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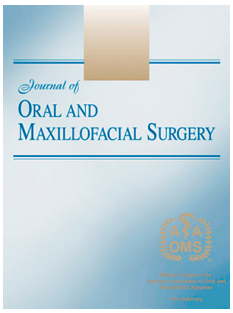


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# Title: Congenital infiltrating lipomatosis of the face: case report with presentation of a new multi-step surgical approach

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## Abstract

*Objectives:* This report describes the first case of congenital infiltrating lipomatosis of the face (CIL-F) that is successfully managed with two-jaw orthognathic surgery. The patient has been followed from the age of 4 to the age of 18. The multistep approach used consisted of a facelift-type procedure at age 12, to improve the soft tissue profile. At age 13, the transverse maxillary deficiency was treated with transpalatal distraction and at age 14 he underwent bimaxillary orthognathic surgery with a genioplasty.

*Result:* The patient satisfaction level was very high, and remained constant in the 4-year follow up. An extra-oral clinical examination revealed a nearly complete harmonization on both the soft tissue and hard tissue level. There was no recurrence of hypertrophy, nor of the bones, nor of the facial soft tissues, during the 4-year follow-up.

*Conclusion:* The results of this study indicate that a surgical approach for CIL-F on both the soft tissue level and bony level is possible if indicated. Orthognathic surgery can be performed and good aesthetic and functional results can be achieved. To minimize the risk of recurrence, it is important to perform the treatment after the onset of puberty. This harmonization on the osseous level can benefit the psychological well-being of the patient greatly.


## Introduction

Congenital infiltrating lipomatosis of the face (CIL-F) was not recognized as a distinct clinicopathological entity until 1983 when Slavin et al first described this rare neoplasia [(1)]. The clinical presentation is a unilateral tumor-like lesion that infiltrates facial hard and soft tissues, leading to an asymmetric facial appearance. Histologically, this lesion is characterized by a collection of non-encapsulated mature lipocytes [(1)].

Malformation of various structures in the head and neck region may result in sleeping disorders, breathing difficulties and problems when swallowing, so that the aesthetic appearance is not the only concern in this group. Consequently, the psychological burden of this diagnosis on these young children must be considered when making a treatment plan.

Thus far, only 43 cases of CIL-F have been described in the literature [2,3]. All of them were either treated conservatively, either on the soft tissue level with minimal osseous reductions. One single case has been briefly mentioned of an 18-year old girl where a Le Fort I osteotomy was performed, but no normalization of the facial appearance was achieved [2]. In the literature, no other cases have been treated on the bony level with orthognathic surgery. However, this can be a crucial step in facial harmonization after the soft tissue debulking. Of course, the clinical indication and possibility for adjuvant orthognathic surgery is dependent of the extent of osseous asymmetry and the dental occlusion.

In this case report, two-jaw orthognathic surgery was performed for the management of the skeletal abnormalities and this approach is presented together with the clinical, radiological, histological and genetic findings of this disorder.

## Material and methods

Ethical approval was given by the ethical committee of the University hospital Antwerp (UZA) (EC/PC/avl/2016.089).

## Case Report

### Pre-surgical clinical characteristics of a CIL-F patient

An 11-year old male patient presented at the Department of Cranio-Maxillofacial Surgery of the University Hospital in Antwerp with a diffuse hypertrophy of his right hemiface and severe occlusal disturbances. Clinical examination revealed a diffuse facial asymmetry with ptosis of the right mouth

corner and decreased elevation of the right upper lip when smiling (Figure 1A and B). Additionally, the right lower lip was significantly more voluminous in comparison to the left side.

This asymmetry had presented itself as voluminous tissue around the right eye lid and ptosis of the right mouth corner when he was born, indicating an affected facial nerve function since birth. An intraoral biopsy that was performed in the neonatal stage had only shown a mass of lipocytes. The psychomotor development of the patient was normal.

Magnetic resonance imaging (MRI) performed at the age of 4 years revealed fatty infiltration in the parapharyngeal space, right cheek, parotid and submandibular salivary glands, palatine tonsils and right tongue. There was no fatty infiltration in the osseous structures (Figure 2A and 2B).

Genetic counseling was performed at that age, with the diagnosis of neurofibromatosis type 1 (NF1) in mind. However, the patient's blood test revealed no mutation in the NF gene so the probable diagnosis of an isolated plexiform neurofibroma was made with the hypothesis that the mutation of the NF gene was likely to be present in the neurofibroma itself. The patient experienced severe swallowing and breathing difficulties but a conservative approach was preferred by the patient's parents.

When the patient was 11 years old, his quality of life was affected by the severity of his facial asymmetry, and a multidisciplinary management plan was set up. Close cooperation with a dentist and orthodontist was required since the right-sided mandibular and maxillary hypertrophy had led to a severe malocclusion. There was also macrodontia on the affected side and occlusal canting, as seen on the preoperative CBCT images (Figure 3A and 3B).

