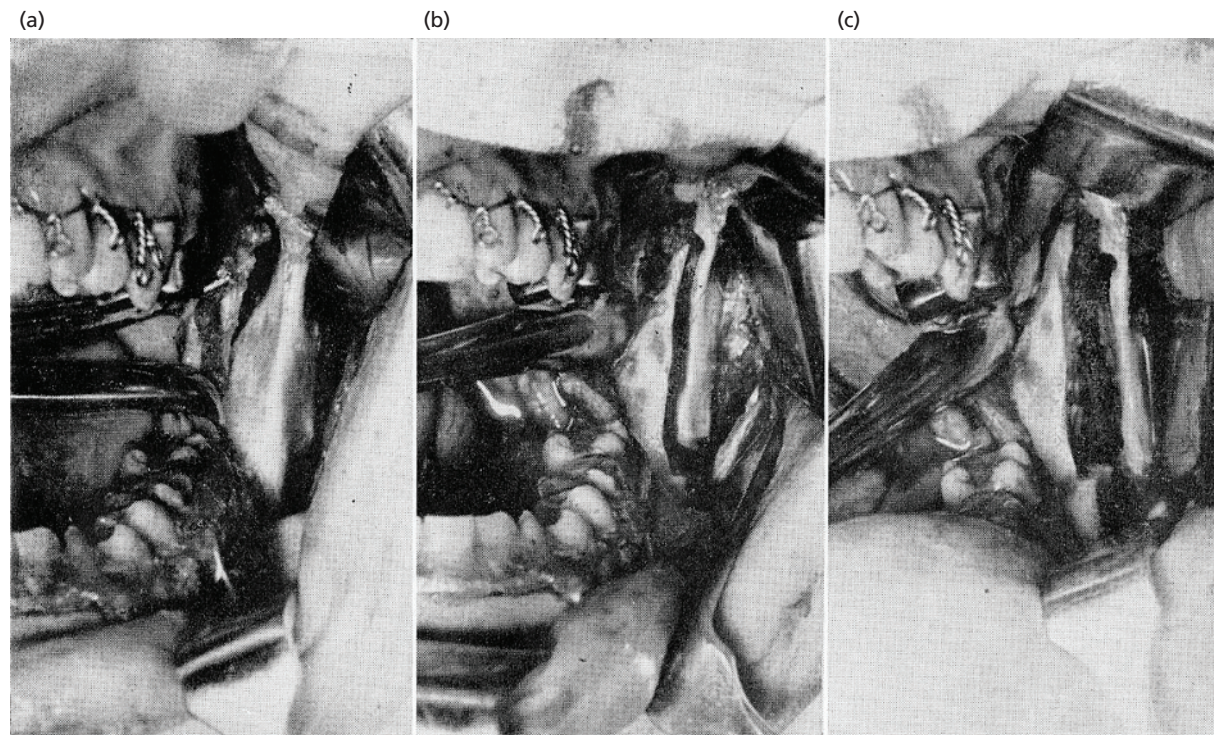


Fig. 1-3 Intraoperative photographs (from: Obwegeser, 1957).³

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The first successfully operated sagittal split: Graz, Austria, 22 April, 1953



Fig. 1-4 My first successful sagittal splitting case (from: Obwegeser HL. Mandibular Growth Anomalies. Springer, 2001).³¹

connected with a bone cutting burr. I want to be certain that I will not be too deep in the ramus, thereby reducing the risk of damage to the mandibular nerve. My nephew, Joachim Obwegeser, prefers to make this connecting cut by the use of a saw. Using the wedge

osteotome, I open the cut gently and not too deeply. Next I use my bone spreader forceps, inserted into the vertical cut, in order to open the cortical plates (see Figure 1-5). Normally, the split opens the cortical plates right through to the posterior border; if not, the posterior border is cut under direct vision with a broad splitting osteotome. By employing this technique I was able to avoid damage to the nerve. Fixation screws will have to be carefully placed.

My final technique for many years

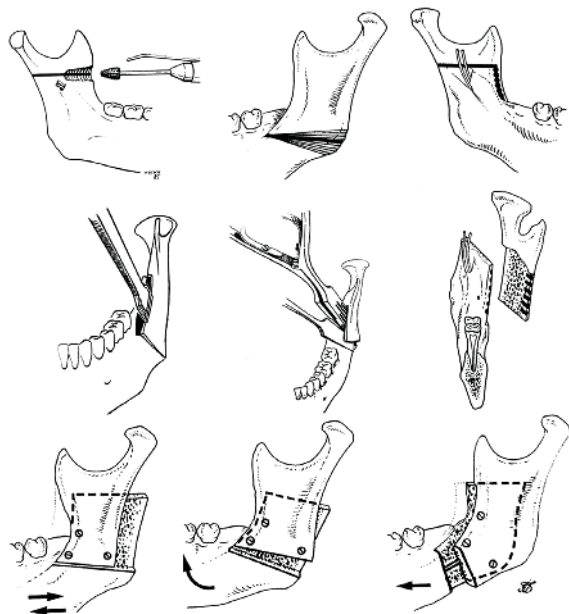


Fig. 1-5 My final technique for the sagittal splitting procedure for many years (from: Obwegeser HL. Mandibular Growth Anomalies. Springer, 2001).³¹

International reaction

After publication of the sagittal splitting osteotomy procedure in *Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology* (1957),³ I was invited to lecture on the subject in various countries. The transoral sagittal splitting procedure went around the world after I had published it in detail and had finally lectured on it in a postgraduate course to the American Association of Oral Surgeons, in 1966, at the Walter Reed Hospital. This procedure conquered the professional world all around the globe. It is now in daily use, probably in every country in the world. It is the procedure of choice for every specialist dealing with maxillomandibular anomalies.

Transoral chin correction

The same is true with the transoral sliding chin correction, a procedure that I published together with the

Transoral sliding chin procedure

(H. L. Obwegeser 1957, 1958)



Fig. 1-6 My technique and first case of transoral sliding chin procedure (from: Obwegeser HL. *Mandibular Growth Anomalies*. Springer, 2001).³¹

sagittal splitting procedure (1957).³ It does not require a detailed description here (see Chapters 3 and 33). Otto Hofer (1942)⁴ was obviously the first to have the idea to increase the prominence of the chin by cutting its inferior rim off the mandibular body. However, he demonstrated the procedure on a cadaver via an extraoral approach. I got the idea when I investigated the lateral cephalometric radiograph of a patient with a very retruded chin. It was so obvious that there was the material I needed. I performed it right away on the patient. The technique was simple and the result very convincing (Figure 1-6). My personal friend and colleague, Otto Neuner (1965),⁵ developed the idea of using a double step, in order to obtain greater increase in chin prominence. I, eventually, also performed a triple step procedure (1970a).⁶

The mobilization of the maxilla – its history

The mobilization of the maxilla had been the intention of many surgeons who desired to correct maxillomandibular anomalies. Georg Axhausen from Kiel, Germany, published three articles describing osteotomies of the maxilla, for the correction of its position after trauma (1934),⁷ and in cases due to

other aetiological factors resulting in anomalies of the maxilla (1936 and 1939).^{8,9} However, his publications did not describe the technique in a way that would permit other surgeons to carry out the procedure. In 1942, Karl Schuchardt,¹⁰ from Hamburg, published the mobilization of the dislodged upper jaw of a war injury and its repositioning using traction weight. He wrote that the procedure would be hardly used for the correction of maxillary deformities in secondary cleft cases.

Sir Harold Gillies worked hard on this subject, as did Norman Rowe. During my training with Sir Harold, in 1951–52, I had on several occasions the privilege to watch or even assist him. He was definitely the pioneer for the final mobilization procedure of the maxilla, because he opened the cleft and rotated the palatally dislocated alveolar segments laterally so far that they could fit with the mandibular teeth. However, he did not dislocate them anteriorly. He filled the very large steps in the canine fossae with cancellous bone grafts from the iliac crest. To the great surprise of his observing visitors the grafts healed, without infection, despite the fact that the region was not completely covered with a vestibular flap or any other mucous membrane on its raw surface on the sides of the maxillary and nasal cavities. That pioneering

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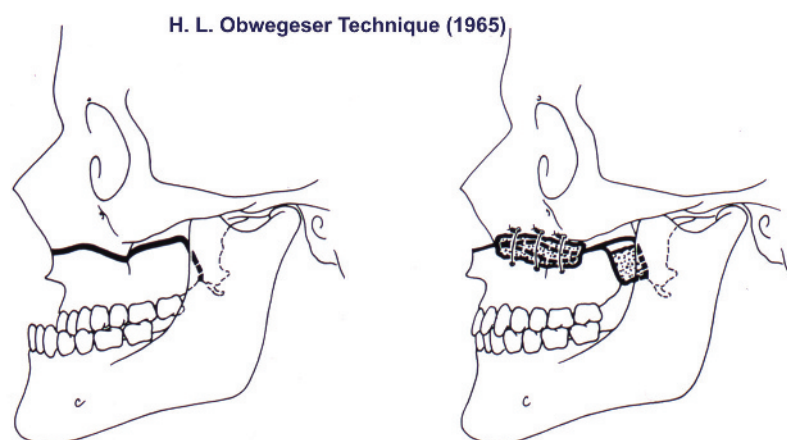


Fig. 1-7 Drawings of my technique of Le Fort I anterior repositioning (from: Obwegeser, 1969).²⁸

Gaps within bone-segments should always be filled with bone (H. L. Obwegeser)

step allowed me to advance the mobilized maxilla up to 20 millimetres and more. These bone grafts, together with the graft that I always place behind the tuberosity and the pterygoid processes, have become to me a *conditio sine qua non* (Figure 1-7). In 1986, R. Drommer published a very interesting article on 'The History of the Le Fort I Osteotomy'.¹¹ He stated very clearly that 'Hugo Obwegeser' was the first to publish a procedure that every experienced surgeon should be able to perform. It was in 1962 at the South American International Conference on Oral Surgery in Buenos Aires, Argentina, when I first reported on my successful mobilization of the maxilla (Obwegeser, 1962).¹² The procedure could be performed together with the transoral splitting of the rami. However, the first patient in whom I operated on both jaws was on 5 September 1969; that is, 16 years after the first publication of the sagittal splitting of the mandibular ramus and 7 years after the publication of the Le Fort I-type osteotomy and mobilization of the maxilla.

