

SILICON ALLOPLASTIC GRAFTS IN MAXILLOFACIAL SURGERY

VIOREL IBRIC CIORANU¹, SORIN IBRIC CIORANU², SILVIU NICOLAE³, VASILE NICOLAE⁴

^{1,2,3,4} "Lucian Blaga" University of Sibiu

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Abstract: Silicon alloplastic grafts are widely used in maxillofacial pathology especially when it is intended to correct posttraumatic sequelae resulted from improper bone healing of the mandible, malar bone or orbital walls. Silicon grafts can be usefully applied in ortognathic surgery, after tumour excision or in the surgical treatment of temporomandibular joint (TMJ) ankylosis as an interposition graft.

Cuvinte cheie: silicon, traumatologie, tumori, dismorfii, anchiloza ATM

Rezumat: Grefele aloplaste din silicon pot fi extrem de utile în patologia chirurgicală maxilo-facială în corecția sechelelor rezultate în urma unor traumatisme soldate cu consolidări vicioase, permițând remodelarea mandibulei, a osului malar, a pereților orbitei etc. Siliconul poate fi folosit și în chirurgia ortognată pentru corecția unor hipoplazii, în patologia tumorală pentru a rezolva defectele rezultate în urma exerezelor sau în chirurgia anchilozei temporo-mandibulare, ca material de interpoziție pentru a preveni recidiva.

INTRODUCTION

Often, it is very difficult to reconstruct complex defects resulted from large ablation of malignant or benign tumours, severe trauma cases, or to correct bone and soft tissue growth pathology. Some times, the surgeon must choose from various techniques, the one with better prognosis. It is very important to use the proper material in TMJ ankylosis, to replace the lost disk.(1)

PURPOSE

The purpose of this study was to demonstrate the utility of silicon alloplastic grafts in correcting defects of the soft and hard tissues, but also as an interposing graft in the treatment of TMJ ankylosis to prevent relapse.

METHODS

In the past 10 years, we have used silicon material (block, sheets, prosthesis) (figure no. 1) to manage cases where there were soft or hard tissue defects: post surgical extirpation of large tumours, dealing with TMJ disorders or congenital facial defects (table no. 1). The first case shows a 58 year-old female patient, who had surgery for cheek carcinoma resulting in unaesthetic facial contour. 3 years from first surgery a malar bone silicon prosthesis was inserted intraorally, fixed with graft screws. The graft was trimmed into the desired shape after a careful clinical and CT examination. The second case is represented by a 26 year-old male patient, who underwent a mandibular resection for an aggressive ameloblastoma 12 years ago. There is a severe mandibular marginal contour defect. A silicon block is fixed in the remaining basal bone resulting in the correction of the defect (figure no. 2). The next 2 cases involved 2 male patients, 47 and 31 years old, who suffered Le Fort II fracture of the middle face after car accident. The malar bones are retruded, thus resulting a serious facial asymmetry. 2 zygomatic silicon grafts are applied and screwed into the remaining bone, thus regaining the normal facial contour.

The next 3 cases are also trauma cases, this time there are major deficiencies in bone healing of the orbital walls of 3 patients resulting in one-sided diplopia. The CT exams revealed improper orbital floor healing. Silicon sheets were inserted to reconstruct the orbital floor. This allowed for normal eye function. A 25 year-old patient who had undergone orthodontic treatment for maxillary hypoplasia intends to correct the facial contour. 2 malar bone silicon grafts are applied and screwed to the zygomatic. A 19 year-old male patient is diagnosed with left mandibular growth defect resulting in major facial asymmetry. After orthodontic treatment, a silicon block is shaped and fixed into place for the correction of the aesthetic deficiency.