Since the patient was too young for orthognathic surgery, an initial debulking procedure was planned by the senior author to treat the soft tissue asymmetry in anticipation of further surgery to treat the skeletal hypertrophy. The dissected soft tissue mass was postoperatively tested to detect the NF mutation in the tumor tissue and confirm the earlier diagnosis of an isolated plexiform neurofibroma. However, there was no growth of Schwann-cells as expected, but only mature lipocytes and fibroblasts were seen. Genetic testing on these cells for a mutation in the NF1 gene

was also negative. Additional chromosomal examination showed no abnormalities. Together with the typical clinical presentation of this patient, the progressive nature and the associated dental malformations, the correct diagnosis of congenital infiltrating lipomatosis of the face (CIL-F) was finally made when the patient was aged 12 years. Additive genetic counseling revealed a dominant activating mutation in the PIK3CA gene in the lipomatous tissue. This mutation could not be found in the patient's blood. Genetic research has recently shown the association between this mutation and CIL-F and other overgrowth disorders [(4)].

## A 3-step surgical approach

Step 1: Initial debulking

At the age of 12 years, the patient was treated on the soft tissue level with a facelift approach to minimize the formation of visible scars. A direct subcutaneous dissection was performed to raise the skin flap over the pathologic mass. Then, a deeper dissection plane was made starting preaurically on the parotid fascia towards the corner of the mouth (Figure 4). The pathologic tissue was then removed and the skin was re-draped and closed (Figure 5). A small local debulking was also done at the right lower lip. The debulking procedure resulted in a significant improvement in the soft tissue asymmetry (Figure 6 A and B). However, the facial asymmetry and dental malocclusion was also largely caused by the skeletal malformations. To harmonize this bony asymmetry, orthognathic surgery was planned in the future.

Step 2: Transpalatal distraction

Despite the presence of a hemimaxillary hypertrophy and macrodontia on the affected side, there was a transversal maxillary deficiency with a posterior crossbite. This was treated by transverse maxillary distraction at the age of 13 years.

Step 3: Bimaxillary procedure

In the third and final stage, a bimaxillary procedure and genioplasty was performed at the age of 14 years to correct the skeletal asymmetry and occlusal canting (Figure 7 A and B). A 3-D treatment plan was made using a CBCT scan (Figure 7 C). The affected maxillary side was intruded combined with an extrusion of the contralateral side. The extent of intrusion had to be planned in harmony with the ptosis of the right upper lip, which was a result of the facial nerve involvement. The lower jaw was advanced and a genioplasty was performed. This resulted in an improvement of the asymmetry on the bony level, which significantly altered the overall aesthetic outcome. Extra-oral clinical views taken at the age of fourteen revealed a nearly complete harmonization on both the soft tissue and bony level (Figure 8 A and B). The ptosis of the right mouth corner and decreased elevation on smiling due to the pre-surgical facial nerve involvement were the only obvious signs of clinical asymmetry remaining.

**Postsurgical clinical presentation**

The patient satisfaction level was very high, and remained constant in the 4 year follow up. The orthognathic surgery had resulted in a stable correction of the asymmetry on the bony level as seen on a CBCT scan taken at the age of 18 years (Figure 9). The overall aesthetic outcome at the age of 18 had significantly improved and had remained stable during the 4 post-operative years (Figure 10 A and B). Orthodontic evaluation proved a stable occlusion (Figure 10 C). There was no clinical recurrence of hypertrophy, nor of the bones, nor of the facial soft tissues involved, during the 4-year follow-up.

## Discussion

Congenital infiltrating lipomatosis of the face (CIL-F), was originally described in 1983 by Slavin et al [(1)]. It comprises the following characteristics: (1) non-encapsulated tumors containing mature adipocytes, (2) fat infiltration in muscle and adjacent soft tissue, (3) absence of malignant characteristics, (4) absence of lipoblasts, (5) presence of fibrous elements and increased number of vessels and nerve bundles, and (6) subjacent bone hypertrophy. This unilateral fatty tissue infiltration always results in a facial asymmetry that progressively increases and is usually present at birth. CIL-F has 2 patterns of growth: a rapidly progressive form with the most hypertrophy occurring in less than 1 year and another more indolent form with patients presenting in adulthood.

Phenotypic features accompanying this congenital disorder include hypertrophy of soft tissues due to infiltration of mature lipocytes. Hypertrophy of adjacent bones (maxillary bone, mandible and zygomatic bone) is usually also present, resulting in a more pronounced facial asymmetry. Less well documented are the dental malformations [(5,6)] accompanying this disorder including ipsilateral macrodontia, abnormal root shape, accelerated tooth eruption and early loss of deciduous or permanent teeth. Presence of a cutaneous capillary blush is often mentioned by authors, and angiogenesis has been suggested to play an important role in recurrence [(7,8)].