Operative technique for mobilization of the maxilla

The patient normally receives nasal intubation anaesthesia. In addition, I infiltrate the vestibulum with 1% local anaesthetic solution plus a vasoconstrictor. The incision goes all the way round in the vestibulum, however, only when the palatal mucosa is free of scars. Next, the periosteum is raised cranially. In the piriform aperture, the mucosa is raised from the floor of the nose and from the septum for at least 15 mm. The septum osteotome separates it from the palate. I use an oscillating saw for the circular osteotomy. Just prior to this, I separate the tuberosity from the pterygoid process with an elastic special tuber osteotome. This prevents the saw cutting further posteriorly and avoids damage to the regional blood vessels.

For many years I used the anterior down fracture technique to get the maxilla loose. My nephew, Joachim Obwegeser (1997),¹³ suggested to me to start in the posterior region with down fracturing, by the

use of my bone separating forceps. Only after that, with the same instrument, the anterior down fracture is performed. The maxilla must be mobilized to the extent that it can easily be overcorrected with a pair of tweezers. The fixation of the maxilla in the new position has to follow the plan. In cases when the mandible also has to be repositioned a preoperatively prepared occlusal splint guarantees the position in which the maxilla has to be fixed. Next the mandibular osteotomy is completed and then fixed in the new occlusion. Whether the jaws are fixed with wires, or plates and screws, you always have to keep in mind that the tendency of the pull of the musculature is to bring the jaws back to their initial position. This means that some use of intermaxillary elastics may be useful to maintain the new dental occlusion.

With these three procedures, orthognathic surgery experienced an explosion throughout the world.

Modifications of the procedures

I received visiting observers from all over the world. Some had the idea to alter the position or the direction of the cortical cuts in the sagittal splitting of the mandibular rami, and went on to name the modified procedure according to their own name (K. Schuchardt, 1954;¹⁴ Dal Pont, 1959 and 1961;^{15,16} E.E. Hunsuck, 1968;¹⁷ B.V. Epker, 1977;¹⁸ etc.). However, I still believe that my original technique for the mandible as well as for the maxilla remains the best solution to the clinical problems.

New procedures

In September 1967 Paul Tessier published for the first time his techniques for the mobilization of the middle third of the facial skeleton (Le Fort III-type osteotomy) and for dislocating the orbital conus including their contents (hypertelorism operation).¹⁹

Between 1953 and 1967 several ideas were published for repositioning the whole mandible.^{20,21} I myself published a technique that I named the transoral angle

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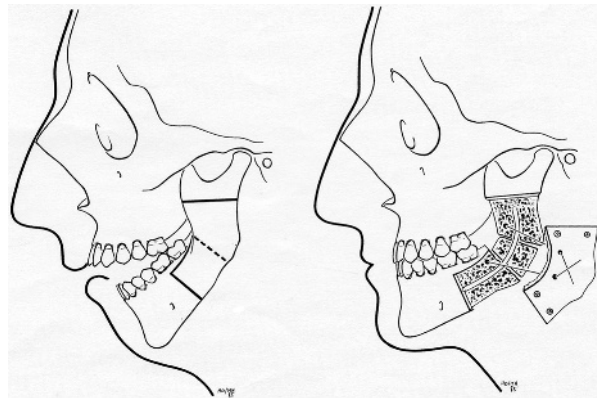


Fig. 1-8 Drawings of my transoral angle osteotomy (from: Obwegeser HL. Mandibular Growth Anomalies. Springer, 2001).³¹

osteotomy (1964) (Figure 1-8).²² In cases of posterior vertical maxillary excess, Karl Schuchardt (1954)¹⁴ had the idea of cranially repositioning the lateral maxillary segments, thereby allowing the mandible to autorotate anteriorly and close the occlusion (Figure 1-9 a–d). In my experience, in a very high percentage of cases, that procedure led to relapse of the anterior open bite.

For the correction of an edentulous antemandibulism I wanted to get rid of the internal fixation with the help of acrylic splints, fixed to both jaws. For that reason I produced a bilateral sagittal splitting as far anterior and close to the mental foramen as possible. By doing so I was able to fix the large segments of the

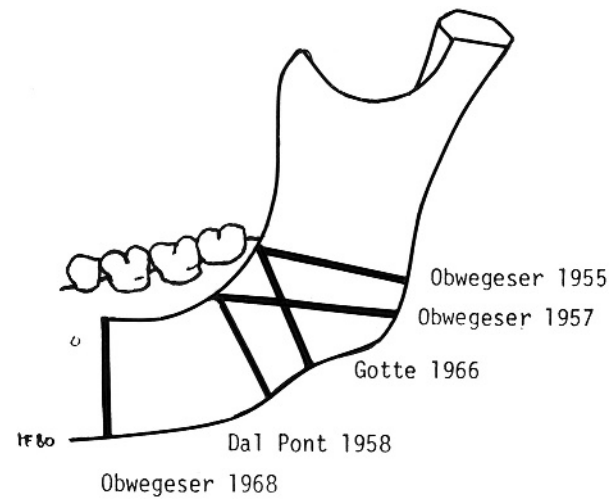


Fig. 1-10 Some variations of lateral cortical cut for the sagittal splitting procedure by different authors (from: Obwegeser, 1968).²³

mandible in the desired position using a circumferential wire in the ramus region as well as in the body of the mandible (1968).²³ There are many minor alterations of the original sagittal split osteotomy, and it is not possible to mention them all in detail (Figure 1-10).

Segmental alveolar osteotomies

Heinz Köle deserves the honour of various segmental osteotomies of the alveolar processes in the maxilla as

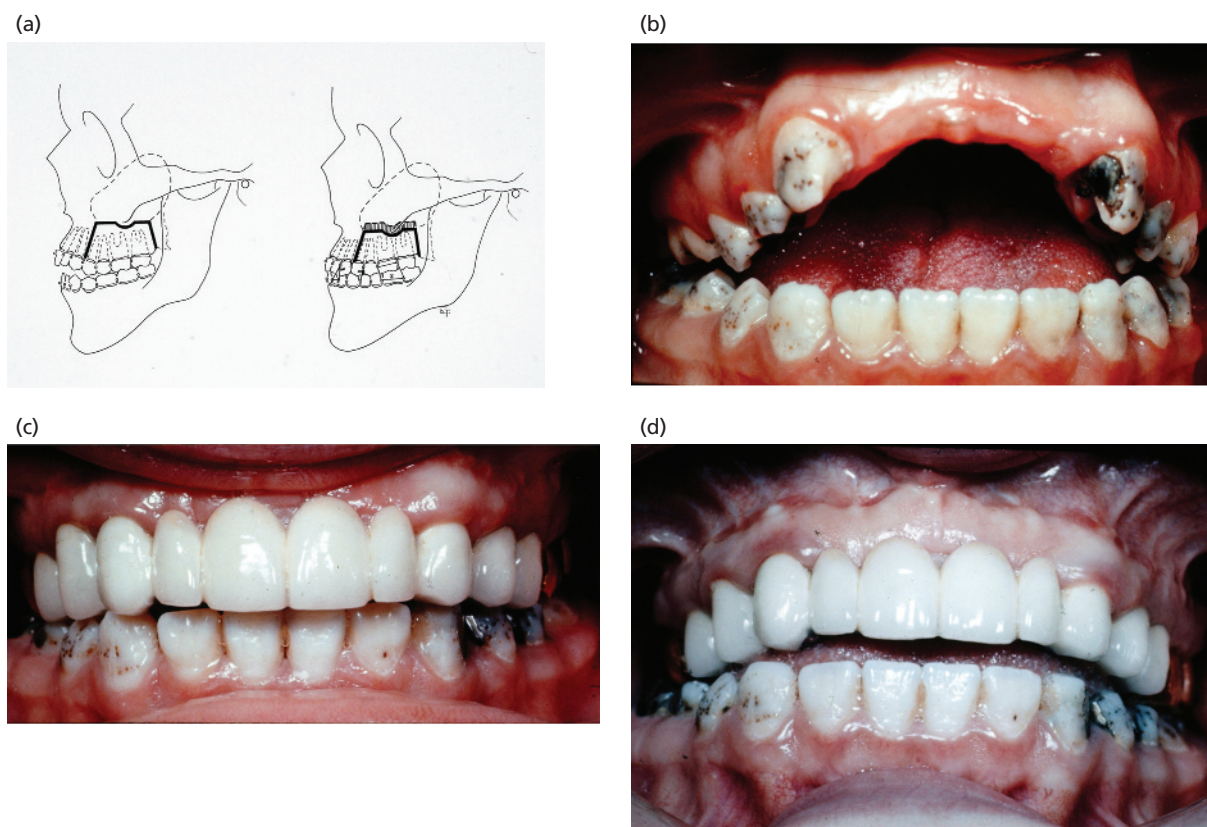


Fig. 1-9 Schuchardt’s procedure for correcting a maxillary open bite: (a) technique; (b) case before surgery; (c) occlusion after additional bridge work; (d) amount of relapse after one year.

