

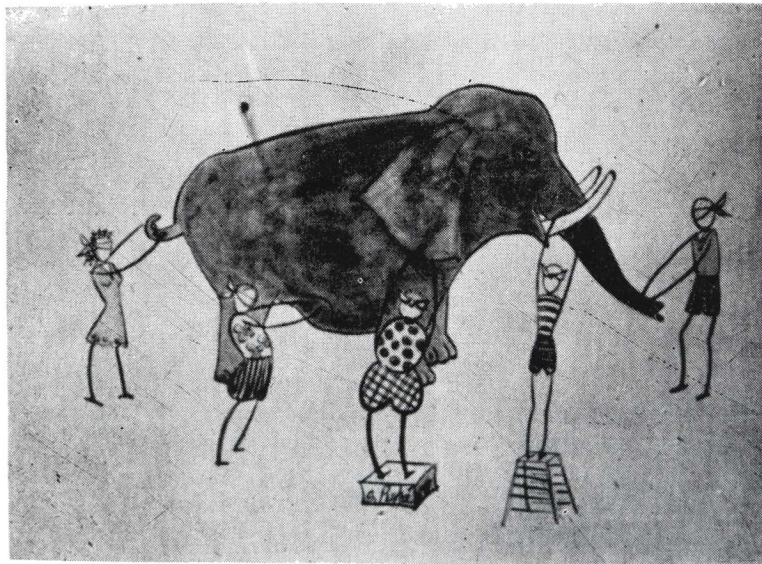
## LOW TENSION GLAUCOMA

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*A 16 year review of 26 original cases*

In October of 1960 I presented a study of 38 cases of low tension glaucoma that were chosen from a diagnostic study of 5000 cases of routine eye examinations or consultations. Statically, this was percentage-wise 0.1%.

This paper will define low tension glaucoma, compare it with open angle glaucoma, and will present the today status of 26 of the original 38 cases, after 16 years of observation.



*Let me briefly review the cardinal concepts of open angle glaucoma in the light of today's knowledge of this tragic eye disease.*

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I consider open angle glaucoma to have a minimum of six facets or diagnostic features. Let us compare it to the components that make up an elephant. Take 5 blindfolded people who have never seen an elephant. What are their reactions? On feeling the trunk, one might say he felt a tree. The second on feeling the tusks, thought they were pipes. The third palpating the huge ears, thought of pillow cases. The fourth, feeling the side of the animal, likened it to a wall of canvas. And the last one was sure that the tail he held in his hand was a rope. It is obvious, that none were correct. Similarly, in chronic open angle glaucoma, we must keep the following concepts clearly in mind:

1. Elevated intraocular pressure, increasing with time.
2. Changes in central and peripheral fields of vision.
3. Positive provocative tests.
4. A diminished facility of outflow, or diminished "C" values.
5. Changes in the optic disk.
6. Gonioscopic changes in the anterior chamber angle.

*CONCEPTS OF LOW TENSION GLAUCOMA*

1. Initially, normal or subnormal intraocular pressure in *one*, or both eyes.
2. Decrease in "C" values, usually in one eye -initially.
3. Optic nerve changes, usually minute.
4. Gonioscopic changes in *one* eye, or both eyes, with or without pigment.
5. Lessened scleral rigidity or "E" values, usually in both eyes. (.021 is taken as normal "K" value).
6. Changes in central visual fields, often limited to changes in the blind spots only.
7. Negative roentgenographic results.
8. Negative neurological results.

The importance of lessened scleral rigidity cannot be overemphasized. By far, the majority of low tension glaucomas will be in moderate or high

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myopia; lessened scleral rigidity places an undue trauma to the optic nerve as it enters the eye. The importance of numbers (7) and (8) cannot in the opinion of Dr. Peter Kronfeld be overlooked. Infections of the sphenoid sinuses can alter visual fields, one example being retrobulbar neuritis.

