STRABISMUS

Diagnosis and Treatment

CUSHMAN

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By

BEULAH CUSHMAN, M.S., M.D.

Attending Ophthalmologist, Passavant Memorial Hospital; Swedish Covenant Hospital, Women and Children's Hospital, Chicago, Ill.; Associate Professor, Ophthalmology, Northwestern University Medical School, Chicago, Ill.

Illustrated

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DEDICATED TO THE MEMORY OF

JAMES WATSON WHITE

Foreword

In the past decade there have appeared a dozen or more books written in the English language on the subject of strabismus or squint. Their authors without exception, have been deep students of the subject, one might even say specialists within a specialty. Each has had great experience based upon a firm anatomic knowledge and years of work in the analysis and diagnosis of the problems of ocular motility, and background in the surgical and orthoptic correction of the defect encountered. There is no question, therefore, that our knowledge regarding this complex subject has made great progress. There is also no question that our surgical results on the whole are obviously better than they were twenty years ago. This is the fruit of the labors of these numerous experts. One might with perfect propriety, therefore ask "why another book?"

The answer is, of course, that the subject is far from being exhausted. The authorities do not agree among themselves on many of the essential points. There exist two major schools, the anatomic one and the neuromuscular or physiologic one. In addition there are many subdivisions and overlapping of beliefs and opinions in each of these schools. No doubt the truth is a combination of the two, but, until the truth is firmly established, there is always room for more articles and books by those sincere workers who devote so much time and thought to the subject.

No one will deny that confusion still persists and that the beginner scarcely knows where to start. A number of points in the anatomy, physiology and neurology of the ocular muscles are still obscure. There are a host of methods of examination and measurement, each ardently, sometimes intolerantly, supported by its advocates. A lot of the ideas regarding the etiology of the muscle imbalance are but theories still. The indications for surgery are still not clear-cut and standardized. The optimal age for surgery is not yet universally agreed upon. There are an extraordinary number of surgical techniques available, each with its ardent and confident supporter. Some say operate on only one eye, others both eyes. Some say operate on the horizontal defects first and then attack the vertical ones, others vice versa; still others say do the entire job at one sitting. Orthoptics has not been the panacea that its enthusiastic advocates had promised. In fact, there exists more scepticism regarding the role and the value of orthoptics today than there was a few years back

Therefore let us have more articles and more books and more discussions and symposia on the subject of strabismus. Let us be constructive pessimists. The subject is so complex that there exists plenty of room for all investigators no matter what is their approach. Fortunately for all of us,

the physiologic tolerance of the patient's muscles to our restorative attempts is so great that the results of our efforts are surprisingly good, on the whole. Perhaps this explains the enthusiasm and confidence that so many ophthalmologists have for ocular muscle surgery, no matter what their diagnostic approach to the individual problem, has been. It often seems that if the eyes can be made only reasonably parallel, within the range of practical use, good Mother Nature will come to our rescue, no matter what diagnostic tests and measurements we have made and no matter what has been our surgical technique.

The crux of any medical problem is the diagnosis, for without a correct one we are entirely at sea and our therapeutic measures are but empirical. The importance of a correct diagnosis of a strabismus problem is so obvious that it is trite to mention it. Once the correct diagnosis is made in the individual case the surgical correction of it is far easier and the results of surgery are more uniformly good. But, even so, there exists a quality that cannot be handed down by teaching, example, or book. This is the clinical acumen possessed by many surgeons, based upon years of experience of trial and error, success and failure.

Due to the frailty of human nature, objective methods of examination and measurements, more or less scientific, have always been far superior and trustworthy than are the subjective methods. For this reason, the objective approach of Alexander Duane and his lucid disciple, James White, has appealed to many and is still winning many adherents. Among these faithful disciples is the author of this fine book, Beulah Cushman. Those of us who have had the pleasure of watching her work for many years can attest, without qualification, to the integrity, validity and success of her efforts in this field. Her results have been uniformly good, in many instances brilliant, and her modest, sound workmanship has been a source of great inspiration to the many of us who were bogged down with confusion and sometimes lost in the maze of conflicting pathways.