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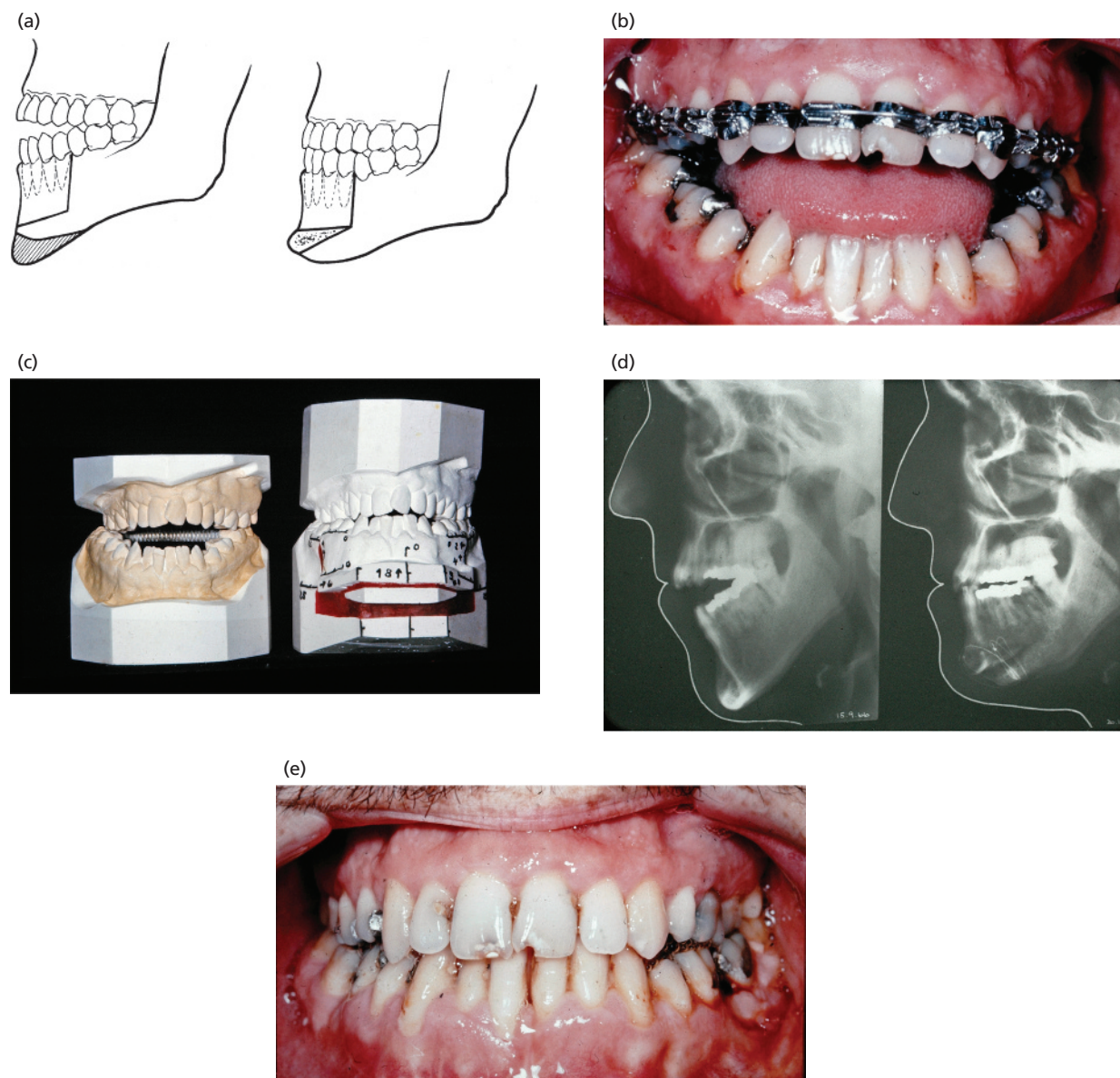


Fig. 1-11 H. Köle's technique for closing an anterior mandibular open bite: (a) The technique in a drawing; (b) Case before surgery; (c) Model operation; (d) Lateral skull radiographs before and after surgery; (e) Occlusion after one year. (From: Obwegeser HL. *Mandibular Growth Anomalies*. Springer, 2001.)³¹

well as in the mandible (Figure 1-11 a–e).²⁴ With the possibilities of alveolar segmental osteotomies, and with the repositioning of the mandible and the maxilla, unlimited corrective techniques are available (Figure 1-12 a–c). Joachim Obwegeser (1987)²⁵ described a circular splitting of the mandible, which is a useful technique for the correction of certain types of cases of independent occlusal and mandibular body anomalies (Figure 1-13).

Problems of maxillary anomalies in secondary cleft deformity cases

Severe deformities of the maxilla tend to occur in secondary cleft deformity cases. Nevertheless, the dislocated parts of the maxilla must be mobilized and repositioned. Accurate model surgery defines the amount and the direction of the required repositioning

of the alveolar segments. Sir Harold Gillies undertook the very important and pioneering work in this subject. He, together with Norman Rowe, rotated the segments so far laterally that they could occlude with the mandible (Gillies and Rowe).²⁶ For that the cleft had to be widely reopened and in a later session closed again. Gillies bone grafted the defects in the steps of the canine fossae with perfect results, although the bone grafts could not be completely covered on the side to the antral and nasal cavities. That step was the pioneering work for the correction of severely collapsed maxillary arches. He only rotated the alveolar segments but did not reposition them also anteriorly; that was my contribution to the Le Fort I repositioning.

The secondary cleft deformity cases are the most challenging to correct properly. However, it is a fascinating subject and very pleasing for both the surgeon

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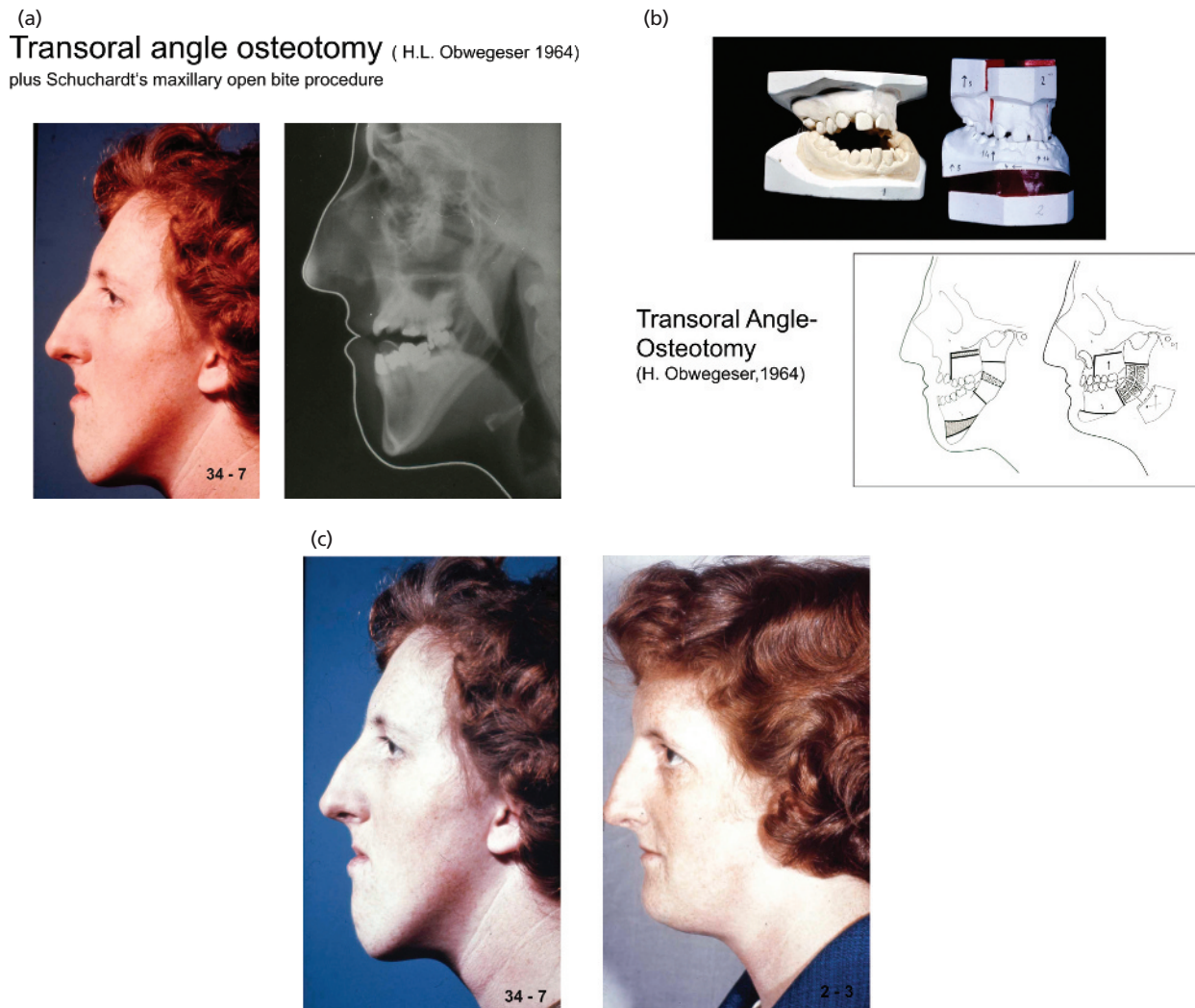


Fig. 1-12 Case of maxillomandibular long face plus open bite: (a) Before surgery; (b) Model operation plus drawings of planned surgery; (c) Result of surgery.

and even more so for the patient. The planning is undertaken as for any orthognathic surgery case: first, on a tracing of the lateral cephalometric radiograph, the ideal profile line is drawn. The model surgery shows all the details of the required osteotomies. The

surgeon will have to decide the technical feasibility of reproducing in the patient what the model surgery demonstrates is required (Figure 1-14 a–d).

