

OCULAR MIGRAINE AND LATENT HETEROPHORIA

BY

RAYMOND R. ROY, O. D.

Portland, U. S. A.

Migraine headache is no respecter of persons. It is found in every civilized country today, and can be traced through literature until man's earliest beginnings. The condition has been more or less a futile challenge to physicians for centuries.

The cuneiform tablets of the Early Sumerian Period of 6000 years ago contain a good medical description of this "disease of the temples". They referred to it as a pressure on one side of the head and associated with "eye troubles".

The Ebers' Papyrus which was an account of medicine from old Egypt, tells the story of Ra, the elder Great Father who began to suffer from "enu" pain in the head. "Enu" means "traveling" and aptly fits a description given by modern twentieth century patients. The papyrus had several prescriptions which were supposed to give relief of this "pain in the side of the head".

In A. D. 30-90, a renowned Greek physician, Arataeus of Cappadocia isolated from a general group of headaches, a type distinguished by its paroxysmal nature, its severity, its unilateral character, and its association with nausea and vomiting. Fifty years later Galen, the grandfather of medicine, introduced the word *hemicrania* meaning "one-sided". The Romans borrowed the word and translated it into the Latin *hemicranium*. This was later corrupted to the low latin *hemigranea*, then to *emigranea*, *migranae*, *migrana*, the French *migraine* and the English *mygraine*, *megrin*, *migrim* and *megrim*. The French word *migraine* is today universally accepted.

As is so often true of any descriptive term, common usage and acceptance over a period of years many times changes the original meaning. Word meaning goes through what is known as *semantic change*, which means that while retaining earlier meanings, new ones have been added due to specialized uses and differences of various other kinds.

This is by no means a disturbing factor because a new concept may be more descriptive and more inclusive than originally was observed. This is true of the word *migraine* as much more has been observed and is known about the subject today. The original meaning was a unilateral cephalalgia of severe intensity with an accompanying visual aura. Popular usage and concepts, however, have come to include in migraine classification, any severe incapacitating headache of previous undetermined origin, whether bilateral or unilateral.

Proof of this concept is found in the writings of such men as Walter C. Alvarez, professor emeritus at Mayo Clinic, who has said of migraine that it can either be a mild trouble, not worth talking about, or it can be a terrible affliction which prostrates the victim several times a week. He also states that many migraine headaches are not unilateral but are felt all over the head.

Further proof of the modern concept of migraine is found in the case histories of these migraine sufferers. In taking histories of thousands of these medical "orphans", it is common to review numerous past medical diagnoses of migraine, with no due regard to location, time of onset, or associated symptoms. In fact patient reports indicate a very languid attitude on the part of internists and other specialists in reference to the complaint of headache. The current opinion that headaches are largely psychogenic precludes exhaustive and thorough examinations and the patient comes away with the usual prescription for analgesics, tranquilizers, or vasoconstrictors.

MIGRAINE EQUIVALENTS

What was originally known merely as a *migraine headache* has now been classified as *migraine simplex*. Because of the variability of migraine attacks a long list of names have been attached for descriptive purposes. Some of these are, abdominal migraine, ophthalmoplegic migraine, precordial migraine, facio-plegic migraine, and ophthalmic migraine. Some of the common names are: menstrual headache; relaxation headache; Sunday headache; spring headache; summer headache; constipation headache; sick headache, and so on.

All of these descriptive names point out the vast complexity of headache. This is verified in that over two hundred etiological factors have been isolated which produce headache pain. Thus we see that when a patient presents a history of chronic recurrent headache, it is not known if the variations indicate multiple manifestations of a single etiology or if the one person actually has multiple etiology and that "a migraine" might actually be the accumulation of two or more factors.

Having worked with thousands of headache patients in the past twenty-one years I have seen many cases in which the migraine was of multiple etiology

necessitating two or more specialists working together to furnish relief. It is no wonder then, that these people had suffered so long with no relief, as all previous investigations were seeking a single etiological factor. Nevertheless in these cases of multiple causation, it was found that latent heterophoria was the salient factor. Once found, the remaining anomalies were easier to isolate.

OCULAR MIGRAINE

That there may be a connection between migraine and visual anomalies is not a new thought, however the literature must be diligently searched to reveal any mention of such possibility.

Savage (1902) said, "However, genuine sick headache - pure migraine - is sometimes caused by both refractive and muscle errors".

Allen (1900) writing of the symptoms of hyperphoria stated, "Reflex headache is exceedingly common in hyperphoria, and is associated with dizziness, staggering gait, feeling as if one would faint, sharp pains through the head, drawing in the temple, pain in the forehead and also behind the ears".