Another characteristic of CIL-F that is frequently reported includes the high recurrence rate (62.5%) after debulking. It must be mentioned that this rate of 62.5%, was first reported by Dionne and Seemayer [(9)] in 1974 for infiltrating lipomas and is based on 13 cases where the infiltrating lipomas are located on the extremities, and not in the face. Slavin et al. stated that the 3 cases they reported all had recurrences but nevertheless showed an aesthetic improvement after debulking, and thus early aggressive resection was recommended [(1)]. Many authors who describe these high recurrences do not specifically mention the age at which the debulking was completed, which can have a great influence. Kamal et al. [(2)] assumed that there is no recurrence if the surgery is delayed until the end of adolescence.

The diagnosis of CIL-F requires the typical clinical presentation, associated with imaging techniques such as CT and MRI and additional genetic testing. Maclellan et al. [4] reported the presence of PIK3CA mutations in affected tissues of these individuals, implicating the possible future role of PI3K inhibitors for prevention of progression or recurrence.

The differential diagnosis of CIL-F is based on the existence of other conditions that can cause a unilateral facial hypertrophy, which includes neurofibromatosis, lipoblastomatosis, liposarcoma, infiltrating angiolipoma, facial angioma and lymphangioma. To exclude these diagnoses, extensive specimen sampling is advisable [10]. On the other hand, a contralateral hypoplasia such as hemifacial atrophy or hemifacial microsomia are also etiologies that need to be considered.

There have been many discussions concerning the optimal treatment for CIL-F, considering the reported high recurrence rates and non-malignant characteristics [8, 11]. Risk of damaging the facial nerve is also a reason for some authors to find a non-surgical approach preferable [5, 8].

The patient presented here was treated by a full surgical approach after the onset of puberty. In the first phase, the lipomatous tissue was excised without damaging the nearby structures. However, this patient presented with a paresis of the facial nerve before surgery, indicating the involvement of the facial nerve in the lipomatous infiltration. The soft tissue resection is often incomplete since the mass is non-encapsulated. In the early years, wide excisions were executed, leaving the patients with remarkable scars. Presently, a preauricular facelift approach is preferred making the scar less visible [7]. It is remarkable that most authors only treat the soft tissue asymmetry and not the associated bone hypertrophy. Because of this bone hypertrophy, the occlusion is often disturbed that can lead to long-term dental problems and a significant accentuation of the facial asymmetry.

The necessity to treat not only the soft tissues but also the bony structures was first recognized by Bouletreau [12], who performed a marginal mandibular resection in a 16-year-old patient with an important improvement in facial aesthetics. Padwa and Mulliken [8] performed osseous reductions of the zygoma, mandible, and maxilla in 3 patients out of 13 before their onset of puberty.

Kamal et al. [2] performed a Lefort I osteotomy simultaneously with a zygoma ostectomy on an 18-year old patient. However, the facial appearance of this girl was not normalized after these procedures and there are no radiological images available.

In our opinion, additional orthognathic surgery can also be a crucial part of the management plan if skeletal harmonization is to be reached. When needed, transpalatal distraction osteogenesis can be used as a preparation for further orthognathic surgery to complete the skeletal harmonization. This two-jaw orthognathic surgery approach was successfully performed when the patient was 14 years old. To date, no clinical recurrence has occurred (patient is aged 18) and a good occlusion and skeletal harmonization was reached. The patient is very satisfied with the result and wishes no further surgeries. A further follow-up to assure remission will be provided for the patient.

## Conclusion

CIL-F is a rare congenital disorder and many treatment modalities have been proposed throughout the years. A surgical approach after the onset of puberty is preferable due to the good aesthetic and functional results and, of course, the psychological well-being of the patients. First, the soft tissue asymmetry can be corrected by a debulking procedure. In a second stage, orthognathic surgery could be performed to correct the skeletal asymmetry, associated malocclusion and dental problems. The possibility for this additional surgery on the bony level must be evaluated for each patient individually, keeping in mind the heterogenous presentation of the underlying skeletal abnormalities such that orthognathic surgery may not always be possible. In this case report, both the soft tissue and bony level were corrected and the results remained stable until present (the patient is 18 years old).

**Conflict of interest**

The authors declare that they have no conflict of interest.

**References**

1. Slavin SA, Baker DC, McCarthy JG, Mufarrij A: Congenital infiltrating lipomatosis of the face: Clinicopathologic evaluation and treatment. Plast Reconstr Surg. 72:158-64, 1983.

2. Kamal D, Breton P, Bouletreau P: Congenital infiltrating lipomatosis of the face: Report of three cases and review of the literature. Journal of Cranio-Maxillo-Facial Surgery. 38: 610-614, 2010.

