

# Ocular Implants and Orbital Reconstruction: Two Follow-Up Cases

**ABSTRACT:** *Ocularists enjoy a special relationship with monocular patients. For many, the ocularist is the only professional who can help them with their prosthetic needs and understand and sympathize with the dilemmas that sometime arise from wearing prostheses. While it is always interesting to see unique case reports, we rarely learn how their subjects fare years later. In this article, the author revisits two patients he saw and reported on in the Journal of the American Society of Ocularists and the Journal of Ophthalmic Prosthetics, and shares his findings in this follow-up report.*

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## MIGRATED CUTLER IMPLANT REVISITED

In 1989, an article appeared in the *Journal of the American Society of Ocularists* regarding a migrated Cutler implant.<sup>1</sup> More than 17 years have passed since the encounter described in the article. This interesting case represents a course that many monocular patients face during their lifetimes. It also demonstrates the role of the ocularist in working with patients as their prosthetic needs evolve.

At times in the course of treatment that includes enucleation, little consideration is given to the patient's long-term needs. The primary objective seems to be fitting an acceptable prosthesis. Ocularists can sometimes help patients avoid surgery, but in this case, fitting a prosthesis over a migrated implant proved to be only a temporary solution to the patient's problems.

### *A Lifetime of Wearing a Prosthesis*

The patient's left eye was enucleated following an accident in 1932 when he was 9 years old. Subsequently, he had a gold ball sphere implanted in the eye socket, which provided good volume and reasonable movement with minimal mucus drainage, all beneficial to this active young man. His school years proved uneventful, although at 6 feet, 4 inches tall, he was a high school athlete: an acclaimed volleyball player. The glass eye (prosthesis) he wore served him well with few problems; early photographs document good cosmetic results. While his monocular vision provided him with an acceptable reason to defer military service, the patient enlisted in the U.S. Army Air Corps in 1943 and attained the rank of technical sergeant during his 3 years of stateside service.

While on active duty and during routine target practice, the patient was struck in his prosthesis-wearing left eye by a shell casing ejected from an M-1 rifle. Two separate accidents to the same eye are unusual enough to report; however, his previously uneventful course with the prosthesis was compli-

#### **KEY WORDS:**

Cutler implant, international ocularistry, microphthalmia, ocular implants, orbital reconstruction, patient follow-up



**FIGURE 1** This photo collage shows the (monocular) patient's life in pictures; starting as a young boy in 1933, continuing through middle age, and finally his senior years. The upper right photos depict the Cutler implant (left) and the posterior view of the ocular prosthesis (right).

cated when splinters of cryolite glass from his hollow prosthesis caused significant damage to the sensitive conjunctiva surrounding the once stable gold sphere implant. Shattering and splintering in this fashion was not uncommon with glass (Snellen-“reform” eye) prostheses, although more frequently, glass eyes imploded in the socket in a reaction associated with drastic temperature changes, similar to pouring warm water on

ice. These accidents usually occurred with temperature changes during winter months.<sup>2-4</sup>

This patient's service-connected eye injury took him through a maze of military procedures as he sought treatment. He kept detailed accounts of his surgical procedures, carried out more than 60 years ago.<sup>5</sup> His annotated military files show that famed John Hopkins surgeon, Jack Guyton, removed the gold ball

ocular implant, replacing it with the “designer” Cutler motility implant in 1950.<sup>6</sup>

The Cutler implant used was a 14-mm sphere of acrylic and tantalum mesh with a short cylinder tube 14 mm in diameter extending forward from its anterior surface. The anterior surface of the tube was inserted with a male peg (also made of tantalum), which was embedded in the posterior surface of the prosthesis.<sup>7</sup>

Initially, the Cutler implant worked well and provided very good motility, especially lateral motion. Photographs show that the appearance was very good. The patient wore the same prosthesis for almost 30 years (Figure 1).

The Cutler implant was one of various ocular motility implants created in the late 1940s and early 1950s. Similar examples include Hughes’ hollow vitallium evisceration implant Stone’s acrylic and tantalum mesh implant, Whitney and Olson’s acrylic implant with tantalum mesh belt (for attachment of recti and Tenon’s capsule), and Rudemann’s famous (or infamous!) modified acrylic eye implant, with tantalum mesh for attachment of tissues.<sup>8</sup> The theory was unique and the eye motion was superior to that of simple spheres, according to correspondence from David Guyton, M.D., of Johns Hopkins Wilmer Eye Institute and others.<sup>9-11</sup> Unfortunately, in this patient the semi-buried implant caused excess mucus drainage and eventual migration, which proved a nuisance. In his later years, he took daily antibiotics in an attempt to combat the chronic mucus exudates. These frustrating side effects, encountered by many patients, were likely the main reason the integrated implants fell out of favor until refinements were made in the mid-1980s.

Several years after the 1989 article was published, the patient had his Cutler implant removed. At the time, it was more than 40 years old. Because of scar tissue and other concerns, the surgeons elected to proceed without an ocular implant. For the first time in almost 70 years, the patient did not have an implant to interact with his prosthesis. Surprisingly, the socket condition and orbital volume seemed calm after this surgery. More importantly, the patient felt relieved that the implant was removed and that a “simple” prosthesis was inserted. Mucus drainage was reduced, although not totally eliminated.

