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A CASE OF DERMIS-FAT AUTOTRANSPLANTATION FOR CORRECTION OF SOFT TISSUE DEFICIT IN HEMIFACIAL MICROSOMIA

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Hemifacial microsomia is a term used to describe a facial anomalies caused by the defect of anatomic structures originated from the first and the second branchial arches.

The defect area encompasses some facial areas including mandible, facial muscles, masticatory muscles, cranial nerves, auricles, etc., and the degree of manifestations of the anomalies is extmely diverse.

A 20-year-old man complaining of facial asymmetry and malocclusion visited our hospital. An orthognathic surgery was performed for the correction of hard tissue anomalies and then autogenous dermis-fat autotransplantation was done for the improvement of remaining soft tissue defect. The result was esthetically good and the case was presented here.

I. INTRODUCTION

Hemifacial microsomia is a term used to describe a spectrum of morphogenetic anomalies involving structures derived from the first(mandibular) and second (hyoid) branchial arches probably due to focal hematoma formation on the stapedial artery at two months of fetal period[5,7].

Other names have been proposed, such as otomandibular dysostosis, unilateral facial agenesis, oral-mandibular-auricular syndrome, et al.[1] A wide variety of phenotypes exist, all having the common feature of asymmetric underdevelopment of the face [17]. The deformity may involve the external ear, lateral facial soft tissues, and the fifth, seventh, and ninth cranial nerves, as well as the orbit, zygoma, maxilla, mandible, and temporomandibular joint, single or in combination. Classification of mandibular defect[4] and auricular anomaly[11] is illustrated in fig. 1, 2. Clinically, the incidence of hemifacial microsomia is reported to be 1 in 3,500-4,000 live births[1], which is the second most common facial anomaly after cleft lip and palate. The condition is usually unilateral, but both sides of the face can be affected [6].

Most of adult patients with hemifacial microsomia need 3 dimensional correction of facial skeleton and adjacent soft tissue[12]. But, if the patient is very young, another factor, growth must be considered.

This is a report of our case, diagnosed as hemifacial microsomia.

II. CASE REPORT

A 19-year-old male(Fig. 3) visited our hospital with the chief complaints of facial asymmetry and malocclusion. The condition was congenital and we diagnosed him as hemifacial microsomia with mild auricular anomaly.

When he was 7 years old, cheiloplasty had been performed to correct the lateral facial cleft at other hospital. Familial history revealed that his elder sis-

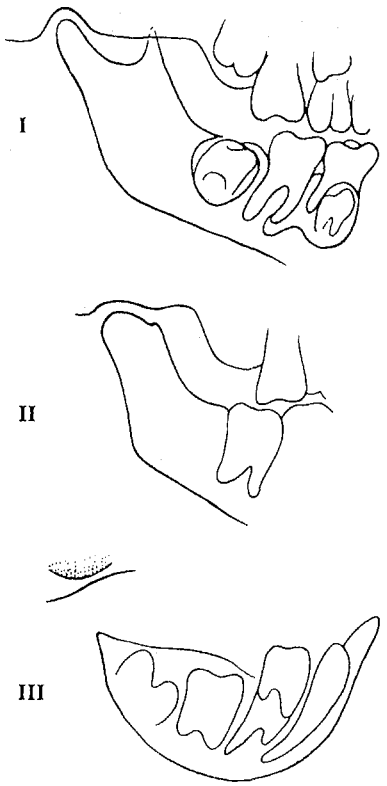

Fig. 1. Three types of mandibular defects. I : Miniature mandible. II : Functioning TMJ but with an abnormal shape and site. III : Absence of ramus and no glenoid fossa.

ter had suffered from congenital anomaly(maybe, cleft) and died about 7 days after birth, but his two brothers were healthy.

His face had an obvious asymmetry characterized by a flatness and deficit of the right side, a deviation of mandible to the right, and postoperative scar on right lip commissure. The panoramic radiogram(Fig. 4) showed a normal left mandibular ramus and TMJ but a diminutive right ramus and TMJ. And in physical examination, there was normal range of mandibular motion with no dysfunction of the TMJ, even though the right condyle was malformed. A tracing of the posteroanterior cephalogram showed underdevelopment of the right zygoma, a tilted maxillary dental midlines and that of the face. In occlusal analysis, there was a tilted occlusal plane that was higher

Fig. 2. Classification of auricular anomalies. Grade I : small, malformed ear with most components present. There is atresia of the external auditory canal. Grade II : vertical remnant of skin and cartilage. Grade III : auricle almost entirely absent except for a misplaced lobule and small skin and cartilage remnants.