The Le Fort III + I osteotomy

After I had the privilege to observe Dr Paul Tessier perform a Le Fort III-type osteotomy, I then performed it. However, soon I had a case to correct presenting with severe micro- and retromaxillism. It was obvious that the forward repositioning of the middle third would not produce a satisfactory result. There would still remain some lack of vertical height. For that reason, in addition to the Le Fort III osteotomy, I separated the maxillary complex with an additional Le Fort I mobilization. That allowed me (Obwegeser, 1969)^{27,28} to reposition the maxilla in a good occlusal relationship with the inferior dentition (Figure 1-15). The gap that remained then between the cranial half of the middle third and the maxilla I filled with cancellous bone grafts from the iliac crest. The final result was very pleasing and with it a new

For independent correction of occlusal and mandibular body anomalies it's circular split of J.A. Obwegeser (1986,1987) is the solution for that problem.

H.L. Obwegeser

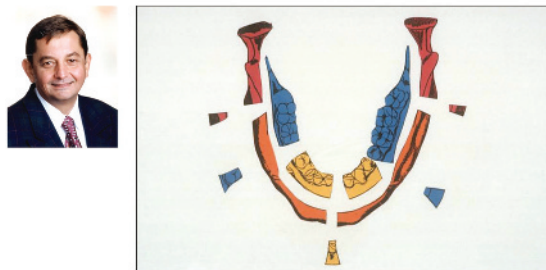


Fig. 1-13 Joachim Obwegeser's circular splitting of the mandible (from: Obwegeser HL. Mandibular Growth Anomalies. Springer, 2001).³¹

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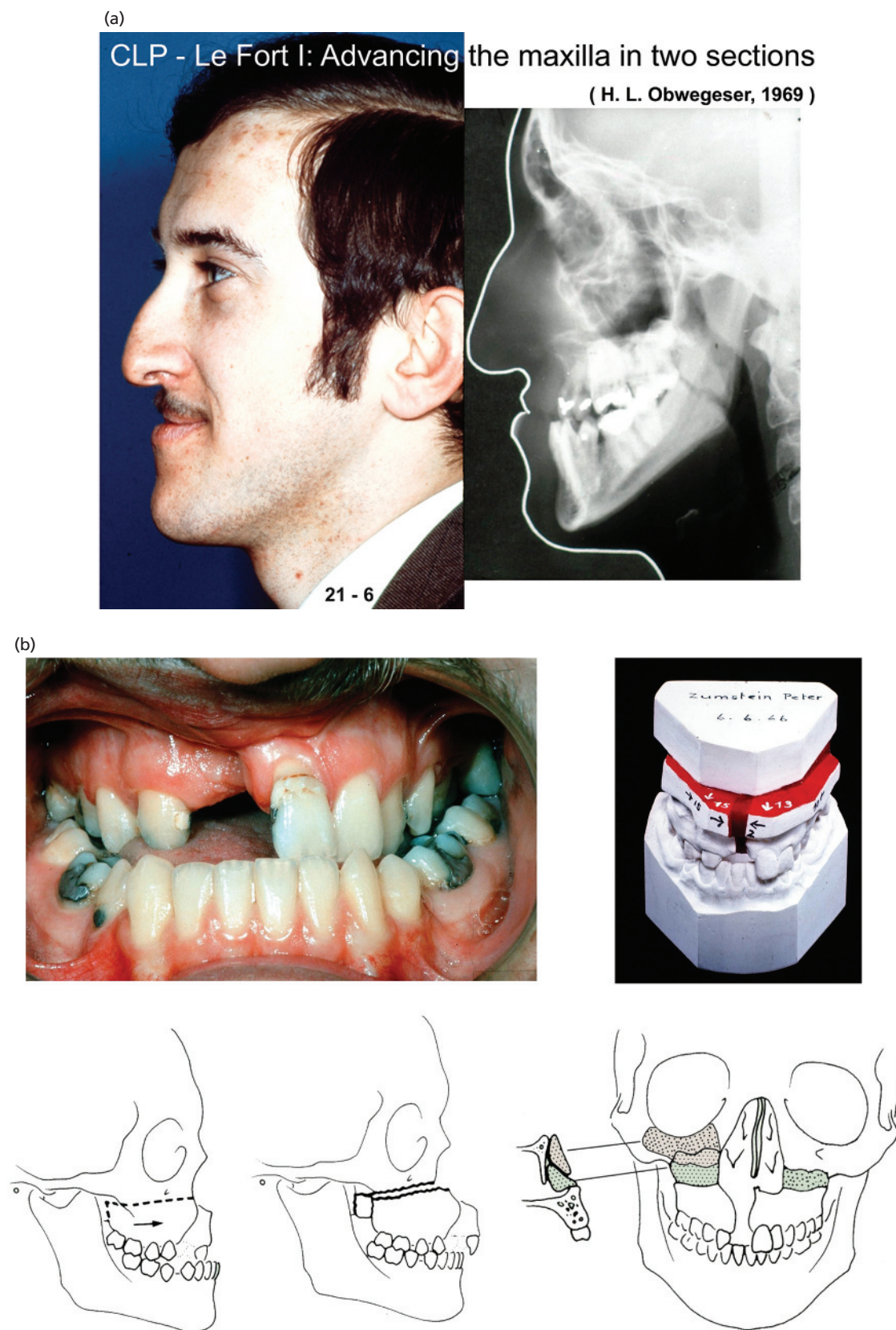


Fig. 1-14 Case of secondary cleft deformity: Retromaxillism plus collapse of the maxillary arches: (a) Before surgery; (b) Model operation and drawings of planned surgery; (c) Lateral skull radiographs and occlusion before and one year and three months after surgery; (d) Profile view before and three months after surgery. (From: Obwegeser HL. Mandibular Growth Anomalies. Springer, 2001.)³¹

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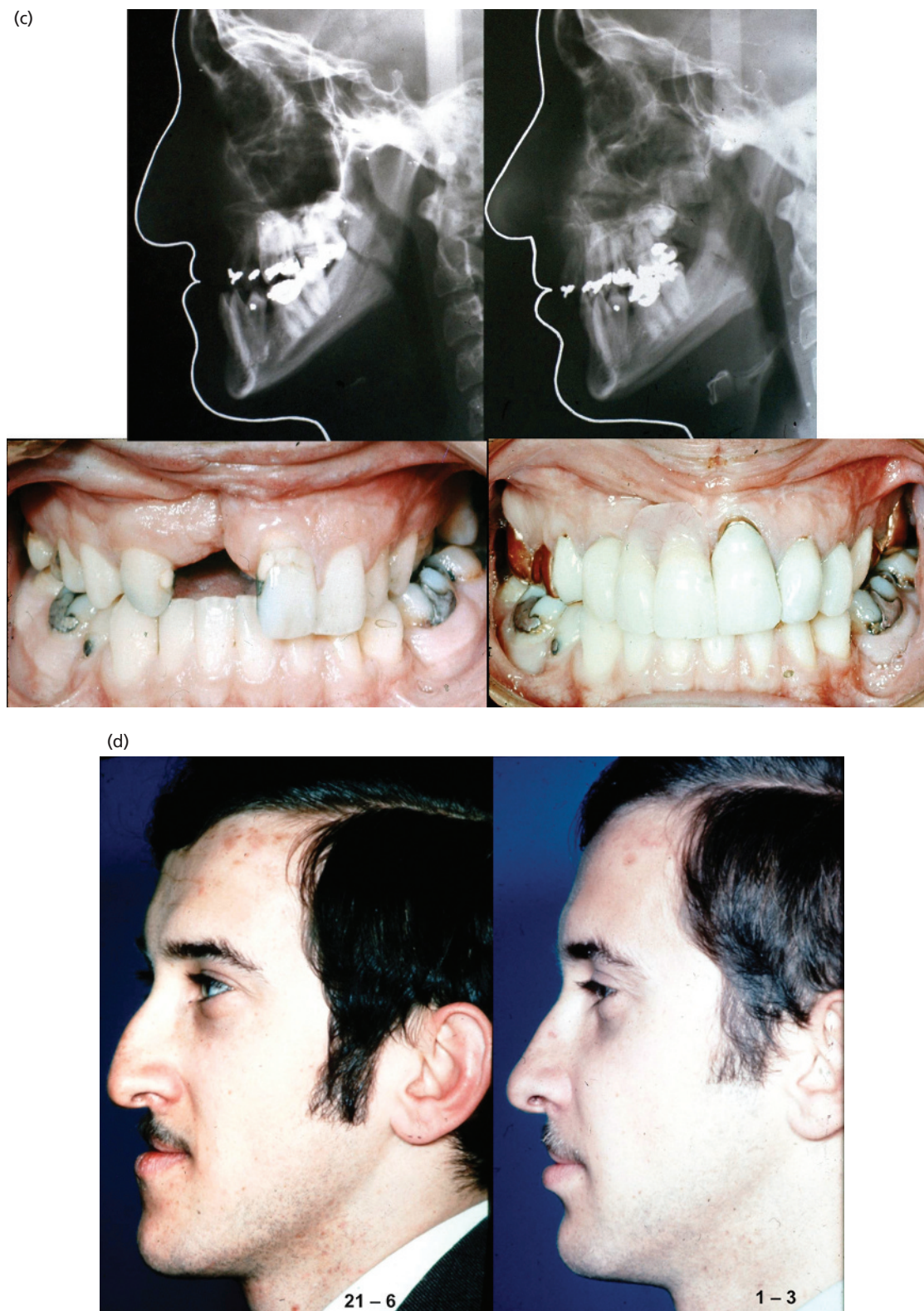


Fig. 1-14 (Continued)

variation of the middle third advancement was born (Figure 1-16 a,b).

