A Case of Chronic Infection 28 years After Silicone Orbital Implant

Muneo Miyasaka[1], Rica Tanaka[1], Ushio Hanai[1], Akihisa Yamazaki[1]
Masahiro Iida[2] and Tadashi Akamatsu[1]

1)*Department of Plastic and Reconstructive Surgery*
2)*Department of Otolaryngology*
Tokai University School of Medicine

(Received December 10, 2007; Accepted January 21, 2008)

Silicone was one of the most common biocompatible materials used for orbital floor reconstruction about twenty to thirty years ago. Recently, surgeons hardly use silicone due to numerous reports of complications such as infection, extrusion and implant displacement. We present a case of chronic infection seen after 28 years of silicone implant used in orbital floor repair. Although it is reported that infection due to silicone implant may decrease after long years of follow up, our case demonstrated the possible case of unexpected infection after more than twenty years with orbital silicone implant.

Key words: Silicone, Orbital floor reconstruction, Alloplastic implant, Autogeneous implant, Infection

INTRODUCTION:

An orbital fracture is a common injury. The most common orbital fracture is the fracture of the inferior orbital wall without the involvement of the orbital rim, also called a blow out fracture. Operative procedure is necessary when the orbital tissue herniates and is trapped in the fractured site or drops into the maxillary or ethmoidal sinus causing the enlargement of the orbital volume with impairment in orbital movement.[1, 2]

For the past decade, there has always been a controversial whether to use autogenous or synthetic implants to reconstruct orbital fractures. Synthetic implants include silicone, hydroxyapatite, porous polyethylene, Teflon, and etc and silicone implant has been used since 1963 and considered to be a valuable material used in diverse surgical applications.[3] However surgeons now prefer to use autogenous materials such as iliac or maxillary bone graft due to numerous reports on complications due to alloplastic implants, especially silicone.[4] Infection, extrusion and implant displacement are the common complications of silicone implant.[5, 6] As Morrison et al reported, majority of silicone complications are seen in the early postoperative period and the chances of complication decreases with longer asymptomatic period[7]. In other words, the chance of seeing a patient with silicone infection after orbital reconstruction decreases by time. In addition, silicone becomes difficult to detect by CT and MRI after silicone deterioration. Therefore, diagnosis of silicone complications long after the primary surgery becomes very difficult for the new physician in charge not knowing the details of past orbital reconstruction. Herein, we report a case of opthalmagia after 28 years of orbital reconstruction with silicone implant.

CASE REPORT:

35 years old male presented with right chronic ophthalmagia and diplopia. He did not have swelling or any sign of active infection in the right eye. As his past medical history, he had injured his right eye and was diagnosed as blow out fracture at age seven. He was immediately operated and received inferior orbital wall reconstruction with silicone implant. At age 19, silicone implant was removed due to orbital abscess at a different hospital. Silicone was thought to be completely removed at that time. However, patient had begun to notice pain in the right orbital area starting December 2005 (at age 34). The patient had consulted an otolaryngologist at Tokai University Hospital on May 2006 for further examination and treatment.

Physical examination revealed supraversion of right eye. **(Figure 1)** Right ocular movement was normal

Fig. 1. 35 years old male presented with right chronic ophthalmagia and diplopia. He presented with a supraversion of right eye but did not have swelling or any sign inflammation.

Rica Tanaka, Department of Plastic and Reconstructive Surgery, Tokai University School of Medicine, 143 Shimokasuya, Isehara-shi, Kanagawa, 259-1193, Japan. Tel: +81-463-93-1121 E-mail: rica@is.icc.u-tokai.ac.jp