### THE DIAGNOSIS

1. Of most importance in the diagnosis, is the initial finding of *normal* or *subnormal* intraocular pressure in *one* or both eyes.
2. Lessened scleral rigidity in one or both eyes.
3. Diminished "C" values in one or both eyes, found on provocative tests, but *improved* with miotics.
4. According to A. Schlossman<sup>2</sup>, if myopia increases relatively rapid, without obvious cause, glaucoma should be suspected. He also stated that miotics may increase the patient's myopia.

### FOLLOW UP OBSERVATIONS

During the past 16 years, twelve (12) of the original 38 cases were not followed up due to death, change in residence, etc., but 26 cases have been under close observation during this period of time. Ten (10) of the twenty-six (26) cases have migrated into the category of standard nomenclature glaucoma; this represents 40%.

The average transition in time of these cases has been from five to six years from the initial time of diagnosis.

Of the 10 cases mentioned, eight are myopia of three or more diopters; two were borderline.

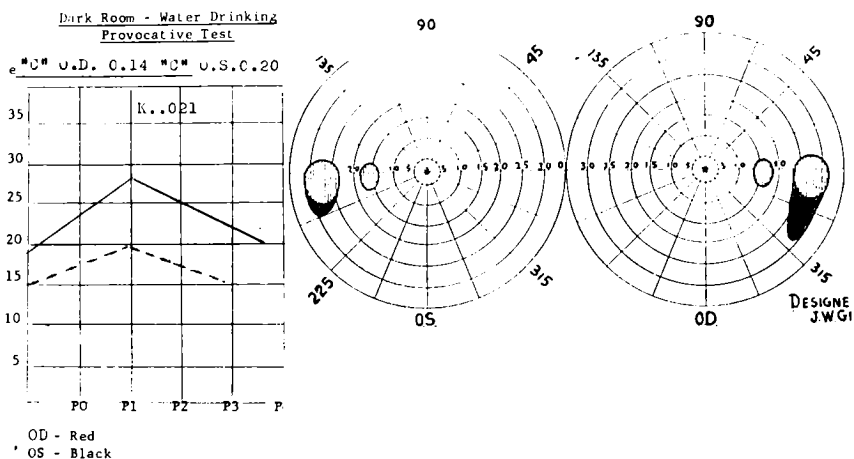
Four typical cases are listed with characteristic findings.

### SUMMARY:

Low tension glaucoma exists. It is not easy to find, but requires diligence on the part of the ophthalmologist. 40% of the cases reported in this paper became high tension cases over a period of five to six years of observation.

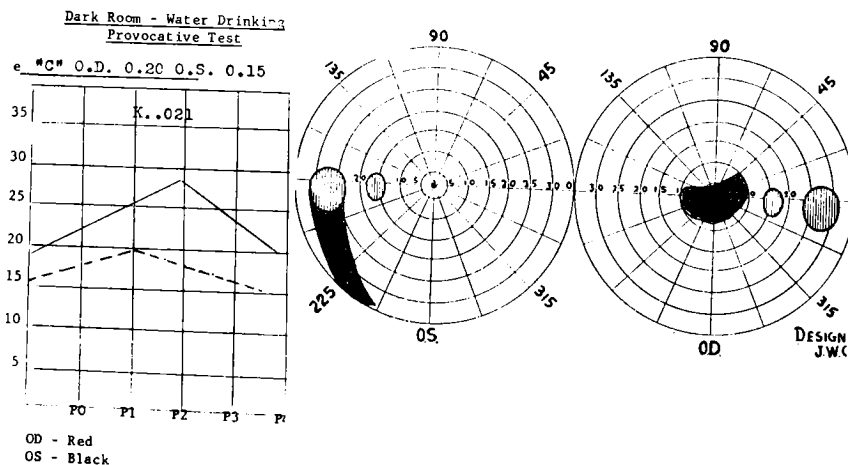
It is my feeling that many of the low tension glaucomas of today will be in the glaucomas of standard nomenclature tomorrow.