The correction of hypertelorism

Dr Paul Tessier described the principal technique of rotating dislocated orbital coni together with their contents. His transcranial approach is the key to the

problem. A subcranial approach was also published, but is more complicated than the approach described above.

The correction of a unilateral dislocation of the orbit is a straightforward procedure, producing a good result. A symmetrical bilateral dislocation is not much more difficult to correct (Figure 1-17 a-d). There is no question that we have to operate on these patients in

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LF III + LF I, H. L. Obwegeser, 1969

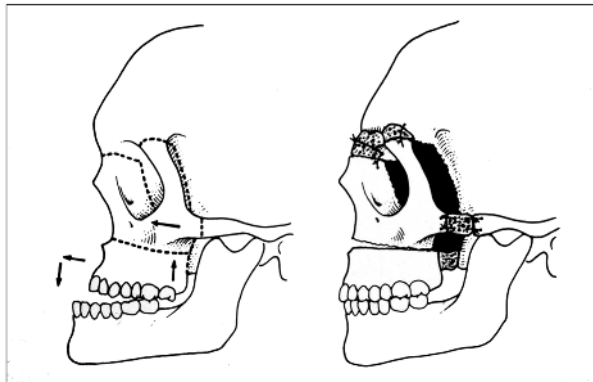


Fig. 1-15 H.L. Obwegeser’s technique for a combined Le Fort III+I operation. (From: Obwegeser, 1969).²⁸

childhood because of their eyes, although we are fully aware that such early correction may interfere with the subsequent growth of the maxilla. That means we have to inform the patient that after the age of 18 years a second operation will be required to obtain the final result. I learned this by treating a very convincing case – Antonio – which I describe as the case of my life (H. Obwegeser, G. Weber, H.P. Freihofer, H.F. Sailer, 1978) ‘Facial duplication – the unique case of Antonio’. *J Maxillofacial Surgery* 6: 179–198).²⁹

Antonio was referred to me at the age of 10 years (Figure 1-18). He was born with a median facial cleft, two complete noses and two fully developed premaxillae and altogether seven incisor teeth. My treatment plan was formulated based on Tessier’s procedure for the correction of hypertelorism (Figure 1-19).

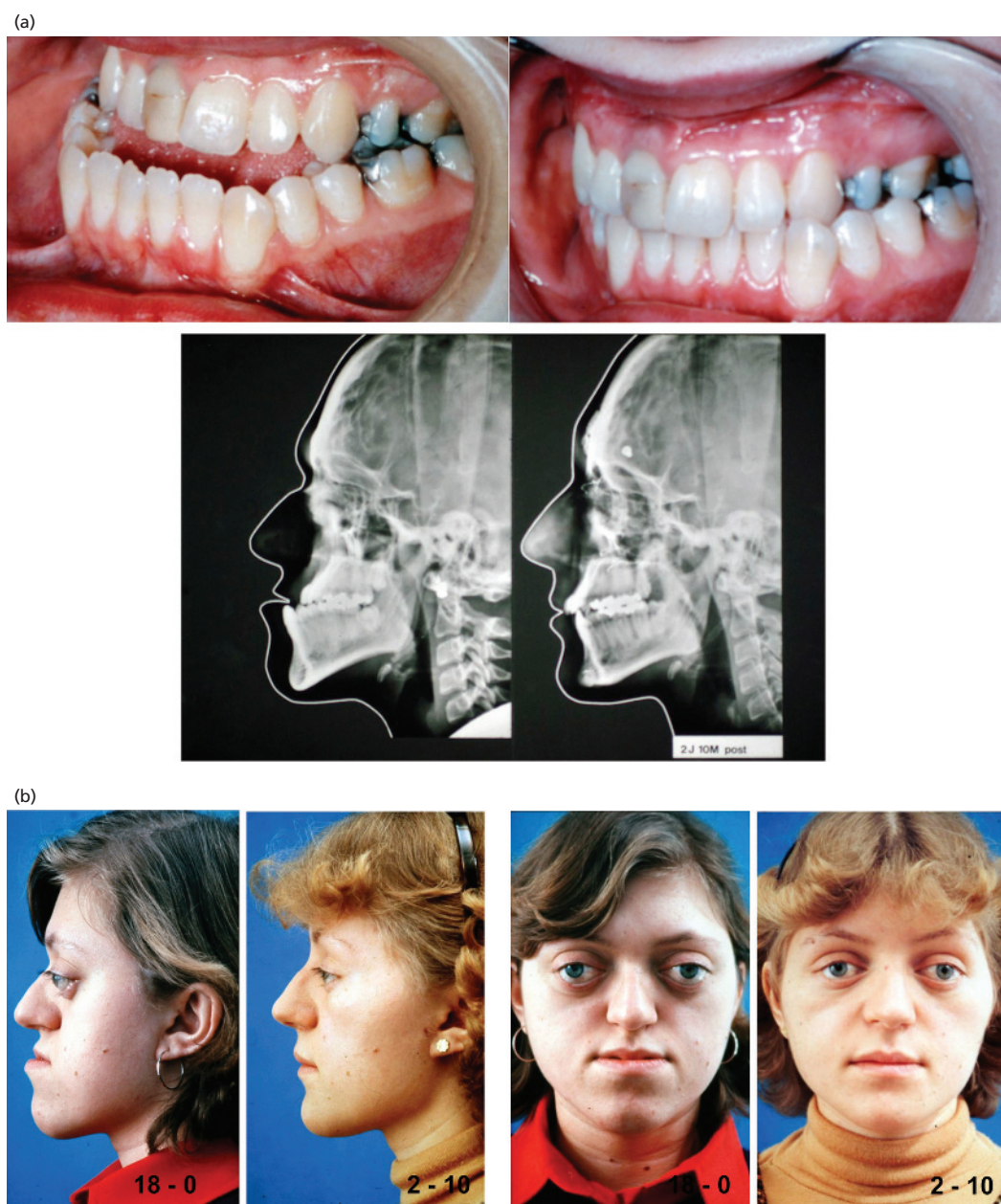


Fig. 1-16 Case of micro-retromaxillism: (a) Occlusion and lateral skull radiographs before and after surgery; (b) Profile and front views of case before and 2 years and 10 months after surgery. (From: Obwegeser HL. *Mandibular Growth Anomalies*. Springer, 2001.)³¹

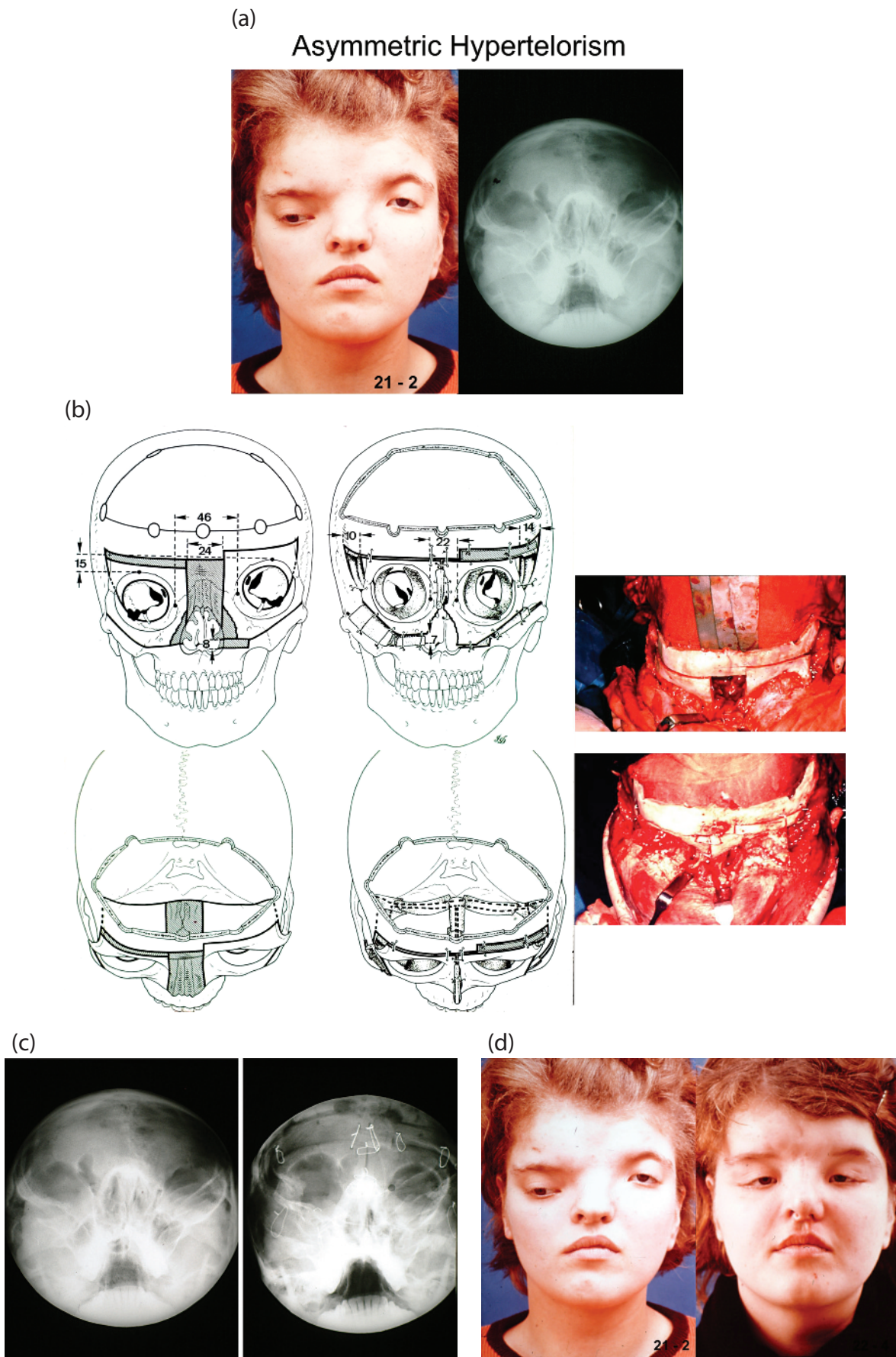


Fig. 1-17 Case of asymmetric hypertelorism. (a) Front view and semi-axial skull radiograph before surgery; (b) Planned operation and operation pictures; (c) Semi-axial radiographs of the skull before and after the correction; (d) Patients front views before and after the correction.