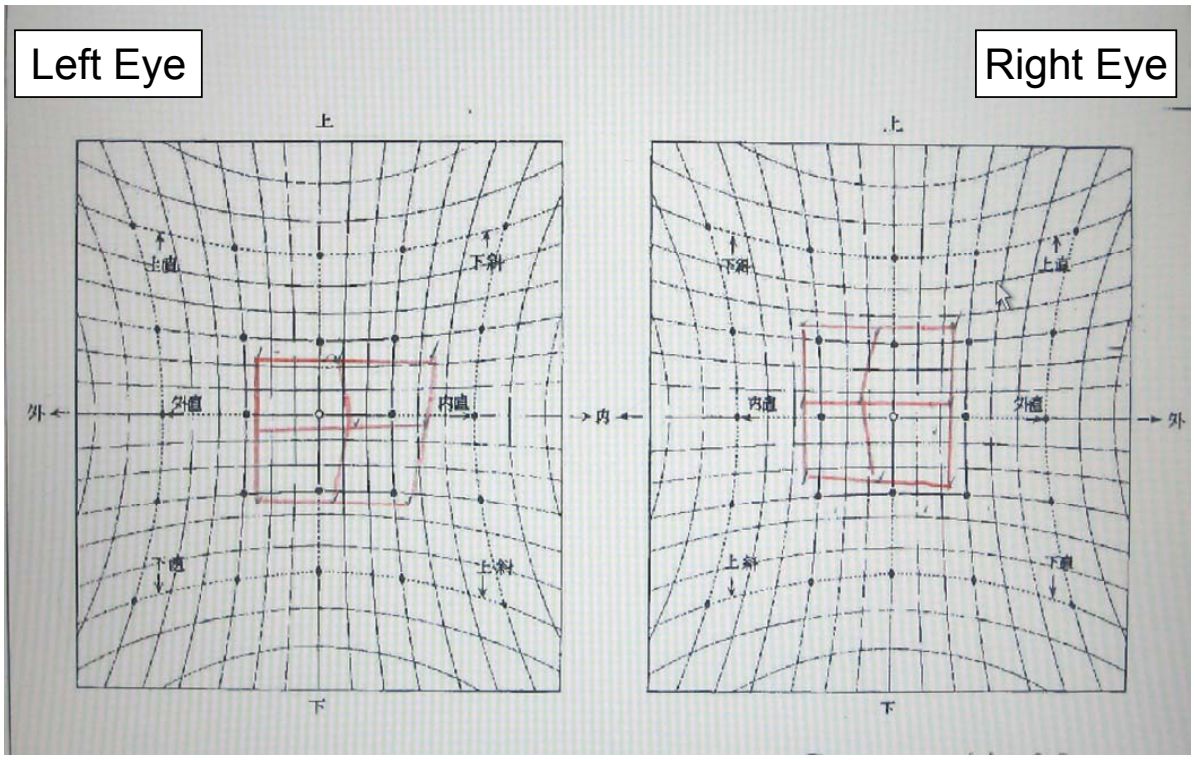

Fig. 2. Hess chart revealed *restricted infraduction and abduction of the right eye*

