Arch. Soc. amer. oftal. optom. (1960) 1 - III

CLINICAL RETINOSCOPY

BY

ARTHUR L. SAVELL, O. D.

Johannesburg, South Africa

Retinoscopy or skiascopy (the word is derived from the Greek translation of 'shadow test') as it is so often termed, is the science of measuring the refractive condition of the eye objectively.

In that this paper is a description of the clinical application of retinoscopy the underlying optical principles will not be discussed. However it must be kept in mind that the principle underlying this method of refraction is simply that it is the emergent light from the patient's eye that is brought to a point which is coincident to the retina of the examiners eye. These emergent light rays are dependent upon the refracting media of the patient's eye and not on the instrument, which, either merely provides the source of light (self luminous retinoscope) or reflects it from some extraneous source (non-luminous retinoscope).

Static retinoscopy

This retinoscopy is the one carried out on an eye which is fixing a distant target.

The three most desirable conditions in static retinoscopy are, firstly that the patient's eye shell be unaccommodated, secondly that his line of sight shall be steady, and thirdly that the retinoscope beam shall coincide, or as nearly as possible, with the visual axis of the examiner.

It is also important that the examiner wear his proper distance correction so that he has maximum acuity. Presbyopic examiners should wear a plus one lens in addition if they are carrying out retinoscopy at one metre.

The first requirement can be achieved with certainty only by the use of drugs to paralyse the accommodative faculty of the eye. However, as the use of drugs is not permitted for optometrists uses in some countries, other methods must be found to inhibit the patients tendency to accommodate to the greatest extent. A simple, though useful method is the use of a blue fixation point in a semi-darkened room.

The writer uses two such fixation points, so arranged at optical infinity, that when sitting in front of the patient, the eye not under examination sees the light on that side only, the examiners head obstructing the other, and vice versa.

There is thus a minimum of obliquity and the second and third requirements are adequately satisfied.

With very young children special methods have to be adopted. School age children can often be treated like adults but with younger children some other manner of holding their attention must be used. This is brought about by the fixation target being a light held by the nurse who maintains interest by switching it on and off. This flickering or flashing holds their interest, but can also be added to by the child calling out when the light is on or off. The addition of coloured filters before the light further stimulates the childs interest, and they often delight in this 'coloured lights' game.

A child under the age of about five should sit on its Mothers lap, with its back to her so that she does not distract the childs attention from the fixation target held by the nurse. In these cases, a doll or toy used as the fixation target further maintains the interest.

On passing the retinoscope beam slowly across the observed pupil, the instrument not being tilted more than a few millimeters to avoid losing the reflection from it, a round, oval or somewhat linear spot of yellowish-red reflection is seen in the pupillary area. The appearance of this reflection varies, depending on the refraction of the eye, the transparency of the media, the amount of pigmentation (albino, blonde, brunette), the amount of illumination and the distance from the eye at which the retinoscopy is being performed. If the reflex is dull and slow a high error of refraction is usually present. If, however, it is bright and fast, the error is small.

The light in the patient's pupillary area may move either in the same or in the opposite direction, being a 'with' or an 'against' movement. If the lighted area moves faster in one direction than in the meridian at right angles to it, astigmatism is present.

Using a plain mirror and a working distance of one metre, a 'with' movement can be due to hypermetropia, emmetropia, or myopia of less than 1D.

A 'with' movement is neutralised by placing plus spheres of increasing strength before the patient's eye until the weakest lens is found which will just neutralise or change the 'with' into an 'against' movement. An 'against' movement is neutralised by placing minus spheres of increasing strength before the patient's eye until the weakest lens is found which will just neutralise the movements or change the 'against' into a 'with' movement. This point of 'reversal' is the one where a lens will just neutralise the movements in the two principal meridians at right angles to each other. It is on this point of reversal that the principal of retinoscopic refraction is based.

If astigmatism is present the appearance of the reflex and the methods of neutralising it will be different. In a case of simple hypermetropic astigmatism, for example, with the meridian of power vertical, the retinoscope beam traversing the observed eye horizontally will give a 'neutral' effect, whilst in the meridian at right angles a 'with' movement will be observed. No correcting lens is thus needed in the horizontal meridian. Attention is now directed to the vertical meridian, and the movements of the retinoscope beam confined to this direction only. The 'with' movement is then neutralised by placing plus cylinders before the patient's eye with axis horizontal until neutralisation is reached.