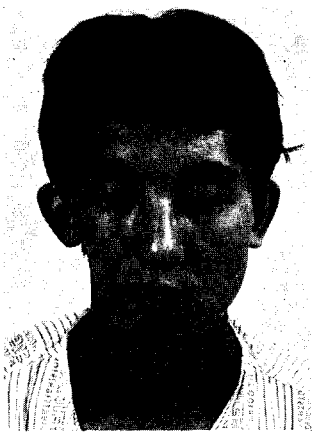

Fig. 3. Preoperative facial view.

Fig. 4. Preoperative panoramic radiogram.

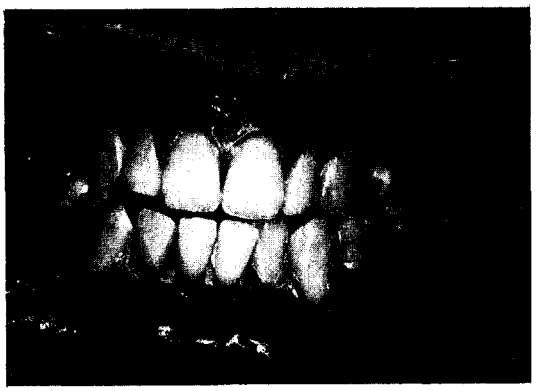

Fig. 5. preoperative occlusion.

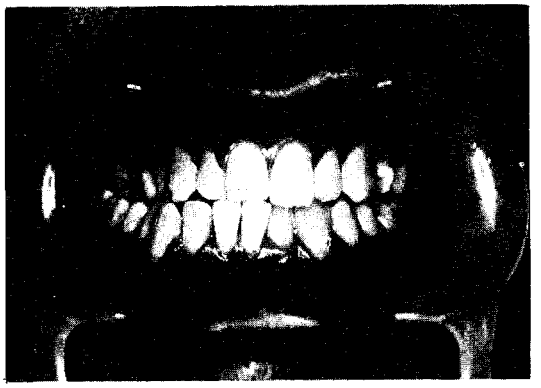

Fig. 6. Postoperative(1st) occlusion.

Fig. 7. Postoperative(1st) facial view.

on the right than the left, a discrepancy between the dental and facial midlines, class III malocclusion with posterior cross bite, and anterior edge bite(Fig. 5).

On Nov. 18, 1988 the patient underwent the first stage in the correction of his deformity. The first operation was pointed on the correction of the malocclusion. Under general anesthesia Le Fort I osteotomy was performed. After application of the intermediate acrylic resin splint, we repositioned the maxilla and performed mandibular osteotomies(Left side··· vertical ramus osteotomy, Right side··· inverted L-shaped osteotomy) to allow the mandible to occlude with the repositioned maxilla. Postoperative result(Fig. 6) revealed that the malocclusion was corrected to good interdigitation and functions on mastication. And occlusal plane was also corrected to horizontal axis.

One year later, the second operation was undertaken to augment the hard tissue component. We performed onlay bone graft on the right mandibular body and ramus using iliac bone, and implantation of alloplast (Proplast···fluorocarbon compound material) on right zygoma. The postoperative facial view(Fig. 7) showed relatively good contour, but depression of the cheek area still required additional correction. So we planned autogenous dermis-fat transplantation to give volume of the depressed buccal cheek and cheiloplasty to reduce the scar tissue on right lip commisure.

The last operative procedure was done on May 24, 1990. First a double Z-plasty(Fig. 8, left) was outlined in the right lip commissure. After skin incision, subsequent dissection and suture were performed(Fig. 8, right). And then we designed the area of augmentation(Fig. 9) and took deepithelized dermis-fat from the lower abdomen(Fig. 10). Through subcutaneous dissection, we inserted the graft and performed tagging suture(Fig. 11). Overcontouring was needed to predict the resorption of the dermal fat tissue.

The patient is now approximately five months after the third procedure(Fig. 12). His facial symmetry remains good, but still shows slight depression on anterior cheek area. In general, he is quite pleased with the results.

Fig. 8. Left···Design for double Z-plasty. Right··· Operative procedure of double Z-plasty.

Fig. 9. Design for soft tissue augmentation.

Fig. 10. Dermis-fat graft from lower abdomen

Fig. 11. Operative view···After insertion of the dermis-fat graft.

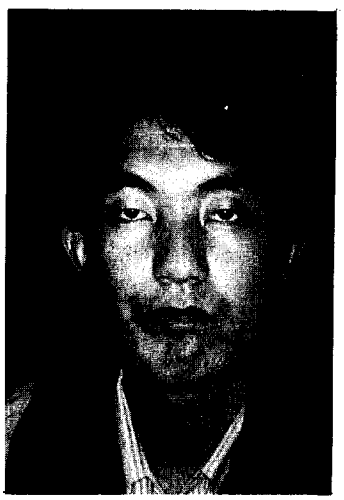

Fig. 12. postoperative(3rd) facial view.

