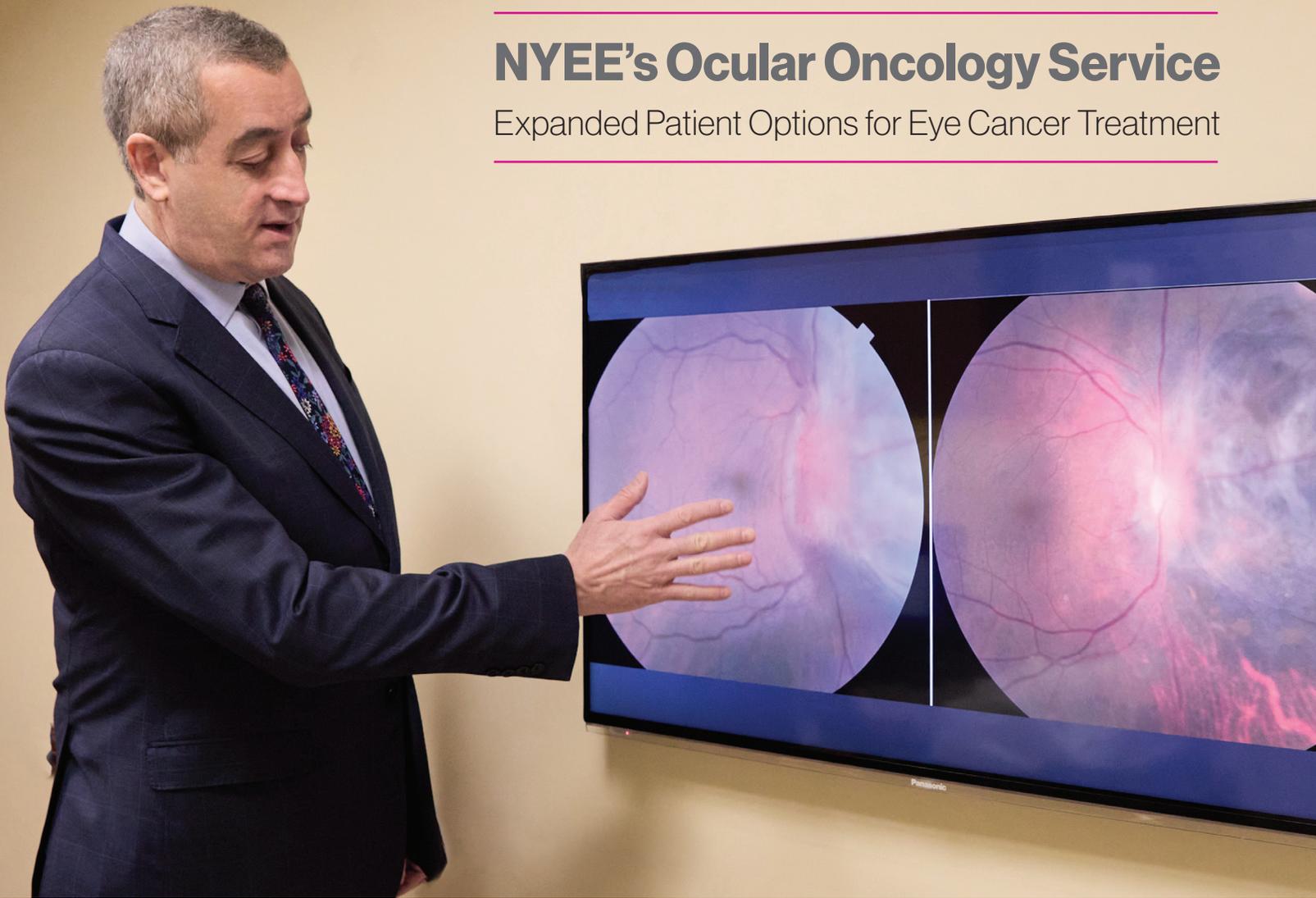


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# NYEE's Ocular Oncology Service

Expanded Patient Options for Eye Cancer Treatment

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*Dr. Finger showing before and after treatment of a choroidal melanoma. **Left:** Before treatment, tumor completely encircles and covers the optic disc. **Right:** Two years after Finger's slotted plaque radiation therapy, the melanoma is darker, smaller, and the optic disc is uncovered.*

Since its inception in 1989, the Ocular Oncology Service at New York Eye and Ear Infirmary of Mount Sinai (NYEE) has been a home to the most advanced forms of eye cancer treatment in the world. For the past 30 years, it has offered patients a range of treatment options aimed at preserving life, preserving the eye, and saving sight.

