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[Close Window](#)**Program#/Poster#:** 4182/B643**Abstract Title:** Epiretinal fixation of the polyimide electrode array using silicon retinal tack**Presentation Start/End Time:** Wednesday, Apr 28, 2004, 11:15 AM - 1:15 PM**Location:** Hall BC**Reviewing Code:** 272 retinal prostheses – RE

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Purpose: Silicon-micromachined retinal tacks were developed for the fixation of the epiretinal-type retina-stimulating microelectrode array. To evaluate the usability and durability of the silicon retinal tack, in vivo experiments were done.

Methods: Silicon retinal tacks were fabricated by using the SBM (Sacrificial Bulk Micromachining) technology, which is a method of releasing silicon structures in a (111) oriented silicon wafer. The dimensions of the retinal tack were 1.5 mm long, 150 μ m wide, and 150 μ m thick, which are substantially smaller than those of the conventional titanium tack. The tapered tip of the retinal tack made the insertion of the retinal tack easy, and the barbed-wire on the retinal tack shank made the fixation of the electrode array strong. To enhance the durability and the long-term biocompatibility of the retinal tack, 3 μ m-thick parylene film was deposited on the entire surfaces uniformly. In vivo experiments were performed in the eyes of anesthetized rabbits. After 3-port pars planar vitrectomy, a polyimide electrode array was introduced into the vitreous cavity through sclerotomy site with vitreous forceps. With a 30 gauge needle, the target sites, where the retinal tacks were located, were marked from inside of the eye. Silicon retinal tack was introduced into the vitreous cavity and the electrode array was fixed by using the silicon tack. After the operation, inflammatory reaction and histological change of the eyes were evaluated.

Results: Twenty implantation experiments of fixing the polyimide electrode with the silicon retinal tack in the rabbit's eye were performed. After the epiretinal implantation of the polyimide electrode array and the silicon retinal tack, the implanted devices did not move or become loose. Inflammatory change was not observed in the rabbit eye for more than 2 months, except a minute glial cell proliferation found around the retinal tack on the histological examination.

Conclusions: The silicon retinal tack is a good device to fix delicate epiretinal prosthetic devices in vivo. Investigations into the long-term stability and the glial cell proliferation around the tack are necessary.

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