SYMPOSIUM ON
HORIZONTAL OCULAR DEVIATIONS

Edited by

DONELSON R. MANLEY

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DONELSON R. MANLEY, M.D.

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To

Celeste, Bill, and Louis

Foreword

Several symposia on strabismus have been held in the past few years and reported either in book form or in journals. The symposia of the Academy, the New Orleans group, the Mid-winter Los Angeles group, the Pacific Oto-Ophthalmological Society, and the International Symposium on Strabismus held in Basel in 1966, to mention but a few, have all appeared in print. One group, the New Orleans, repeated its symposium and published four separate books, testifying to the popularity of literature pertaining to strabismus and to the value to the practicing ophthalmologist of keeping up-to-date with the thinking of the experts in this field.

The most recent symposia, held at the Wills Eye Hospital in Philadelphia in 1968 and 1969, constitute the basis for *Symposium on Horizontal Ocular Deviations*. Strictly speaking it is neither a factual reporting of a symposium nor a textbook, but a combination. This is due to the editorial work of Dr. Donelson R. Manley, who collected and edited the papers as they were presented and then requested the authors to add material that would supplement the pedagogical sequence in which he had arranged them. This obviously adds enormously to the value of the volume.

The symposia are outstanding in the prominence and erudition of the members who participated, and unique in that the symposia were confined to the horizontal deviations, with special emphasis on the exodeviations. It is unusual to find exodeviations given consideration equal to that of the esodeviations in any book, and half this volume is devoted to the exodeviations. The discussion by the panel at the conclusion is confined entirely to this subject. Of the vertical deviations, only those associated with exotropia were discussed. Although it is true that more patients with esotropia are seen in routine practice than are those with exotropia, the latter constitutes an important part of our practice. The best results of strabismus surgery, both cosmetic and functional, are achieved in children with intermittent exotropia. It would seem logical to give this group a fair share of discussion, especially since even the experts still cannot agree on how best to achieve these good results. One suspects that Mother Nature gives them a helping hand. Even

in this volume we find about as many different opinions on what type of surgery to do and when as there are panelists.

Symposia are not usually expected to serve as textbooks. The material presented by different panelists is usually not organized for teaching and seldom is graded to readers of one level of experience. This is a shortcoming of all symposia. It poses no problem, of course, for the knowledgeable. As I have stated, in this particular book, due to Dr. Manley's skillful efforts, compromises have been made, so that it can be profitably used as a text by residents in training. Occasionally he will inadvertently run into difficulties, as in the beginning chapter, where he is confronted with a section on fixation disparity and the monofixation syndrome. Alas, these are subjects that are not for the beginner. The experts do not agree on their definition. Some of us can still remember the old master, Verhoeff, insisting, like the farmer at the zoo in front of a giraffe, "there just ain't no sich animal."

In many ways this volume is a great tribute to a fine mind, a skillful physician and teacher, and a man loved and respected by all his contemporaries, Dr. William Krewson. He and Dr. Robison D. Harley conceived the idea of these symposia, organized them, and labored together until the first one came to fruition. Before the second could be held, William Krewson died. He had written and presented a paper at the first symposium, but unfortunately the paper was not to be found among his personal effects and so could not be included here.

Robison D. Harley carried on alone for the final meeting, and the success of his efforts is attested to by this volume. It is by such meeting of the minds that progress in medicine is made. This volume is one of the milestones on this long road.

Francis Heed Adler, M.D.

Preface

This volume contains material presented at the first and second Symposia on Ocular Motility sponsored by the Department of Pediatrics and Motility of the Wills Eye Hospital. Following the Symposia, each participant was asked to expand and update his material so that it would be current at the time of publication. The first section of this volume is devoted to the esodeviations and the second to the exodeviations.

I wish to express my gratitude to each of the participants for presenting the material and then making it available for publication. Each brought to the Symposia information based on wide clinical experience, and if disagreement occurred at times, it merely reflects that there are probably several satisfactory ways to solve the same problem.

The Department of Pediatrics and Motility of the Wills Eye Hospital has continued to grow rapidly as the result of continued support from the Fight for Sight group in New York City and Philadelphia, the Pennsylvania Lions Club, and Mr. Samuel Edelstein. They have helped to provide the necessary environment that increases medical knowledge, and some of the material in this volume is the result of work done in the department that was directly supported by their grants. We wish to express our gratitude for their generous support.

A number of individuals have contributed to this volume while serving as resident surgeons at the Wills Eye Hospital. My special thanks are extended to them for having us see their interesting patients, for giving us their original thoughts about strabismus, and also for asking penetrating questions which, although at time difficult to answer, increased our thought processes. They are Drs. Samuel Winn, Robert L. Shindler, William N. Offutt, IV, Eyck W. Fintelmann, William A. Blank, Patrick D. Moore, James E. Wilson, Ann E. Barker, and Ira G. Weiner.