The founding Director of the service, Paul T. Finger, MD, FACS, pioneered many of the surgical and therapeutic breakthroughs that have become a staple not only at NYEE's Ocular Oncology Service but around the world. They include the use of topical chemotherapy for conjunctival melanoma, anti-VEGF therapy following radiation, and innovations in radioactive plaque treatment. On the diagnostic side, NYEE has developed and introduced new applications of ultrasound biomicroscopy,

optical coherence tomography, and digital imaging, all designed to identify and target eye cancers with submillimeter precision.

Because ocular cancers are often complex and systemic in nature, our experts work closely with multiple specialists at Mount Sinai, including radiation oncologists, oncologists, and hematologists to provide the most comprehensive and appropriate treatment. The Ocular Oncology Service also relies on the deep expertise of the Ophthalmic Pathology Service. The only remaining eye pathology department in the New York metropolitan area, our pathology service offers accurate diagnoses and the most sophisticated analyses of eye tumor biopsies. Within NYEE's own network, specialists in oculoplastic and reconstructive surgery help optimize our patients' appearance and function in cases that require eyelid tumor repair.

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## Topical Chemotherapy

In 1993, Dr. Finger became the first physician to use mitomycin chemotherapy eye drops to treat conjunctival melanoma and primary acquired melanosis. Since then, the therapy has become widely used around the world to reduce tumors prior to surgical removal, and with surgery in cases where excess normal tissue is involved. More recent work showed that topical interferon chemotherapy (Intron A) eye drops could be used to treat superficial conjunctival melanoma and most giant conjunctival squamous carcinomas without surgery. On the Ocular Oncology Service, almost all squamous carcinomas are cured with eye drops alone.

## Finger-Slotted Eye Plaques

Not satisfied with existing treatments, Dr. Finger invented this technique, which allows ophthalmologists to both effectively treat and often save the sight (and potentially the lives) of patients whose choroidal melanoma is near, touching, or wrapped around the optic nerve. This unique approach provides 8-mm slots or cut-outs to accommodate the orbital optic nerve into the radioactive disk (thus bringing the disk's radiation seeds into position as to completely treat the entire intraocular tumor).

Unlike old fashioned notched plaques, "Finger's-slotted Eye Plaques" allow the entire tumor to be covered by the radiation. Improved local control has saved lives and eliminated most of the enucleations previously performed on choroidal melanoma patients at NYEE.

## Anti-VEGF Therapy Following Plaques Radiation

While radiation has become the treatment of choice for patients with intraocular melanoma, concern has persisted over the damage it can cause to surrounding structures, including irreversible vision loss from radiation maculopathy (RM). Physicians at NYEE worked to change the paradigm through research that showed early administration of monthly intravitreal anti-VEGF medication (bevacizumab) was well tolerated and prevented or delayed vision-threatening RM in high-risk choroidal melanoma patients after plaque therapy (Ophthalmology Retina, May 2020). Without anti-VEGF

treatment, the average patient with posterior choroidal melanoma became 20/160 due to radiation optic neuropathy or maculopathy. "In contrast, utilizing early intervention and tight suppression with periodic intravitreal anti-VEGF therapy, the average patient retained 20/32," says Dr. Finger, who conducted a recent study with Brittany Powell, MD, a retina fellow in the Department of Ophthalmology at NYEE, and holds the U.S. patent for anti-VEGF therapy for radiation vasculopathy. "It's been a game-changer for eye cancer patients," asserts Dr. Finger.

## Palladium-103 Plaques Radiation Therapy

At a time when most ocular oncologists were treating intraocular choroidal and iris melanoma with iodine-125 or ruthenium-106 plaque therapy, NYEE's Ocular Oncology Service once again offered its patients a better solution. In 1991, Dr. Finger discovered that the use of palladium-103 plaque brachytherapy typically offered improved intraocular radiation distributions compared to the more widely used iodine-125 plaques. The use of palladium-103 enhanced vision retention and local cancer control.