Duke-Elder (1949) states that, "Not uncommonly gastric disturbances may dominate the clinical picture of eye-strain - chronic indigestion, dyspepsia, nausea and even vomiting. It is this symptom-complex, when it occurs periodically associated with an acute and incapacitating headache, which resembles a true migraine".

The above writers have seen that stress on the ocular muscles can produce severe headaches which in every way fit the description and modern concept of migraine. It is to be noted however that the stress which was found to be the etiology of the migraine was a *manifest* dysfunction — found by a careful analysis of the visual mechanism.

Now, however, *latent* binocular stress or heterophoria may be found by means of a prolonged monocular occlusion test. By utilizing a standardized technique and investigating the possibility of latent heterophoria on migraine patients previously showing no appreciable heterophoria by any testing modality, it can now be shown that a tremendous percentage of migraine patients can be classed as having ocular migraine.

In this work, the history of chronic, severe incapacitating headache along with allied symptoms is used as the basis for utilizing a standardized prolonged monocular occlusion test. In an extremely high percentage, these patients reveal latent heterophoria, which when corrected by means of proper prism lenses, obtain relief heretofore unobtainable.

PROLONGED MONOCULAR OCCLUSION

In 1920, Marlow published a paper entitled, "Prolonged Monocular Occlusion as a test for Muscle Imbalance". This was a monumental work which opened the door into one of the vast unexplored areas of our knowledge of the function of binocular vision. It evoked a storm of protest, however, from so-called authorities who immediately claimed the test unreliable with very little support and a vast amount of protest, the validity of the prolonged occlusion test was questioned by ophthalmologists and optometrists alike. A typical sentence that carries the finality of the last rites is quoted from Krimsky as recently as 1948; "Biesbarth and Abraham and others exposed the unsoundness of the occlusion test and it required a wealth of literature to finally show that prolonged occlusion is of no value in diagnosis". He then refers to Marlow's 1938 writings as being a final admission that his occlusion was in reality producing artefacts that had no relation to the normal physiology of the eye.

Scobee (1952) devotes one paragraph to Marlow's prolonged occlusion and quotes a few of Marlow's critics, such as Cridland, who said, "it has evoked a voluminous outpouring of unscientific hyperbole and almost hysterical vituperation".

Maddox, objecting to it said, "a delict machine is not so informative as a functioning one, although we can learn something from it".

Abraham (1931) studied six cases in which he occluded each eye in turn and each occluded eye developed hyperphoria. He said bluntly, it is a subjective test for demonstrating Bell's phenomenon and is not a test for latent heterophoria."

Scobee's comment in conclusion of the above quotation, is: "It is clear that the position of rest revealed by prolonged occlusion is close to the physiologic position of rest, but can never attain it because the fixation reflex (monocular) comes into play. The hyperphoria thus revealed in nearly every case strongly suggests a persistence of the protected position of the eyes in sleep, the persistence of any abnormal position being well established. It is a method which demands the greatest caution in its interpretation".

In the face of such overwhelming authority as to the impractical value of monocular occlusion as a diagnostic test it would only be the stouthearted or the curious who would attempt any practical therapy based on occlusion. This was indeed a tragic mistake—a costly mistake which has set back headache therapy by at least three decades. A standardized technique of prolonged monocular occlusion, rightly interpreted, is the key to relief for multitudes of chronic headache sufferers.

Coachman (1948) in a brief paper on Prolonged Occlusion was the first to refute these negative arguments. In refuting the fact that prolonged occlusion was a manifestation of Bell's phenomenon he said, "The occlusion of each eye separately does not demonstrate a Bell's phenomena as some have claimed, for we do not sleep with one eye and the other closed".

In 1955, I published a paper to show statistical evidence that prolonged occlusion has no parallel with Bell's phenomenon. By classifying over 200 clinical records of occlusion cases it was shown that only 49% reacted in the same manner as Abraham's six cases. Thus we see that inconclusive evidence and prejudice were allowed to creep into scientific journals and inhibit further research in the area of latent binocular imbalance.

LATENT HETEROPHORIA

Phoria measurements are designed to indicate the position which one eye will take in relation to the other eye when the controlling influence of binocular fusion is abolished and all residual binocular stress has been eliminated. In the event that structural symmetry is good and the reciprocal and synergistic relationship of the binocular reflexes is such that there is no vertical, horizontal, or rotational differences, the condition is referred to as orthophoria.