Dr. Ronald Hughes critically reviewed the material as it was being prepared for publication, and I would like to thank him for performing this difficult task.

My thanks are also offered to Mr. David Silva, Miss Karen Albert, and Miss Laurel M. Weeney of the Wills Eye Hospital Photography Department for the many excellent photographs.

Mrs. Mildred T. Selig, Miss Barbara Schoenfeld, and Miss Joanne Andrijanoff typed the manuscripts, and I would like to thank them for their continued efforts.

Finally, I would like to thank Dr. Robison D. Harley, the head of the Department of Pediatrics and Motility at the Wills Eye Hospital, for his capable leadership and continuing moral support.

Donelson R. Manley, M.D.

Contents

PART I

Esodeviations

CHAPTER 1

Classification of esodeviations*

Donelson R. Manley

The esodeviations have varied characteristics that are used singly or in combination for classification purposes. Following are some of these:

1. Age at onset—congenital, infantile, or acquired
2. Intermittency—esophoria or esotropia
3. Relationship to accommodation—accommodative and nonaccommodative
4. Relationship to the accommodative convergence/accommodation (AC/A) ratio—esodeviation greater at near or distance (distance-near relationship)
5. Comparison of up and down gaze—A and V patterns
6. Size of the deviation—monofixation syndrome

Some overlapping may occur, and time or surgery may change one type of esodeviation into another type.

Neurological causes of esodeviations, such as the Gradenigo and Möbius syndromes, will not be discussed. We will confine ourselves to those esodeviations that are ophthalmological in nature.

In strabismus, as in no other subspecialty within ophthalmology, a certain amount of confusion often occurs because of terminology. Lancaster[1] advocated the use of "precision in words," and his admonition will be heeded in this chapter. Terms to be used will be defined so that their meaning is clear.

The visual axis of an eye joins the fovea with the fixation point and passes through the nodal point. Strabismus exists when the visual axes are not properly aligned, and esodeviation occurs when the visual axes cross in front of the point of fixation. In other words, a convergent alignment of the visual axes is present.

Esophoria is a convergent alignment of the visual axes that is kept latent by fusional divergence. It is not a tendency but is an actual deviation. Monocular cover-uncover testing differentiates whether a deviation is a phoria or a tropia, and this test should be performed prior to the alternate-cover test that determines the magnitude of the entire deviation. When the alternate-cover test is combined

*I would like to thank Marshall M. Parks and Bruno Bagolini for their help in preparing this chapter.

with prisms (prism–alternate-cover test), the total deviation can be measured. Usually a phoria is not denoted by one eye or the other, as in a right esophoria. At times, however, a phoria may be greater with one eye fixating than with the other. As an example, an individual may have more hypermetropia in one eye than in the other. When he fixates an accommodative target with the more hypermetropic eye, it will require more accommodation to see the target. Hence it will cause more esophoria. Wearing proper spectacles will correct this. Another cause of an asymmetrical phoria is scarring from previous muscle or conjunctival surgery. The techniques of cover testing will be discussed under monofixation syndrome.

The abbreviation for an esophoria in the distance is E, and at near it is E′.

Esophoria-tropia is also called *intermittent esotropia*. It is an intermittent convergent alignment of the visual axes that is both latent (phoria) and manifest (tropia). As long as the amplitude of fusional divergence is sufficient to overcome the misalignment, a phoria exists. When the deviation exceeds this amplitude, a tropia occurs. This is abbreviated E-ET for distance and E-ET′ for near. Another common abbreviation is E(T) and E(T)′.

Esotropia is a manifest convergent alignment of the visual axes. It is not controlled by fusional divergence, which may be decreased (illness, fatigue, etc.) or completely absent (congenital esotropia). This is abbreviated ET for distance and ET′ for near.

The following classification is one that has been found clinically useful:

1. Congenital esotropia
   a. Pseudoesotropia
   b. Esotropia
2. Acquired esotropia
   a. Accommodative esotropia
   b. Nonaccommodative esotropia
3. Monofixation syndrome

CONGENITAL ESOTROPIA

Pseudoesotropia

Pseudoesotropia is the appearance of having esotropia when in fact no actual convergent alignment of the visual axes is present. In a pediatric ophthalmology practice nearly one half of the infants seen because their relatives believe them to have crossing of their eyes will actually have pseudoesotropia. Convincing the parents that the eyes are not crossed is usually easy compared to discussing the problem with the infant's grandparents.

Generally the child's parents will give the history of an intermittent crossing, which they usually notice when the infant looks to the side (Fig. 1-1, *A*). Prominent epicanthal folds that may be asymmetrical tend to cover the nasal bulbar conjunctiva of the adducted eye, and it must be agreed that the eyes of many infants do have the appearance of being crossed. When the infant looks straight ahead (Fig. 1-1, *B*), the left eye has the appearance of being crossed, and the