3. Urs A, Augustine J, Kumar P, Arora S, Aggarwal N, Sultana N. Infiltrating lipomatosis of the face: a case series. J Nat Sci Biol Med. 4(1):252–257, 2013.

4. Maclellan RA: PIK3CA activating mutations in facial infiltrating lipomatosis. Plast Reconstr Surg. 133(1):12e-9e, 2014.

5. Macmillan ARG, Oliver AJ, Reade PC, Marshall DR: Regional macrodontia and regional bony enlargement associated with congenital infiltrating lipomatosis of the face presenting as unilateral facial hyperplasia. Int J Oral Maxillofac Surg; 19: 283-286, 1990.

6. Sun L, Sun Z, Zhu J, Ma X. Tooth abnormalities in congenital infiltrating lipomatosis of the face. Oral Surg Oral Med Oral Pathol Oral Radiol.; 115(2): e52-62, 2013.

7. Ünal S, Demirkan F, Arslan E. and Cinel L. Infiltrating lipomatosis of the face: a case report and review of the literature. Journal of Oral and Maxillofacial Surgery, Vol. 61, Issue 9, p1098-110.

8. Padwa BL, Mulliken JB: Facial Infiltrating lipomatosis. Plast Reconstr Surg; 108: 1544-54, 2001.

9. Dionne GP, Seemayer TA: Infiltrating lipomas and angiolipomas revisited. Cancer; 732, 1974.

10. De Rosa G1, Cozzolino A, Guarino M, Giardino C. Congenital infiltrating lipomatosis of the face: report of cases and review of the literature. J Oral Maxillofac Surg. 1987 Oct;45(10):879-83.

11. Kang N, Ross D, Harrison D, Unilateral hypertrophy of the face Associated with infiltrating lipomatosis. Oral Maxillofac Surg; 56:885-887, 1998

12. Bouletreau P, Breton P, Freidel M, Congenital infiltrating lipomatosis of the face: Case report. Journal of Oral and Maxillofacial Surgery. 58 (7): 807-810, 2000.

## Figure captions

Figure 1A: Frontal clinical picture of the patient at the age of 11, before the debulking procedure. The asymmetry between the left and right side of the face is clearly seen.

Figure 1B: Frontal clinical picture of the patient at the age of 11, before the debulking procedure. When the patient is smiling, the facial nerve malfunction with ptosis of the mouth and decreased elevation of the upper lip becomes more evident.

Figure 2A: Coronal MR image taken at the age of four, showing the asymmetry on the soft tissue level.

Figure 2B: Axial MR image taken at the age of four, showing the asymmetry on the soft tissue level.

Figure 3A: pre-operative CBCT image showing the occlusal canting and right-sided mandibular hypertrophy.

Figure 3B: Coronal pre-operative CBCT image showing the macrodontia on the affected side.

Figure 4: Subcutaneous dissection and sub-SMAS extension of the dissection plane above the parotid fascia.

Figure 5: Removal of the pathologic tissue and closure of the skin.

Figure 6A: Frontal clinical picture of the patient at the age of 12, taken 6 months after the debulking procedure.

Figure 6B: Frontal clinical picture of the patient at the age of 12 when smiling, taken 6 months after the debulking procedure.

Figure 7A: At the age of 14 the orthognathic surgery was planned. A CBCT scan was taken during the set-up consultation showing the right-sided hypertrophy of the upper and lower jaw and occlusal canting.

Figure 7B: At the age of 14 the orthognathic surgery was planned. A CBCT scan was taken during the set-up consultation showing the right-sided hypertrophy of the upper and lower jaw and occlusal canting.

Figure 7C: At the age of 14 the 3D planning for a bimaxillary operation and genioplasty was made.

Figure 8A: Postoperative results at the age of fourteen after the three-step approach (debulking, transpalatal distraction and orthognathic surgery). The residual asymmetry is mainly due to the facial nerve involvement that was already present since childhood.

Figure 8B: Postoperative results after the three-step approach when smiling (debulking, transpalatal distraction and orthognathic surgery). The residual asymmetry is due to the facial nerve involvement.

Figure 9: Postoperative CBCT obtained 4 years after the orthognathic surgery (age 18 years) showing the stable results with no recurrence of the osseous hypertrophy.

Figure 10A: Frontal clinical picture of the patient at the age of 18, taken 4 years after the orthognathic surgery was performed. The asymmetry on the soft tissue and bony level has remained stable.

Figure 10B: Frontal clinical picture of the patient at the age of 18 when smiling, taken 4 years after the orthognathic surgery was performed. The asymmetry on the soft tissue and bony level has remained stable.

Figure 10C: Intra-oral view showing the stable occlusion at the age of 18.