There are two factors in the above definition of phoria measurements which are equally important. First, binocular fusion must be abolished; but secondly, *all residual binocular stress must be eliminated*. Here is the great stumbling-block to the accurate determination of heterophorias.

As true orthophoria is an almost incomprehensible state of perfection, we conclude that heterophoria in some degree must be found in every patient examined.

The great problem is to find the direction of deviation and the degree. If heterophoria exists in any degree, then we know there must be a stress set up in the neuromuscular pattern to counteract this deviation if efficient binocularity is to be maintained.

Here is where *time* becomes an integral factor in phoria measurements. If a hyperphoria has existed for many years, perhaps even a congenital hyperphoria such as found in hypertropia, it may take hours, or days, or even months for this stress to be inhibited to a degree to facilitate a true phoria measurement and correction. The type of simple phoria measurement that most of us were taught to make is generally worthless if we are to adequately diagnose a migraine patient.

DIFFERENTIAL DIAGNOSIS

When bodily and ocular stresses have become deeply imbedded through years of compensatory muscle tension, and when electromyographic research has proven

that in the face of increasing fatigue a muscle requires a more prolonged time for relaxation, it any wonder that our feeble superficial efforts to measure phorias meet with such dismal failure?

Once we realize that *time* is a most important catalyst in the creation of binocular stress, it is easy to see that time may become equally important in relieving that stress. If a patient has utilized a compensatory disjunctive stress for twenty years to maintain single binocular vision, it is only reasonable to assume that this must be relieved for a prolonged period if a true finding is desired. The only way in which binocularity can obtain relief is by occluding one eye. After a designated period of monocular occlusion then phoria measurements are again taken and the difference noted.

Here are a few typical examples from the files of successfully completed migraine patients as an illustration of changes in binocular relationship following a standardized prolonged occlusion test:

<i>Patient</i>	<i>Before Occlusion</i>	<i>After Occlusion</i>
A	1½* Left Hyperphoria 3* Exophoria	8* Left Hyperphoria 8* Exophoria
B	¼* Left Hyperphoria 3* Exophoria	10* Left Hyperphoria 10* Exophoria
C	½* Left Hyperphoria 12* Exophoria	5* High Hyperphoria 22* Exophoria
D	1* Left Hyperphoria 6* Esophoria	Negative 27* Esophoria

* Prisms Dioptics.

In each of the above cases there had been a long history of severe headache which was eliminated after the proper amount of prism was prescribed to relieve the binocular stress. Hence it is easy to see why the etiological factor of these migraine headaches was not found in all of the previous investigations and why the label "psychosomatic" was placed there instead.

CONCLUSION

It has been the purpose of this article to try to show how latent heterophoria can produce neuromuscular stress in the binocular act which may result in headaches of the severest intensity. It is impossible in this short space to cover the standardized prolonged occlusion technique and the associated test used in differential diagnosis, but it is desired to point out that no patient suffering from chronic headache has had an adequate investigation for etiological factors until a thorough investigation of possible latent heterophoria has been made.

318 S. W. Alder St.

BIBLIOGRAPHY

- ABRAHAM, S. V., Bell's Phenomenon and the Fallacy of the Occlusion Test, *Am. Jnl. of Opth.* 14:65, 1931.
- ALVEREZ, WALTER C., "How to Live with a Migraine Headache", Newspaper Article.
- COACHMAN, E. H., A Common Extraocular Muscle Imbalance, *The Eye, Ear, Nose and Throat Monthly*, 27: 175-179, 1948.
- DUKE-ELDER, *Textbook of Ophthalmology*, C. V. Mosby Co., 1949.
- MARLOW, F. W., Prolonged Monocular Occlusion as a Test for Muscle Imbalance, *Trans. Am. Oph. Soc.*, 1920.
- ROY, RAYMOND R., Ocular Migraine and Prolonged Occlusion, *Opt. Weekly* Sept. 3-10-17, 1953.
- ROY, RAYMOND R., Prolonged Monocular Occlusion and Bell's Phenomenon, *Jnl. of A. O. A.* June 1955, 26: 626-630.
- ROY, RAYMOND R., Headaches and Binocular Stress, *Opt. Weekly* Oct. 11-18, 1956.
- ROY, RAYMOND R., Symptomatology of Binocular Stress, *Opt. Weekly* May 15, 1958.
- SAVAGE, G. C., *Ophthalmic Myology*, McQuiddy Printing Co., 1902.
- SCOBEE, RICHARD G., *The Oculorotary Muscles*, C. V. Mosby Co., 1952.
- WALKER, KENNETH, *The Story of Medicine*, Oxford University Press, 1955.