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Fig. 1-18 Antonio – the case of my life. (From Obwegeser et al., 1978.)²⁹ Patient presented with midfacial duplication and medial facial cleft. Left: situation after birth; Right: at age of 10.

The operation was performed on the 4 July 1969. The first operation went well. After the neurosurgeon (G. Weber) had raised the skull flap he found, to our great surprise, two cristae galli. In those days neither tomography nor MRI was yet available. That meant I had to plan the case on the basis of conventional radiographs and according to my imagination. The two cristae galli solved the problem of how much of the cranial base I would have to excise (Figure 1-20) – they provided the answer (Figure 1-21). I planned the operation with military precision, step by step, including the necessary time that would be required for each step. This was typed and handed to every person working on the case. The operation was started at 8.00 in the morning and ended precisely according to my written plan at

3.00 o’clock the following morning. I had to resect both premaxillae with the seven incisor teeth.

Eventually, we achieved a result that allowed a good functional occlusion for mastication and acceptable anterior dental aesthetics, so that nobody would miss his front teeth! However, at this stage there was still a long way to go. The primary result was very pleasing, but a purulent infection compelled the neurosurgeon to remove the large bone flap of the skull and I removed the bone grafts for the reconstruction of the lateral orbital defects. The Children’s Hospital managed to treat the meningitis. In due course, the patient was discharged home with a helmet. Ten months later he returned with a severe discrepancy of the middle third of the face and the mandible. The latter was far

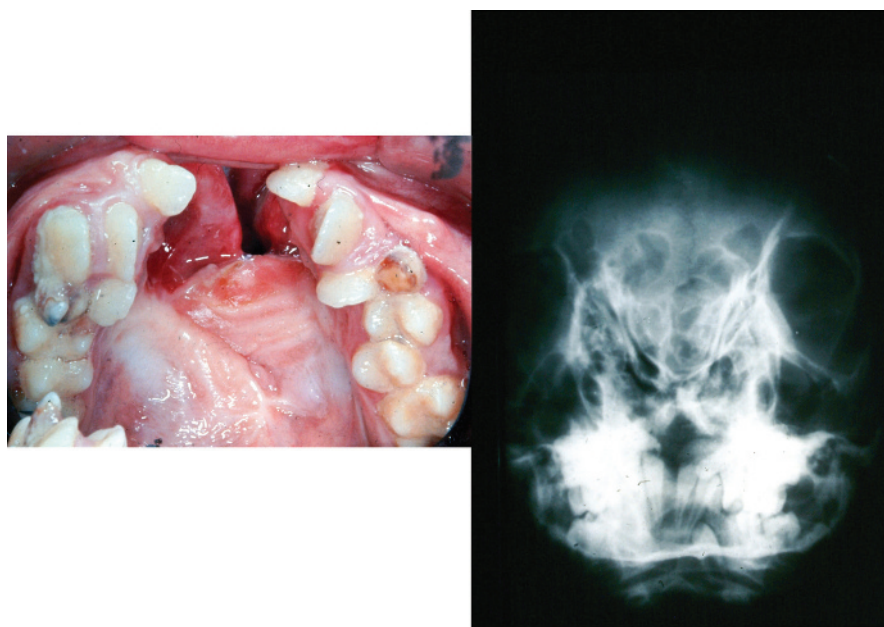


Fig. 1-19 Patients maxilla with two premaxillae plus skull semi-axial radiograph.

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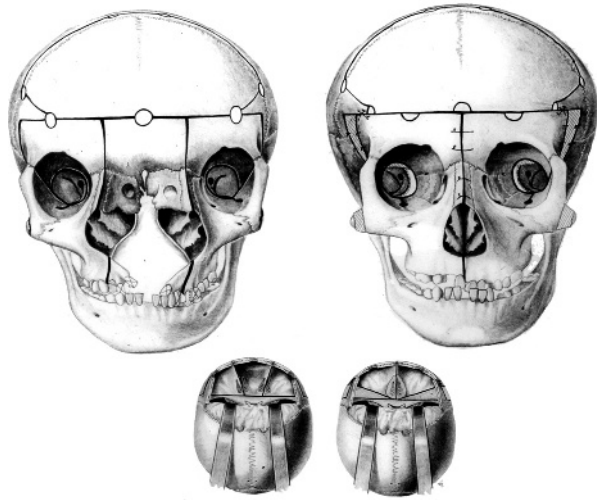


Fig. 1-20 Drawings of planned operation.

in front of the maxilla, as the mandible had grown forward but the maxilla had not. I corrected the condition with a Le Fort I advancement in two sections and a repositioning of the anterior mandibular alveolus. The primary result was quite pleasing (Figure 1-22).

Thirteen months later the neurosurgeon reimplanted the skull flap again after he had autoclaved it. The same immediate infection caused him to remove it again. I said to him do not worry; I will make him a new skull covering. So I did, 10 months later. I took

from the right side of the chest four ribs, and from the left three ribs. As they had been taken already during the first intervention the regeneration was somehow sclerosed bone. Despite this I managed to split the ribs. So I had 14 half-ribs for the reconstruction of the large skull defect. There were no postoperative problems. The patient could now leave without a helmet. Finally, the whole defect was covered with bone made from his own ribs (Figure 1-23). However, the face changed very much in the following years (Figure 1-24). I decided to wait until he was at least 18 years of age. When he returned the presentation was that of a severe midface retrusion and mandibular prominence, due to lack of forward growth of the maxilla and zygomatic bones and lower half of the nose, and overgrowth of the mandible – the patient described his own appearance as ‘monstrous’ (Figure 1-25). After evaluation of the situation it was obvious that I had to posteriorly reposition the mandible in addition to its anterior alveolar segment, and the maxilla and the inferior periorbital region had to advance (Figure 1-26). The result was very convincing (Figure 1-27). In addition, the missing columella had to be reconstructed. For that I planned a caterpillar flap with an L-shaped cartilage taken from the ribs (Figure 1-28). There were no complications but a nice result of the nose and the profile was produced. The patient was discharged home as a man with a normal face, albeit with some scars. He could eat everything. The missing incisors were not obvious. The quality of his speech

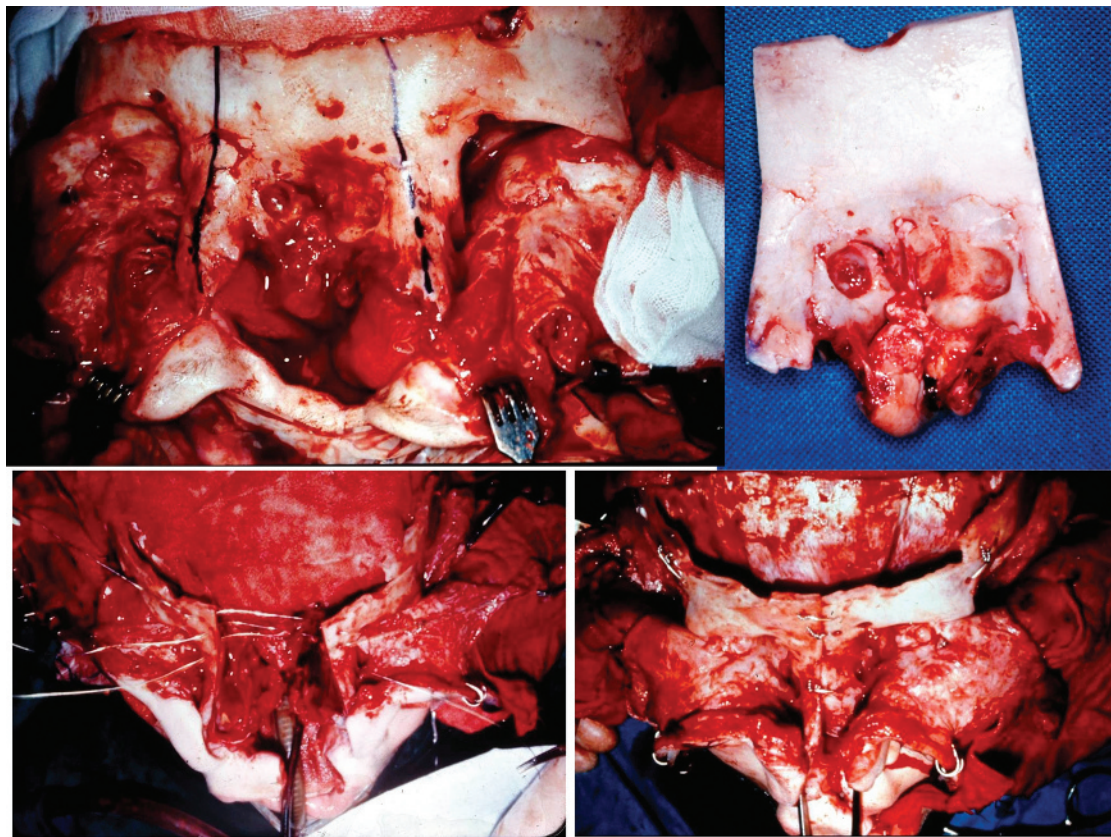


Fig. 1-21 Skeletal situation during and after correction plus excised part of forehead area.