## Micro-Incision Biopsy for Ciliary Body Tumors

Because their obscure location typically prevents visualization, ciliary body tumors have presented a diagnostic challenge for ocular oncology. Dr. Finger's response was to develop a small incision technique that uses a 27-gauge aspiration cutter and intracameral viscoelastic to make an iridotomy at the iris root, then extend it through the iris into the tumor. This provides a minimally invasive and safe method for obtaining ciliary body tissue for cytology, histopathology, and immunohistochemical analysis. In addition to minimizing the risk of damage to normal intraocular structures, this innovative biopsy approach can be performed through a small, self-sealing, clear corneal incision that doesn't require a suture for closure.

## For Referrals to Ocular Oncology Service:

**The Bendheim Family Retina Center  
at New York Eye and Ear Infirmary of Mount Sinai**

310 E. 14th Street, North Building, 8th Floor

New York, NY 10003 | Phone: **212-614-8301**

## Topical Chemotherapy

Two patients treated with chemotherapy eye drops as the sole curative therapy. **Top:** Slit lamp photograph of a giant ocular surface squamous neoplasm with extensive bulbar conjunctival, limbal, and corneal involvement. Pretreatment (A) and (B) showing complete resolution of tumor utilizing topical IFN $\alpha$ 2b (3 months) at 12 months of follow up. **Bottom:** A second patient prior to treatment (C) multifocal lesion and (D) showing complete resolution utilizing topical IFN $\alpha$ 2b (3 months) plus 5 FU (2 weeks) at 15 months. Note the absence of symblepharon, corneal, or scleral thinning.

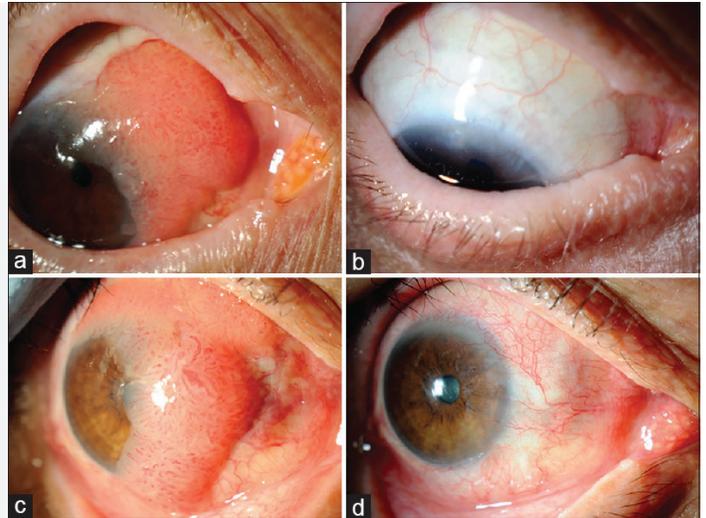


Image reproduced by permission of the *Indian Journal of Ophthalmology*, Topical chemotherapy for giant ocular surface squamous neoplasia of the conjunctiva and cornea: Is surgery necessary? 2018;66(1):55-60.

## Finger's Slotted Eye Plaques

**Top:** Note a cut out in a standard COMS-type plaque is fashioned to be large enough to accommodate the typically 5-6 mm wide orbital optic nerve sheath, and thus allow the plaque to be placed so as to cover and thus treat tumors involving the optic disc.

**Bottom:** Intraoperative ultrasound imaging demonstrates the plaque positioned around the retrobulbar optic nerve.

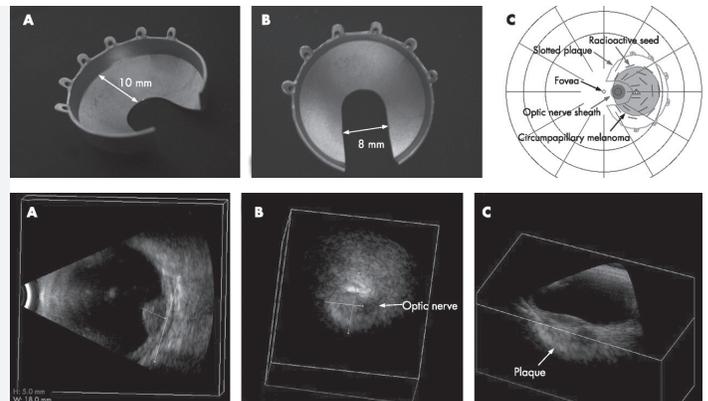


Image reproduced by permission of the *British Journal of Ophthalmology*, Finger's "slotted" eye plaque radiation therapy: treatment of juxtapapillary and circumpapillary intraocular tumours. 2007;91:891-894 Figures 1 and 3.