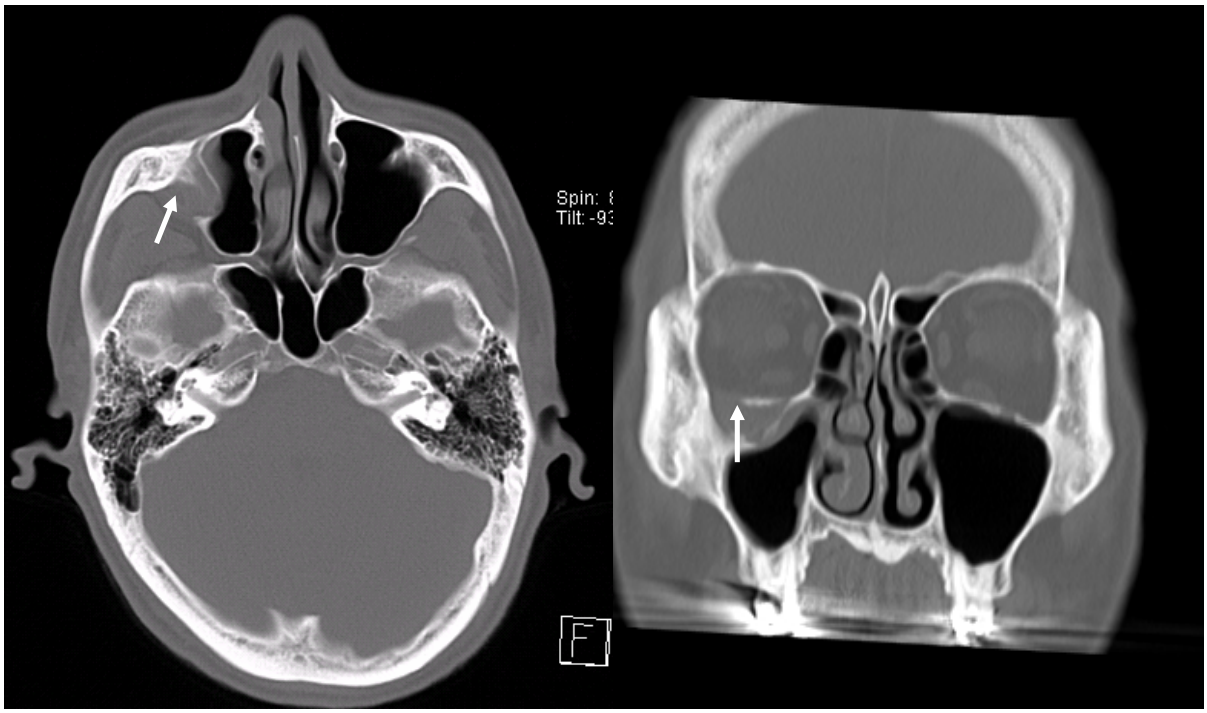

Fig. 3. Computed Tomography result showed an increased soft tissue density between the right zygomatic bone and right maxillary sinus. There was no fluid collection and sign of active infection in the right maxillary sinus.

but Hess chart **(Figure 2)** revealed restricted infraduction and abduction of the right. Blood examination contained normal numbers of white blood cells and CRP 0.17mg/dl. Computed Tomography result showed an increased soft tissue density between the right zygomatic bone and right maxillary sinus. **(Figure 3)** There was no fluid collection and sign of active infection in the right maxillary sinus. Preoperatively, we diagnosed the pain was due to chronic orbital infection. We performed an open drainage of the orbital floor and removal of increased soft tissue mass on May 31st, 2006. Surprisingly, residual silicone implant was observed. **(Figure 4)** Deteriorated and fragmented sheets of silicone were removed. The culture of resected tissue did not show any bacterial growth. Postoperatively, the pain had disappeared and postoperative Hess examina-

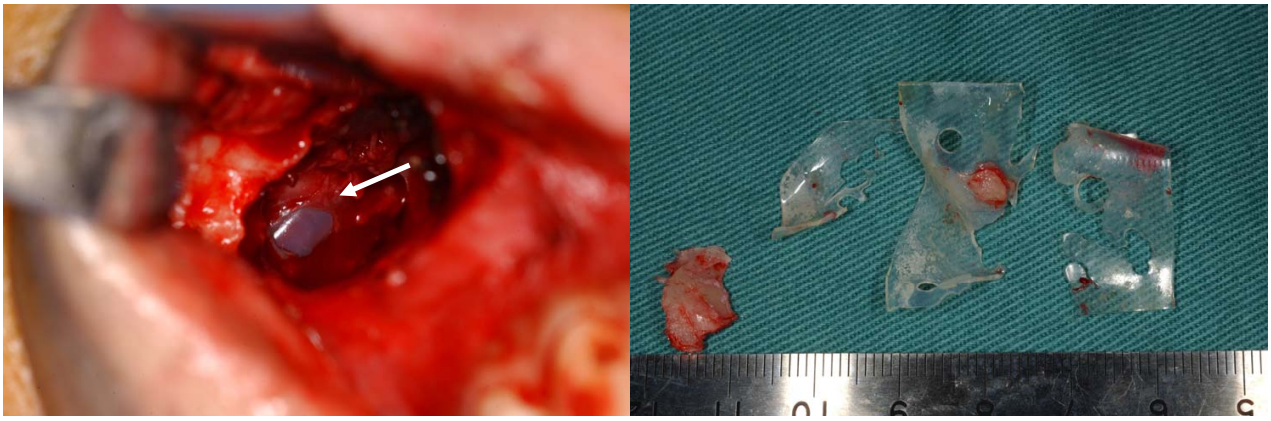

Fig. 4. (Left) Picture taken during transconjunctival anterior orbitotomy and increased soft tissue mass was removed, and the arrow shows the residual silicone implant in the orbital floor. (Right) Silicone implant removed from the orbital floor.