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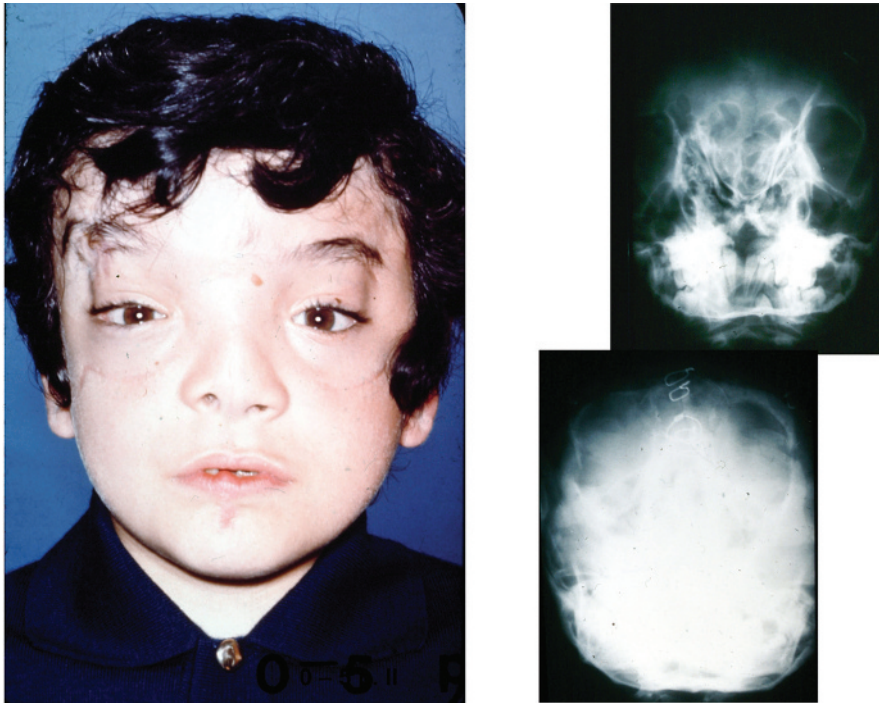


Fig. 1-22 Patient after surgery plus radiograph.

was good enough for his native town to employ him in the city's telephone business (Figures 1-29 and 1-30). His nasal airway was excellent and so was the view of the nose from below (Figure 1-31). Twenty-five years later I visited him in his home town in southern Italy. We met on the road like father and son, with much enthusiasm on both sides (Figure 1-32).

In summary, I must confess that I learnt a great deal by treating Antonio. First, to never give up, and second, to avoid operating on the maxilla until its growth has ceased. That is what I now advise every young colleague.

Recurrence

There are many possibilities for relapse and recurrence of a deformity. While a patient's skeletal growth has not ceased, there will always remain the possibility that further growth will alter the result of surgery. The mandible will continue to grow normally as long as the condyles have not been involved. On the contrary, the maxilla will almost cease to grow after it has been surgically exposed. A further cause for a postoperative change may be due to hyperactivity in the condyles growth regulators. We believe that there are two; one for growth in length and the other for growth of mass

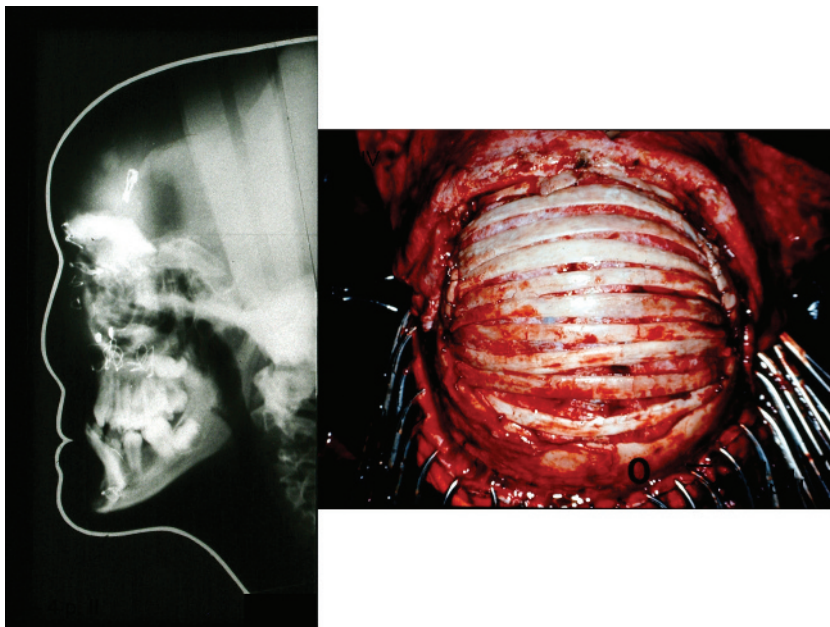


Fig. 1-23 Patients lateral skull radiograph after removal of cranial plate due to infection plus view of reconstruction of skull defect with 14 half ribs.

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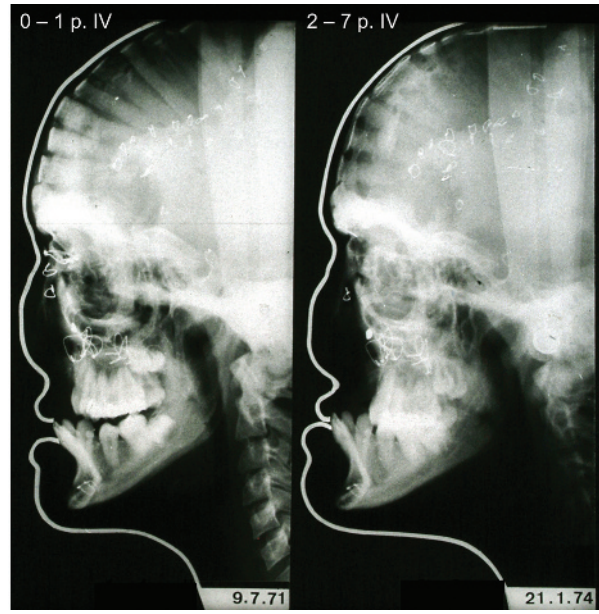


Fig. 1-24 Lateral skull view with slight retromaxillism on the left side and 2.5 years later with severe facial deformity.

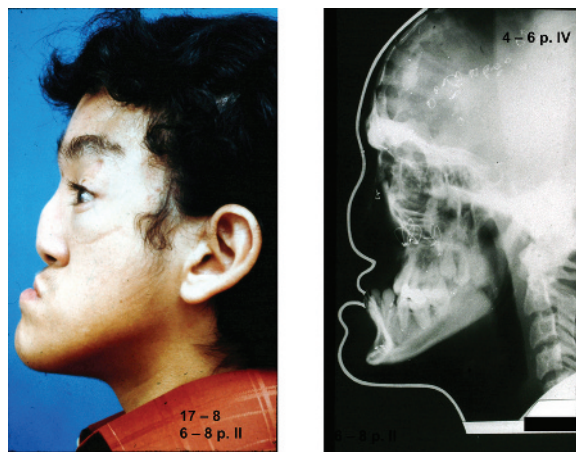


Fig. 1-25 Patients profile at age 17 years and 8 months and his lateral radiograph at age 18.

(Obwegeser and Makek, 1986).³⁰ The relapse following Schuchardt's procedure for correction of an anterior open bite due to the inferior position of the lateral maxillary alveolar segments is probably due to the fact that the maxillary sinuses are reduced in their size, without an additional connection to the nasal cavity. That was John Hovell's explanation when I discussed the problem with him; I think he was right. Muscular force may be another cause for relapse, certainly in cases with greater neuromuscular aetiology.

Special instruments

For all the procedures that I have developed, I also developed special instruments in order to make the surgery less difficult. These instruments facilitate the surgery to a great extent. For me, it was mandatory for these instruments to be available when I was operating. These surgical instruments are sold all over the world by various companies as 'Obwegeser Instruments'. Most of them are of no use in my hands as they have been altered from my original designs. Only the Medicon Company (in Tuttlingen, Germany) and KLS-Martin-Company (also in Tuttlingen, and in Jacksonville, PO Box 50249, Florida 32250-0244 USA) have asked me to check their instruments from time to time to guarantee permanent best quality according to my original designs.

The same is true with the surgical hand piece for the drill burr. The usual hand pieces are too short for our work in the depth of our operating fields. I asked W & H Dentalwerk Bürmoos (GmbH, Austria, 5111 Bürmoos), a famous Austrian hand piece producer for drill burrs, to make a longer hand piece, which can hold any burr with a shaft of 2.35 mm diameter. They were able to make it to my great satisfaction. I recommend it very much for working on the skull, in particular for the sagittal splitting technique. The same company also produces a special electro motor for use in surgery in the operating room.