## Intravitreal Anti-VEGF Therapy for Radiation Retinopathy



Photograph shows a nasal, plaque-treated choroidal melanoma with Stage II radiation retinopathy (cotton wool spots, retinal hemorrhages and macular edema).

Eight monthly anti-VEGF injections were associated with resolution of both the retinal hemorrhages and cotton-wool spots associated with radiation retinopathy.

## Palladium-103 Plaque Radiation Therapy

**Left:** A photograph of free palladium-103 seeds on a white background. **Middle:** Palladium-103 seeds densely packed within a COMS-type gold eye plaque seed through acrylic fixative. **Right:** A diagram showing how an eye plaque is placed on the surface of the eye to treat an intraocular tumor. Note, though palladium-103 seeds are the same size and shape as iodine-125 seeds, Dr. Finger has shown that treatment of choroidal melanoma with palladium-103 seeds typically offers a more favorable intraocular radiation distribution.



## Micro-Incision Biopsy for Anterior Uveal Tumors

**Left:** A 27-gauge aspiration cutter is inserted through clear cornea, while visco-elastic maintains the depth of the anterior chamber. **Right:** The cutter is used to perform an iridectomy at the iris root, through which the surgeon accesses the ciliary body tumor for biopsy.

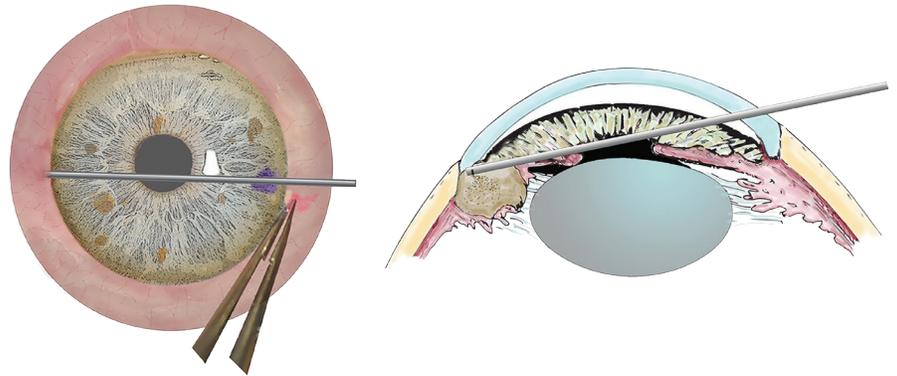


Image reproduced by permission of the *Canadian Journal of Ophthalmology*, 2020 Finger PT, Chua MR, Iacob CE. Micro-incision, trans-iridal aspiration cutter biopsy for ciliary body tumours. *Can J Ophthalmol*. 2020 Sep 10;S0008-4182(20)30710-9. doi: 10.1016/j.cjco.2020.08.002. Epub ahead of print.

## Doctor Reported Outcomes (DRO)\*

Collected as each patient returned for follow-up, near-real-time outcome data was averaged pertaining to the treatment, vision, life, and follow-up. The DRO included patients presenting with choroidal melanoma, iris-ciliary body melanoma, and ocular surface squamous carcinoma. A unique software program, developed by a NYEE Ocular Tumor fellow,

was used to collect this data on a HIPPA compliant internet portal. At NYEE, we have found this information helpful for both patient education and results-based monitoring.

\*Last updated on 02/18/2021.

### Choroidal Melanoma

Patients entered	316
Average vision	20/63
Most common vision	20/25
Local tumor destruction	99.7%
Preserved eye (no enucleation)	95.6%
Initial eye removal	4.4%
Average follow-up (in years)	7.7

### Iris-Ciliary Body Melanoma

Patients entered	108
Average vision	20/20
Most common vision	20/20
Local tumor destruction	99.1%
Preserved eye (no enucleation)	98.2%
Initial eye removal	1.8%
Average follow-up (in years)	6.9

### Squamous Conjunctival Malignancy

Patients entered	30
Average vision	20/25
Most common vision	20/20
Local tumor destruction	96.7%
Preserved eye (no enucleation)	100%
Initial eye removal	0%
Average follow-up (in years)	2.8

For additional information on ocular cancer treatment outcomes: Maheshwari A, Finger PT, Malpani A, Jain P, Tomar AS, Garg G. Doctor reported outcomes: Real-world data from a tertiary eye cancer center. *Indian J Ophthalmol*. 2021;69:135-9.