It is an honor, therefore, to have been asked, and a pleasure to accept her request for a foreword to her book. I am sure everyone who studies it carefully will agree that it is not "just another book on strabismus," but a valuable contribution towards the ultimate solution of this massive problem. It merits a successful career.

Derrick Vail, M.D.

Northwestern University Medical School
Chicago, Illinois

Preface

In writing this book, I have tried to make one that would be intelligible and interesting to the student of oculo-motor anomalies and at the same time profitable to even the most advanced specialist in the department.

As a member of the American Orthoptic Council for a few years and an associate examiner for the American Board of Ophthalmology in motility, I realized that the post-graduate medical student in Ophthalmology had no book to which to refer for the routine analysis of motor anomalies, whereas, the orthoptic technician was being trained and asked to pass an examination that many ophthalmologists did not understand.

A small book for the objective examination of the extra-ocular muscles was written and litho printed in 1948 for the post-graduate students in the Northwestern University basic course in ophthalmology. This book was so well received that it was redone in 1950. Since post-graduate students have requested more help, it has seemed necessary to elaborate and enlarge on the lectures and the list of case reports.

The form in which the subject is presented was developed entirely from the precepts as outlined by Doctors Alexander Duane and James Watson White, neither of whom left a book to cover the subject of ocular motility. However, Duane did leave a monograph and Doctor White many papers. There was also the book by Joseph LeConte which both doctors felt gave the clues to monocular and binocular vision and motor function.

It was through the clinics and teachings of Doctor J. W. White and through the help of Misses Lucille Sobacke and E. Jane Bailey that I came to understand the Duane and White approach to the correction of the problems of ocular motility. My grateful appreciation is given to Miss Helen Ockerlund and Miss Helen Barth in the preparation of the manuscript.

Electromyography, a new method for the determination of the weak extra-ocular muscles, may be a great help in the determination of the basic muscles at fault, but it will be a long time before it correlates fixation and the refractive errors with the secondary deviations and contractures to permit a working diagnosis and outline treatment.

Therefore, in presenting this subject, I do it, realizing that binocular single vision is a complex problem, but this objective approach of Duane and White has been so satisfactory and has given such excellent results for me as well as to the students trained in its use for the objective examination of ocular muscles and their treatment that I pass it along.

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Introduction

THE INTEREST in a logical approach to the problem of muscle anomalies has gradually become more widespread since Alexander Duane presented his thesis and James W. White was able to get such satisfactory results with his own work, following Duane's methods. A careful analysis and diagnosis, proceeding with proper treatment, offers the ophthalmologist an opportunity to give the squint patient comfortable binocular vision.

The etiology of strabismus is now and always has been under much discussion. There is much work that remains to be done if a squint is to be corrected from the etiological standpoint. The real solution for the immediate squint problem, however, comes with the proper diagnosis and treatment of the anomaly as it exists at the time of examination.

Normally the eyes are in perfect muscular equilibrium, giving binocular single vision with real depth vision and stereopsis. A disturbance of this equilibrium can give any number of different types and combinations of muscle anomalies. In all cases, however, some type of binocular fixation usually can be demonstrated at the angle of squint. The following chapters will deal with the various muscle anomalies, the procedure in diagnosis, and the correct treatment—surgical and non-surgical.

While the body of this text stresses the objective diagnostic approach to the squint problem, a brief outline of the embryology of the extra-ocular muscles proves to be interesting and may aid, somewhat, in clarifying some of the etiological factors present in congenital anomalies.

Keiner* in his monographs in 1951 correlated some of the early developmental anomalies of vision with oculo-motor anomalies as a form of 'myelogenesis retarda' and he felt that between the group of blind infants with severe disturbances such as 'papilla griesa' of Beauvieux and the group of squinting children (classed as having slight disturbances) there existed a gradual difference. He felt it was obvious to seek the cause of the affection in both groups in a more or less retardation of the normal development of the tracts and connections of certain parts of the central nervous system.

He stated that "all children are born with a potentiality to squint and almost total disassociation of the two eyes.

* Keiner, G. B. J.: New Viewpoints in the Origin of Squint, published by Matinus Nijhoff, The Hague, Netherlands, 1951.