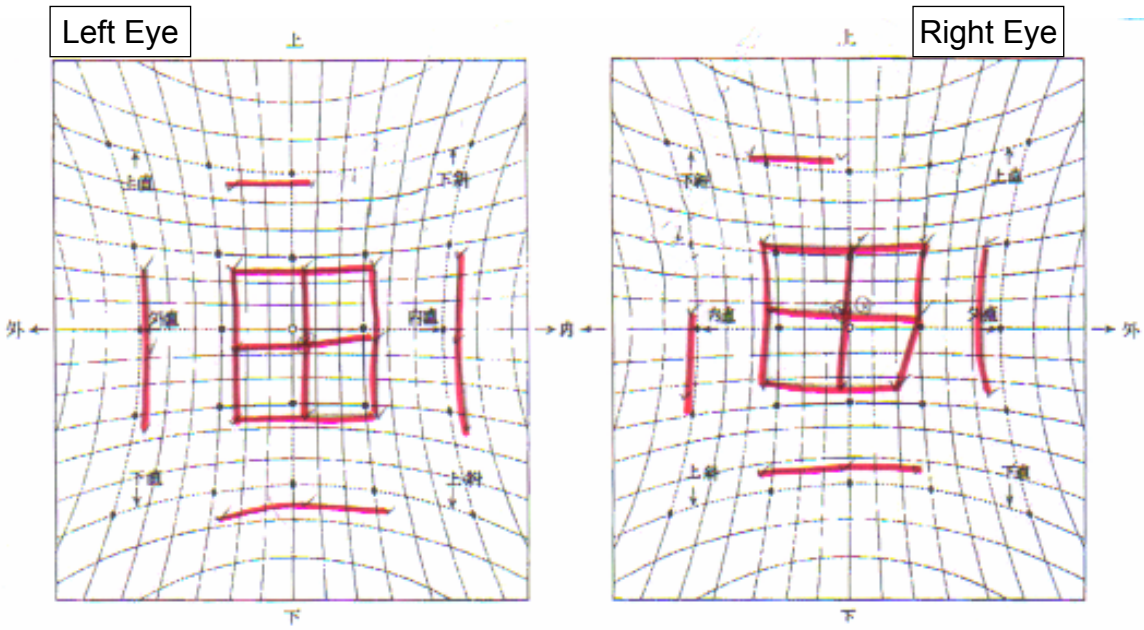

Fig. 5. Post operative Hess chart revealed improvement of right and left ocular movement and ocular position.

tion performed on June 6, 2006 showed improvement of the orbital movement and ocular position. (**Figure 5**) Patient is doing well after two year follow up examination.

DISCUSSION

The benefits for using alloplastic materials for orbital reconstruction are the ease of use, availability, saving of the operating time, and sparing of the donor site. However, the main problem using alloplastic material is the possibility of infection, extrusion, and displacement. Rubin et al reported that the silicone and metal plates have the highest infection rate within various alloplastic orbital implants, silicone having 4.4% of infection rate.[8] Morrision et al were the ones to conduct the largest and longest operative study for silicone implants for orbital wall defects and they reported that average of 13% patients had silicone implant removal. The average time to removal was 31 days and the vast majority of patients underwent the removal of the implant were in the early postoperative period. They indicated that the longer the material is in place and asymptomatic, the greater the chance of permanent retention.[7]

Despite this fact, we have experienced a case of silicone complication 28 years after the primary orbital reconstruction. In this case, the silicone was believed to be completely removed 15 years prior to the second infection. We assume that there was more than one silicone sheet or one sheet folded in two placed in the orbital floor at the primary surgery. The surgeon who had operated at the first infection possibly did not know this at that time or could not completely remove it due to severe silicone deterioration. Severe silicone deterioration had caused thick granulation tissue in the infra orbital area and lead to restriction of the orbital movement and had caused diplopia. Since the orbital pain and diplopia had resolved after removal of silicone, and the post operative Hess examination record showing corrected orbital position, we speculate that the orbital pain was caused by accommodative asthenopia.