A similar procedure is adopted for simple myopic astigmatism, minus cylinders being used.

Shoul the two principal meridians not be vertical and horizontal, but oblique, all the meridians in turn must be traversed until the major directions of movement are found. In simple astigmatism, this is facilitated by the fact that the observed reflex has a distinctive bar or band of light extending across the pupil in a meridian coincident with that of the power axis of the cylinder power present, and with motion in the meridian at right angles.

With compound astigmatism the best method to adopt is to keep placing appropriate spheres before the patients eyes and making the retinoscope beam traverse several meridians of the pupil with each change until the astigmatic 'band' appears, thus donating the major axis of the error. The retinoscope movements are then confined to these two principle meridians. One meridian is neutralised by means of a suitable sphere, thus reducing the error remaining to one of simple astigmatism, which is corrected as already described. The most reliable results are obtained when the residual astigmatic reflex is obtained in the form of a 'with' movement to be corrected by plus cylinders.

The greatest difficulty in this method of utilising both spheres and cylinders for neutralising the reflex — or cylinder retinoscopy, as this technique is called — is the determination of the correct axis of the astigmatic element. If the retinoscope beam traverses any meridian other than one of the principle meridians, a fresh set of movements will result in two meridians now set obliquely with reference to the original meridians. This effect is particularly marked when the astigmatic condition of the eye is one of simple astigmatism, or has been reduced to this condition by means of a basic correcting spherical lens in the manner described above whether the preliminary neutralisation is carried out so that the residual error is one of simple myopic or simple hypermetropic astigmatism is a matter of personal choice.

For correction with plus cylinders and the assumption that one meridian of the astigmatic eye has already been correctly neutralised, a 'with' movement is now left in the other principle meridian, which is approximately horizontal. To correct this a 'plus' cylinder is used, the power being estimated by the degree of error evaluated by the speed of the reflex movement. This is then checked. Should any movement still be present the substitution of cylinder of a different power is indicated and changed until neutralisation is achieved.

However, had the true axis of the correcting cylinder been at 80º, then when then estimated cylinder was set at 90º there appeared two meridians of movement. These will lie obliquely with reference to the original position of the correcting cylinder at 90º. The existence of these new meridians of movement is due to the alteration in axes caused by the resultant efects of two obliquely positioned cylinders of opposite power the first being that in the eye itself and second in the correcting cylinder. If the retinoscopic beam is now made to traverse each of the new oblique meridians in turn, it will reveal that in one direction there is a 'with' movement, whilst in the other at right angles there is an against movement. In order to correct this, the axis of the plus cylinder is moved a few degrees through the acute angle which now separates it from the new meridian of the 'against' movement so that it approaches the latter. This will again cause a shift in the obliquity of the resultant axes, and the procedure is repeated as the obliquity diminshes, until finally, the axis of the true error of the eye, should the correcting cylinder be rotated beyond this point, a fresh condition of movement in oblique meridians will arise, this time the directions of motion being reversed.

A refinement of this technique is that should the movements in the oblique meridians be rather indefinite an alteration of the power of the cylinder used experimentally, will increase the apparent obliquity, thus making for easier recognition of the discrepancy between the axis of the correcting cylinder and the true error of the eye itself.

Pascal refers to this variable angle between the correcting cylinder and the corresponding meridian of oblique movement as the 'Guide Angle'. Accurate observation of this guide angle makes it possible to correct both power and axis with a minimum of rotations or changes in the power of the experimental correcting cylinder.

When correcting with minus cylinders the method is precisely analagous except that to find the correct axis, the minus cylinders placed before the patients eye must be rotated towards the oblique meridian which shows a 'with' or hypermetropic movement.

The use of minus cylinders will follow if the necessary initial spherical correction was such that a simple astigmatic movement of the "against' or myopic type is present.