## RUSSIAN MICROPHthalmic CASE REVISITED

During an outreach to care for children in need of prostheses, various microphthalmic eye patients were treated at orphanages in the Siberian region of Russia. One particular child, then known as Pavel, was a timid three-year-old in 1998. A report in the *Journal of Ophthalmic Prosthetics* detailed the author’s trip to Russia to work with orphans suffering from microphthalmia, anophthalmia, and other congenital anomalies. Pavel’s case was part of this report and included his photo.<sup>12</sup>

This young child would be seen again—6,000 miles, 4 years, and five surgeries later—after he was adopted by a family in suburban Philadelphia who later moved to metropolitan Washington, D.C. The patient, now called Paul, had been fitted with a prosthesis in the United States prior to the D.C. reunion, although he still faced numerous obstacles as a result of his various birth defects. Paul’s primary defect is a Tessier cleft (Figure 2), which was caused by amniotic banding. This condition, also known as constriction band syndrome, is a rare congenital condition caused by the rupture of the amniotic sac early in pregnancy. Very little is known about the rupture. Paul’s infant medical report obtained from the orphanage revealed very little about his defects and prenatal care. Many times, as pointed out in the earlier report, orphans’ medical diagnoses are made by staff without expert medical advice or training.<sup>13</sup> However, it is possible that the birth defect was caused by trauma, infection, or an imperfectly developed amniotic sac.

Because amniotic banding is not a genetic condition, occurrence is sporadic. The ratio of male and female children born with this condition is approximately equal.<sup>14</sup> These children are often born with congenital amputations, missing or fused digits, cleft lips and palates, cranial abnormalities or, as in Paul’s case, microphthalmos. While Paul had a preliminary surgery on his disfigured upper lip in Russia, he received no significant care for his microphthalmic eye until he came to the United States. Paul’s “residual eye” was about 2 mm in diameter, which made it almost nonexistent in appearance. The entire orbit was also positioned low and slightly medial.



**FIGURE 2** This series of photographs starts in Russia in 1998 and continues clockwise through the year 2004. It reflects the marked improvement this young (monocular) patient has made in both a physical manner and cosmetically.

Upon arrival in the United States, Paul had a dermal fat graft (adipose tissue) with donor tissue taken from his thigh area. This graft provided some much-needed volume to his socket. He was later fitted with his first prosthesis at age three.

This case continues to present several challenges from a facial reconstructive perspective. As the result of severe right facial clefting, Paul has a paucity of tissue between the right orbit and right mandible, causing a severe inferior displacement of the right socket, canthi, and lids. In July 2004, a right cheek tissue expander was surgically implanted to achieve an increase in soft tissue volume in the area of the cleft repair. The expander was removed two months later, and the lower lid and medial canthus were reconstructed. These surgeries greatly improved Paul's appearance, which was also complemented by a new prosthesis.

Usually some loss of effect occurs as time passes; some recent regression has been noted. Paul, nevertheless, is improving and seems comfortable with his

appearance. In more ways than one, he has traveled a great journey.

## CONCLUSION

The patients in these two cases are very different from each other, although the common thread is that both had difficulties with their implants or lack thereof and both required surgery to resolve their particular problems. While the cases presented here may not be typical, they do represent the obstacles ophthalmologists and their patients sometimes face. Creativity, diligence, patience, and sympathy are qualities necessary to care for patients adequately in such challenging cases.

Both patients also had difficulties caused by injury to, or inadequacy of, their eye sockets, with one patient in the initial stages while the other was concluding his concerns. The end result was not perfect in either case; compromises were made and

“realistic” expectations fulfilled.

This article has been written as an update on two special patients. The author hopes that the experiences shared in this follow-up article may benefit other ophthalmologists treating patients with similar difficulties. Given the limited curriculum available in this field, and the fact that ophthalmologists’ professional lessons are often learned by trial and error, sharing information becomes especially important to practitioners and patients alike.

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#### REFERENCES

1. Hughes MO, LeGrand J. Fitting for a migrated Cutler implant. *J Am Soc Ocular* 1989; (1):16-17.
2. Metz RB. The spontaneous explosion of artificial eyes. *J Ophthalmol Otolaryngol* 1940; (11):719.
3. Weidler WB. Explosion of the Snellen eye: report of a case. *Ophthalmic Rec* 1917; (1):37.
4. Behrman O. A rare accident to the eye (non-industrial). Program Bulletin: The Academy of Medicine of Cincinnati; December 1938; Cincinnati, Ohio.
5. Patient’s correspondence with Bernard Cooper, Feb. 2005.
6. Clyde Andrews, ophthalmologist, personal correspondence, Sept. 16, 1988.
7. Guyton JS. Enucleation and allied procedures. *Am J Ophthalmol* 1949; (32); 1517; passim.
8. Guyton JS. Enucleation and allied procedures: a survey of semiburied implants. *Am J Ophthalmol* 1949; (32): 1725-34.
9. Guyton JS. Enucleation and allied procedures: a new procedure involving use of an ‘exoplant.’ *Am J Ophthalmol* 1950; (33): 283-290.
10. Sauders BF. Recent trends in enucleation: modern implants and prostheses. *Pennsylvania Medical Journal* 1949; 1190-1191.
11. Gougelmann HP. The evolution of the ocular motility implant. In: Shannon GM, Connelly FJ, eds. *Oculoplastic Surgery and Prosthetics*, Boston: Little, Brown and Co., 1970.
12. Hughes MO. Microphthalmia in Russian orphanages. *J Ophthalm Prosthet* 2002; (1):37-41.
13. Roche A. *Children of Chernobyl*. New York: Harper-Collins, 1996:17-19, 146-147.
14. Wide Smiles Cleft Lip and Palate Resource. Available at: <http://www.widesmiles.org>. Accessed October 28, 2005.

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