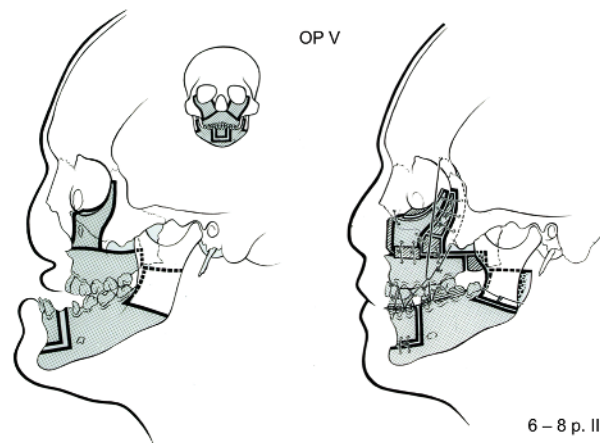


Fig. 1-26 Drawings of the skeletal situation and the planned correction.

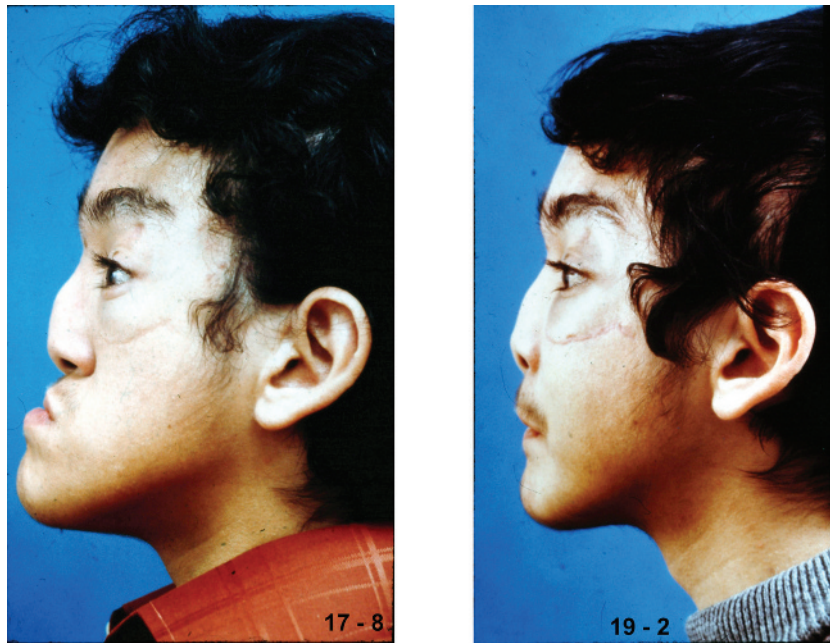


Fig. 1-27 Profile before and after surgical correction.

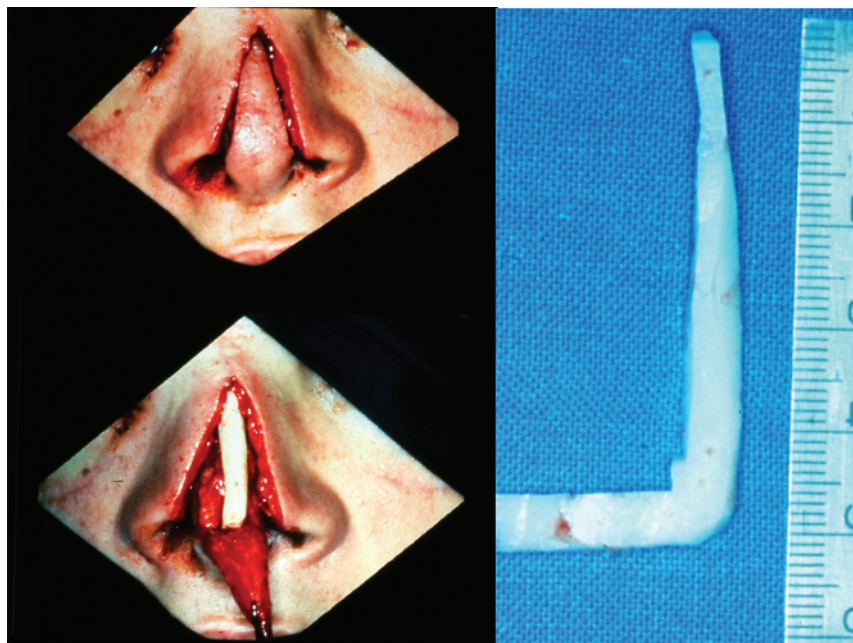


Fig. 1-28 Reconstruction of the missing columella by a caterpillar flap and reconstruction of the framework of the septum by an L-shaped cartilage graft from the ribs.



Fig. 1-29 Profile view of patient at age 17 years and 8 months, and 20 years and 7 months.

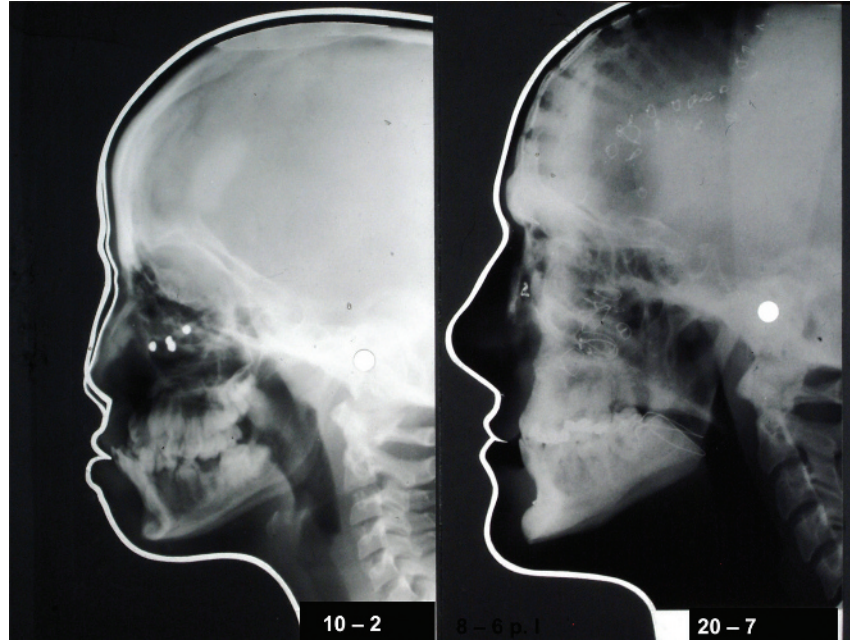


Fig. 1-30 Presurgical and final lateral cephalometric radiograph of the skull.

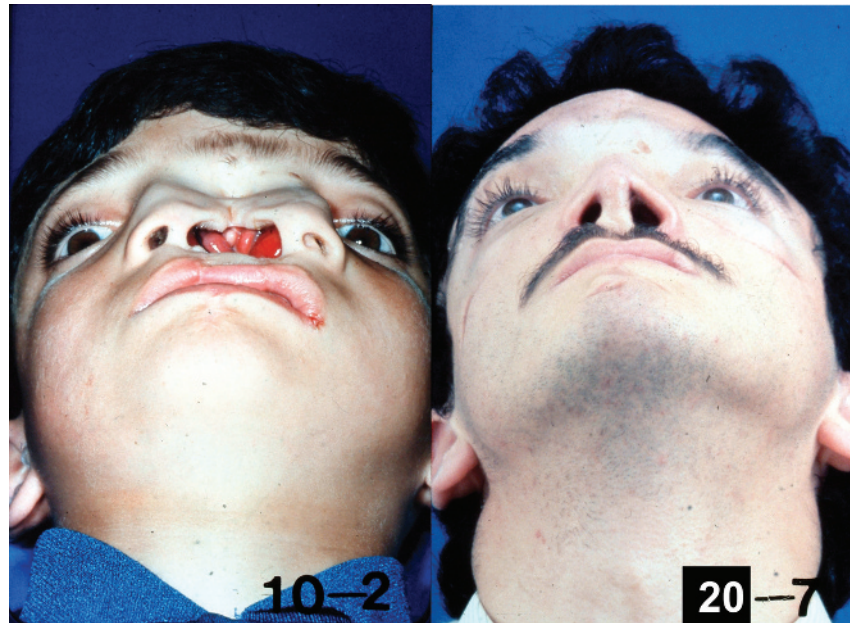


Fig. 1-31 View of the nose before surgery and the final result.



Fig. 1-32 The patient and his surgeon again 25 years after surgery.

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Concluding remarks

I am delighted to be honoured with the dedication of this reference textbook on orthognathic surgery, the subspecialty of cranio-maxillofacial surgery to which I have devoted most of my working life and professional career. Dr Naini has gathered together many of the most famous names from around the world, in all the fields relevant to the treatment of the orthognathic patient – from cranio-maxillofacial surgery, orthodontics, facial plastic and reconstructive surgery, otorhinolaryngological surgery, psychiatry and other related specialties. As I write this introduction, at the age of 92, I am well aware that many of the distinguished contributing authors in this book have been my students, or students of my students. As such, many internationally-renowned centres devoted to cranio-maxillofacial and orthognathic surgery, around the world, are training second- and third-generation 'Obwegeser' students. It fills me with immense pride to know that the procedures I pioneered for the correction of dentofacial and craniofacial deformities are helping to improve the quality of life of countless patients, and allowing great professional satisfaction for the clinicians serving these patients.

Acknowledgements

I have published an introduction on this subject in my book *Mandibular Growth Anomalies* (Springer, 2001)³¹ and also in an article published in *Clinics in Plastic Surgery* (Edited by Pravin K. Patel, Elsevier, 2007)³². Some of the illustrations used in this chapter are from these publications.

I wish to express my sincere thanks to my nephew, Professor Joachim Obwegeser, for his tremendous help in making this introduction possible for me by transferring my original slide illustrations onto a computer system. I also wish to express my gratitude and compliments to Dr Farhad Naini for editing the text and transferring it into proper English.

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