III. DISCUSSION

The goals of treatment in hemifacial microsomia are correction of malocclusion and facial skeleton, restoration of facial volume, and reconstruction of ear defected[2].

In 1961, Longacre performed repeated augmentation of defected facial skeleton using split rib or iliac

bone[13], and Converse recommended that ramus operation would be performed at mixed dentition stage and maxillary osteotomy should be delayed until facial growth would be accomplished[5]. Obwegeser said that it was beneficial that early bone graft was performed at first to mask the facial defect and gnathosurgery should be performed after completion of facial growth.

Meanwhile in 1977, Edgerrton reconstructed the TMJ in hemifacial microsomia at the age of 2.5 using costochondral graft[7], and in 1984 Murray treated the patients with hemifacial microsomia with activator [15]. And Munro established 5 surgical treatment models in hemifacial microsomia according to the anatomic incompleteness of the TMJ and the extent of orbital involvement.[14].

There are three types of autogenous fat transplantation ; 1) free adipose tissue transplantation, 2) transplantation of adipose tissue with dermal tissue as a carrier in the form of dermis - fat graft, 3) transplantation of adipose tissue with microvascular free tissue transfer technique. And clinically fat transplantation may be performed for replacement of soft tissue defects, for obliteration of dead space, and for creation of a favorable tissue interface[9].

Neuber(1893) pioneered the application of fat transplantation and made the first attempt in humans. Lexer(1910, 1925) employed adipose tissue transplantation extensively and reported success in establishing normal contour in hemifacial atrophy and in enlargement of small breasts. And Montgomery & Pierce(1963) got excellent results following the application of autogenous fat implants to fill the dead space left behind by stripping of the frontal sinuses.

The uncertainty in terms of the volume reduction after free fat tissue transfers has rendered vascularized omental transfers an attractive alternative. In 1972 McClean & Bunke introduced the omental free flaps for facial soft tissue reconstruction, particularly for reconstruction of hemifacial atropy and craniofacial microsomia[3]. And Fujino & Sugimoto(1975)[10], Edgerton & Wells(1977)[9] ensures blood supply and some predictable results by application of deepithelized dermis - fat flap with microvascular transfer.

Regarding the fate of transplanted fat cells, there are two opinions ; namely "host cell replacement theory"(Peer, 1977) and "cell survival theory" (Peer, 1955, 1959)[16]. The latter is of the opinion that in free fat transfers, the fat cells do not survive and that the host histiocytes phagocytize the lipid released from the decomposed fat cells and become new adipose cells. And the former is that some adipose tissue indeed survives and that the cells collectively represent the fatty tissue ultimately remaining in the transplant. As in this case, deepithelization ensures early vascularization of the dermal graft. Hair follicles generally disappear within two months, but most of the sweat glands survive permanently and continue to function. Consequently the fate of dermal graft need further study.

Peer's report indicated that approximately 50 percent of the weight and volume is lost one year after fat transplantation[16]. And in general, 20 - 30 percent overcorrection is adequate to compensate for volume resorption and well tolerated by the patient.[8].

In our case, the patient had lean body and overcontouring was insufficient objectively. And in lip commisure area, dermis - fat graft was impossible due to the double Z - plasty. But, the facial symmetry is restored and the patient feels satisfactory.

Ⅳ. SUMMARY

We performed double Z - plasty to correct the lateral facial cleft scar and autogenous dermis - fat transplantation from lower abdomen to correct the soft tissue deficit on patient with hemifacial microsomia.

And, we got good result esthetically.

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국문초록

반안면왜소증환자에 있어서 자가지방이식을 이용한 연부조직결손의 수복예

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반안면왜소증이란 제1및 제2새궁에서 유래되는 기관에 결손이 옴으로써 초래되는 안면기형을 일컫는 것으로 선천성 악안면기형 중 순열 및 구개파열 다음으로 빈발하는 질환이다.

결손부는 하악골을 포함한 안면골의 여러 부위와 안면근 및 저작근, 뇌신경, 이개등여러 부위에 다양하게 나타나며, 그 기형의 발현 정도도 아주 다양하다.

본 교실에서는 안면비대칭과 교합부전을 주소로 내원한 20세된 남자환자에 있어서 먼저 경조직을 바로잡기 위하여 상·하악골에 대한 악교정수술과 onlay 골이식을 시행한 후, 남아있는 연조직 결손부에 대하여 진피-지방이식을 시행하여 심미적으로 만족할만한 결과를 얻었기에 보고하는 바이다.