Furthermore, silicone is difficult to detect by CT and MRI after deterioration, therefore, diagnosis of silicone complication long after the primary surgery becomes very difficult. In addition, it is very difficult to track ones operative history after 20 years. We learned from our experience that surgeons always need to remember that there is a possibility of an unknown implant to be placed in the surgical site at the time of symptomatic complaints after orbital reconstruction.

After numerous reports on complications due to alloplastic implants, surgeons now prefer autogenous implant. In contrast to alloplastic implant, autogenous implant is reported to have very few infection rates.[9] However, the disadvantages for these implants are additional operative time in harvesting, difficulties of handling in contour to proper size, individual variations in resorption, and risk of donor site morbidity. Recently, Kontio et al reported the effective cases of iliac bone graft. Although resorption rate was high, he stated that majority of bone graft was displaced by advantageous remodeling.[10] Lee et al reported successful cases of maxillary bone graft used with less donor morbidity and resorption.[11] Considering these positive reports using autogenous materials, we understand the reason why surgeons prefer these over alloplastic materials. However, there is no large long term study done in the past to clarify the controversy between the uses of alloplastic versus autogenous materials. Since we cannot conclude that all alloplastic materials are harmful, the decision should be made with prudent prospective or retrospective investigation on all the materials currently being used for the same purpose.

REFERENCES:

1) Dutton JJ. Visual rehabilitation of aphakic children. *Surv Ophthalmol*. Mar-Apr 1990; 34(5): 365.

2) Koornneef L. Current concepts on the management of orbital blow-out fractures. *Ann Plast Surg*. Sep 1982; 9(3): 185–200.

3) Lipshutz H, Ardizone RA. The Use of Silicone Rubber in the Immediate Reconstruction of Fractures of the Floor of the Orbit. *J Trauma*. Nov 1963; 3: 563–568.

4) Nam SB, Bae YC, Moon JS, Kang YS. Analysis of the postoperative outcome in 405 cases of orbital fracture using 2 synthetic orbital implants. *Ann Plast Surg*. Mar 2006; 56(3): 263–267.

5) Brown AE, Banks P. Late extrusion of alloplastic orbital floor implants. *Br J Oral Maxillofac Surg*. Jun 1993; 31(3): 154–157.

6) Davis PK, Jones SM. The complications of silastic implants. Experience with 137 consecutive cases. *Br J Plast Surg*. Oct 1971; 24(4): 405–411.

7) Morrison AD, Sanderson RC, Moos KF. The use of silastic as an orbital implant for reconstruction of orbital wall defects: review of 311 cases treated over 20 years. *J Oral Maxillofac Surg*. Apr 1995; 53(4): 412–417.

8) Rubin JP, Yaremchuk MJ. Complications and toxicities of implantable biomaterials used in facial reconstructive and aesthetic surgery: a comprehensive review of the literature. *Plast Reconstr Surg*. Oct 1997; 100(5): 1336–1353.

9) Polley JW, Ringler SL. The use of Teflon in orbital floor reconstruction following blunt facial trauma: a 20-year experience. *Plast Reconstr Surg*. Jan 1987; 79(1): 39–43.

10) Kontio RK, Laine P, Salo A, Paukku P, Lindqvist C, Suuronen R. Reconstruction of internal orbital wall fracture with iliac crest free bone graft: clinical, computed tomography, and magnetic resonance imaging follow-up study. *Plast Reconstr Surg*. Nov 2006; 118(6): 1365–1374.

11) Lee HH, Alcaraz N, Reino A, Lawson W. Reconstruction of orbital floor fractures with maxillary bone. *Arch Otolaryngol Head Neck Surg*. Jan 1998; 124(1): 56–59.