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CASE 1

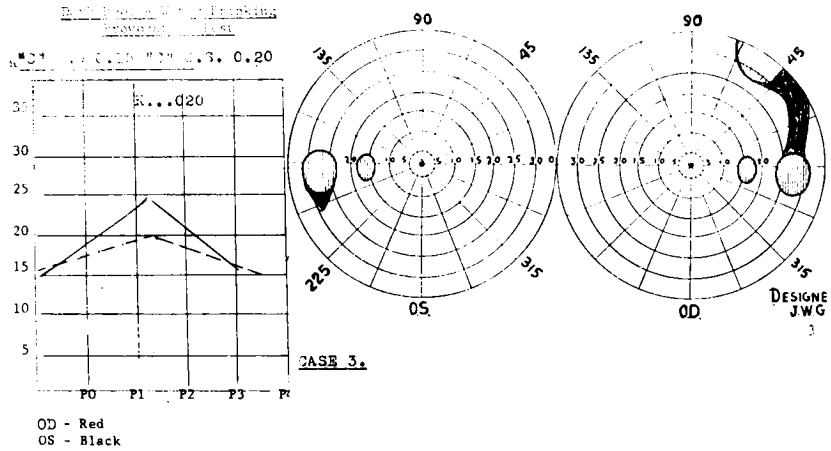
Initially, this case had normal intraocular tensions bilaterally. The water drinking dark room provocative test, showed a rise of 10 m.m. in the right eye, and a negative provocative result in the left eye. Both blind spots showed enlargement at 2 meters. This was a 14 year old Japanese female with five diopters of myopia in the right eye and four in the left.



CASE 2

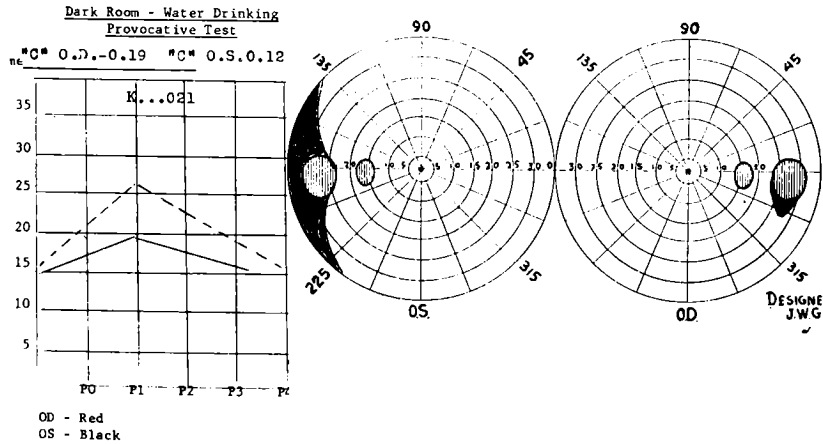
This case was a proven uveitis in the right eye with a large central scotoma, which had normal "C" values before provocative testing. The provocative water drinking-dark room test was positive in the left eye, which also showed an arcuate scotoma extending inferiorly from the blind spot. She was a 16 year old caucasian female.

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CASE 3

A 35 year old photographer, with positive provocative result in the right eye, associated with an arcuate scotoma. Note the enlarged blind spot in the left eye. These fields recorded at 2 meters, which distance brings out early changes often not found at the routine one meter distance.



CASE 4

A 36 year old Chinese female with bilateral myopia of more than 3 diopters. She had normal intraocular readings on four occasions but with provocative testing, a diminished "C" value of 0.12 was found in the left eye, and a normal value of 0.19 in the right eye. The central field defect in the left eye is bi-arcuate.

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**SUMMARY:**

In his paper, the author defines low tension glaucoma and compares it with open angle glaucoma, showing the present condition of 26 of the original 38 cases in whom this operation was practiced, after 16 years of observation.

F. S.

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