Table no. 1. Personal cases divided by pathology and the use of the silicon graft

16 PATIENTS	19 SILICON GRAFTS
2 tumour excision	1 malignant – malar prosthesis 1 benign – shaped block
6 posttrauma sequelae	2 malar prosthesis 4 silicon sheets for obital reconstruction
2 hypoplasia	Bilateral Maxilla – 2 malar prosthesis Mandibular unilateral growth disorder – 1 block
6 TMJ ankilosis	5 unilateral, 1 bilateral Interposition graft

We used silicon grafts in the management of TMJ ankylosis in a group of 6 patients (2 females and 4 males) with good functional results. The cause of ankylosis was pediatric trauma in 5 patients and one patient suffered from recurrent ear infections as a child. In 5 patients, the disease affected one side, with only one case being bilateral. The opening of the mouth ranged from 2 to 6 mm, with a minimum in bilateral ankylosis. The chin appears rebounded, deviated towards the affected side, the pathological side of mandible looks shorter. The

¹Corresponding author: Viorel Ibric Cioranu, Str. C-tin Rădulescu Motru, Nr. 16, Ap 95, S4, București, România, E-mail: maxfaxsurg@yahoo.com, Tel: +40748 365320

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CLINICAL ASPECTS

interincisive line is deviated towards the affected side (figure no. 3).

Figure no. 1. Silicon sheets 2 mm thick



When examining a patient with bilateral TMJ ankylosis, it is noticed a severe mandibular growth defect, there is a so called "bird" like profile, the inferior incisors are inclined towards the oral touching the palatal mucosa. Oral health is very often hard to keep as these patients have multiple decays, calculus, gum issues. Somatic development is also compromised.(2) All the 6 patients underwent accurate clinical exams, blood tests and also x-rays exams: panoramic radiographs, skull and facial x-rays. CT exam was the one that brought the largest amount of information concerning the TMJ bone block. The block was surgical removed. There are numerous interposition techniques (temporalis muscle, masseter muscle, temporalis fascia, derm, cartilage).(3,4,5) Silicon sheets (2-3 sheets depending on the case), that were fixed in the temporal bone, were used to create joint disk.

Figure no. 2. Patient with mandibular defect after bone resection for mandibular ameloblastoma. A. Preoperative picture. B. Silicone block screwed into the basal mandible. C. Postoperative picture with facial contour correction



Figure no. 3. A. TMJ ankylosis, preoperative. B. X-ray picture showing the joint bone block. C. Postoperative picture showing normal mouth opening



RESULTS

The group of patients comprised of 16 cases for which 19 silicon grafts were used. The batch had a heterogeneous range of defect causes. 2 were the result of tumour extirpation (1 carcinoma and 1 one ameloblastoma). 6 patients had been previously involved in work or car related accidents that left them with bone sequelae in the middle face. 2 patients suffered from birth bone growth defects (one in the mandible and one in the maxilla). 6 patients had TMJ internal disorders: ankylosis. In 11 cases silicon was used as on lay graft to correct facial contour. 8 cases involved the use of silicon as a bone prosthesis

replacing the malar bone whose shape was trimmed after CT examinations.

DISCUSSIONS

Silicon was used as sheets (2-3 mm thick) when dealing with orbital floor improper posttraumatic bone healing.(6) In the surgical management of ankylosis, after bone resection, silicon sheets were used as interposition graft.(7) Orbital floor reconstruction did not pose a high surgical risk, but ankylosis treatment proved to be quite difficult. Nasal intubation was necessary in these cases often assisted by the bronchoscope. When the bone block develops towards the medial side, there is a high risk of damaging the maxillary artery, the meninx or the carotid artery.(8) There is also a risk of perforating the middle cranial fossa or damaging the acoustic nerve if the block extends towards the glenoid fossa or the petrous region of the temporal bone. In 2 cases, the silicon was used in block form, which allowed for easier handling and shaping intra-operatorily. All the grafts were fixed with special screws, beside the orbital floor grafts which did not require any fixation at all.(9) At follow-up, all the grafts looked well, not showing any signs of infections or resorption in early stages. The facial contour was regained leading to good symmetry.(10)

CONCLUSIONS

Silicon grafts in maxillofacial defects are widely used with good esthetic outcome in the correction of soft and hard tissue deficiencies and also as interposition grafts to replace the disk in ankylosis of TMJ. It is an optimal material due to its rapid integration, easy handling, the various forms of presentation and good prognosis.

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