Should this be the case, and the direction of the 'against' movement is approximately horizontal, a minus cylinder is placed before the patient's eye at 90º. If this is a correct estimate, no further movement will be set up. There will be neutralisation along the vertical meridian whilst in the horizontal there may be 'against' movement, or a 'with' movement indicating that the power is correct, too weak, or too strong, respectively.

This is adjusted as previously described.

If, however, the true axis of error in the eye is at 80º and the correcting cylinder set at 90º, movements will be observed in two meridians which run obliquely to the 90º meridian. To find the correct axis the minus cylinder is rotated throught the acute angle towards the meridian of 'with' or hypermetropic movement. Here again the same effects will apply should the cylinder be rotated over the mean position.

In place of a combined sphero-cylindrical correction for neutralisation, spheres alone can be used, treating the major meridians of the astigmatic eye as separate elements.

It must be borne in mind, however, that the ultimate aim of the retinoscopic examination is to make the far point of the eye under examination fall on the plane of the retinoscope mirror. This is achieved when the reflex observed becomes' neutral'. The eye, however, has been made artificially myopic with reference to the examiners position and it is necessary to compensate for this error by making allowance for the'working distance'. This is the dioptric value of this 'working distance', being +1.50 D. for 66 cms., + 0.50 D. for 2 metres. This must be subtracted algebraically from the correction before the patient's eye.

The writer favour the practice of 'putting up' his working distance first and then on completion of the retinoscoy simply removing it, having the true correction left.

Streak Retinoscopy

The technique of streak retinoscopy differs very little from that of ordinary retinoscopy with a self illuminated instrument. It can be used statically or dinamically with the sane optical principles applyin as in the conventional methods.

The streak retinoscope is an electric retinoscope designed to project a streak or band of light (regardless of the error of refraction) in contradistinction to the usual spot of light (which is converted into a circle, oval, or band of light, depending upon the type of refractive error) projected by concave or plane mirror types of retinoscope. Several features, however, aid in the determination of the refractive state of the eyes. Each meridian can be neutralised separately by the rotation of the band through 90°, and as the reflex is band-shaped instead of circular, astigmatism(particularly small degrees), and its axis, is much more apparent.

The retinoscope is set so that the uncrossed rays (plane mirror effect) make a streak about 5 mm. in width when projected from 1 metre. With the patient fixing a distantt object the streak of light is directed at the pupil of the eye under examination and observation made of the white band of light which appears to be in the plain of the pupil more or less parrallel to the axis of the streak of the retinoscope. The fundus reflex appears band-shaped because the streak of light is narrower than the pupil so that only a narrow portion of the retina is illuminated. Observation of the light in the pupil rather than the shadow should be made as the sharp edge of the light is often a good way of locating the axis. The streak is rotated about the axis by manipulating the handle of the retinoscope and observation made of the characteristics of the fundus reflex. Observe whether the band of light is narrow or wide, whether it is distinct or indistinct, whether it moves 'with' or 'against', whether this movement is quick or slow, and whether these characteristics are the same or different in all meridians.

The band usually appears narrow in simple hypermetropia or in hypermetropic astigmatism, and wide in simple myopia or myopic astigmatism. A quick movement indicates a small error of refraction, whereas a slow movement indicates a high error (plus or minus).

If a 'with' movement is present, it is neutralised by means of plus spheres, if an 'against' movement by minus spheres. When neutralisation of the 'with' or 'against' movement is reached, the streak disappears and light occupies the whole pupillary area.

Neutralisation of a 'with' movement is brought about by placing plus spheres of gradually increasing strength in the trial frame, or rotated into the refractor head, until all movement is neutralised and the whole pupil is illuminated.

To check the neutralisation point, either approach closer to the patient when a 'with' movement should again be seen, or further away when an 'against' movement will be observed. The addition of a further plus 0.25 will result in an 'against' movement.

An 'against' movement is neutralised in exactly the same way as for the 'with' movement, only minus spheres are used. If, however, the streak is adjusted so as to give a concave mirror effect (producing crossed rays) and converting the 'against' movement to a 'with' movement, faster results are obtained. Minus lenses are still used for neutralisation.

A check is made as before by moving closer or further away from the patient, or the addition of an extra —0.25 sphere for reversal of the movement.

If after neutralisation a band reflex still remains in the meridian at right angles to that which has been neutralised, astigmatism is present. Its axis is determined by rotating the streak through 90º and observing the band of light ('shadow') at this meridian. If it happens to lie in the axis of astigmatism a bright, well definied band appears, which mover 'with' or 'against' but parallel with the streak of light on the face. If it is somewhat off the principle axis the 'shadow' not only becomes indistinct, but it also produces a break in continuity between it and the streak of light on the face. The streak is rotated until the reflex band of light in the eye and the streak of light on the face are in alignement and move in parallel directions. The axis is noted and the shadowing continued at this axis and at the axis at right angles to it, neutralising the reflex (in the proper meridians) with plus cylinders in hypermetropic astigmatims or minus cylinders in myopic astigmatism.

If an 'against' movement is present in one meridian and a 'with' movement in the meridian at right angles (mixed astigmatism) the 'against' movement is neutralised with minus spheres and the 'with' movement with plus cylinders.

Dynamic Retinoscopy

This method is used for the objective determination of the refractive condition of the eyes for near vision whilst both accommodation and convergence are being exercised at the working distance (about 33.3 cms.)

The instruments used are a dynamic retinoscope and either a dynamic rack or a series of binocular additions so mounted as to be easily picked up and placed before the eyes. The rack takes the form of a plastic or metallic holder containing lenses mounted in pairs, and forming a series of gradually increasing dioptric powers one above the other. The fixation target is either attached to, or built into the retinoscope itself and illuminated by the lighting system of the instrument. The targets take various forms, such as reduced Snellen letters of various sizes, geometric patterns, or simply a few steel balls let into the body of the retinoscope. They are mounted centrally in vertical alignment with the instrument in the plane of the mirror and slightly above or below the line of sight of the observer.

Dynamic retinoscopy is usually carred out after static retinoscopy has been performed, the subjective examination for distance completed and the muscle balances taken. Correction should be made by prisms of any hyperphoria, if present, and any horizontal imbalance if over 2 prism dioptres. A point of importance to be kept in mind, is that Dynamic Retinoscopy is not accurate unless the patient has binocular vision.

In the following resume on Dynamic Retinoscopy greater deatil of the physiology of vision has been discussed for a clearer understanding of the visual functions involved. The clinical application is much the same, but the results, due to the dynamic functioning of the eyes, follows a different diagnostic pattern. To facilitate this a slight change in approach has been made from the description already given on the application of the retinoscope as a clinical instrument.

The examiner places himself in front of the median line of the patient's eyes and at the same height so that his eye is equidistant from the eyes of the patient. Retinoscopy is then carried out at the average reading distance of 33.3 cms., although this may vary according to the particular investigation being conducted.

The patient is directed to look at the largest letter or pattern of the illuminated chart. The retinoscopic light patch is passed rapidly from one eye to the other in the horizontal plane, and the movement of the shadow is noted as is usual with static retinoscopy. With certain exceptions which will be dealt with later on, it will be noticed that there is a 'with' movement of the shadow. For example, with a +1.00D., O.U., there may be a reversal or 'against' movement. It is necessary then to reduce this addition until there is no movement or only a slight 'kickback'. It will be found that the lens with which this result is obtained is a +0.75 or a +0.50 D. This is called the Dynamic Neutral. From this figure is subtracted the 'Objective Lag' for the patients age. If this happens to coincide, and zero results, it may be concluded that the distance correction will be satisfactory for the performance of all tasks, whether at distance or for near work.

Objective Lags vary according to age, as can be seen from the following table:
+1.00 up to 30 years.
+0.50 to +0.75 from 30 to 45 years.
+0.50 from 45 to 70 years.
Over 70 years : nil.

From the age of 45 years and onwards, through the presbyopic years, no more than +0.50 is deducted for the Objective Lag. Larger Dynamic Neutrals than +0.50 are considered as binocular reading additions if close work for long periods is to be accomplished without discomfort. For example, a patient of 50 has a Dynamic Neutral of +1.75; then, subtracting the lag of +0.50, +1.25 is obtained, which is the reading addition, O.U.

Various authorities account for the Lag in different ways. It is, however, generally accepted that most people rarely exert their full accommodation for the working distance. At 33⅓ cms., their accomodation is nearer 2.5D than the full 3D. Their accommodation may be said to be loose. They do not really look at an object, so much as glance at it, it being unnecessary to focus exactly for every visual task, especially if the print is not too small. Where the patient is young (up to 30) and has been trained to use his eyes for fine work, the Dynamic Neutral appears already to exist i.e. there is a slight 'kick-back' of the shadow. The placing of a binocular addition of +0.50 before the yes and repeating the right to left flash of the retinoscope will probably reveal a definite 'with' movement. With a +1.25 addition there may now appear to be a definite 'reverse' movement. Using a +1.00 addition, neutralisation will probably result. What appeared at first to be neutralised now satisfies a Lag of +1.00 which is normal for that age, and the patient should have emmetropia for distance with or without co-rrection. There is, Therefore,

a) Neutralisation with no Lag

b) Neutralisation with a +I.00 0.U.

The patient has, therefore, relaxed his accommodation I.00D. whilst maintaining full convergence, which is normal for his age.

"Since the act of accommodation does not conform to geometric optics, the amount of accommodation in use for comfortable reading vision an uncertain quantity. If a patient is under test it is natural for him to make a greater effort than he will make in ordinary circumstances." (Swann).

"Amplitude of accommodation tests are useless in that the nearer the object is approached to the eyes, the larger the visual angle becomes, so that the accommodation is not used at all, and if used, only partially. The cards nearness enables a person to receive a larger and more magnified image of the object." (Taylor).

All these factors render the use of subjective tests upon the amplitude uncertain unless the true value by objective means is first ascertained.

Undoubtedly the objective lag is the result of the eyes not focussing accurately or exactly on the target, but somewhere behind it. Only if the target is advanced to 28 cms. in front of the patient's eyes is neutralisation at the point of observation produced.

It is probable therefore that in carrying out Dynamic Retinoscopy the actual Negative Relative Accommodation is what is measured.

Negative Relative Accommodation at:

30 years: +0.25 to +I50 at maximum.

30 to 35 years: +I00 to +I25 at maximum.

35 to 40 years: +I.00 at maximum.

40 to 45 years: +0.75 at maximum.

As Negative Relative Accommodation is the ability of the eyes to relax while convergence remains unchanged, it is seen that the table of Negative Relative Accommodation approximates very closely to the table of objective lags. It is, however, unwise to relate one table very closely to the other, for it must be rembered that accommodation is adequate when the positive and negative ranges are in normal ratio. If the positive range is normal the negative range will also be normal.

The Correction of Presbyopia.

For the correction of Presbyopia, the 'with' movement is noted. If it is fairly marked, a substancial binocular addition is tried, e.g., around +2.00D. sphere. If this neutralises most of the 'with' movement, a further addition of 'plus' in half diopter steps is made until a definite reverse movement takes place. This may be obtained with a +2.50. A return to +2.25 then results in the movement being neither 'with' nor 'against'. This is the Dynamic Neutral. By knowing the patients age, which is given as 55, and substracting the Objective Lag. +0.50, the result is +I.75. This is the reading addition which should be given. Subjective checking can be made with one of the methods described.

Exceptions.

I. Al larger addition than +2.00 indicates that either the patient is under-corrected for distance, or the cause may be pathological.

2. When the reflexes are unequal it may be due to:-

a) Pathological processes in one eye.

b) Improper correction in one or other the eyes for distance.

c) Unequal convergence of the eyes on the target.

In the case of b) if plus is added or subtracted until the lag equals the normal for the patients age, it is possible to neglect reversion to the subjects distance test. The examiner will know quite well that the Dynamic findings will be verified by experience. In cases of c) - Strabismus, Dynamic Retinoscopy is almost impossible unless the eyes are more or less straight.

Excessive Convergence:

After the full correction has been given for distance and muscle balances show a condition of Esophoria for distance and near, a state of excessive convergence exists. Ths is usually confined to young people, but quite frequently it is found up to the age of 45 and later.

The patient is directed to read the illuminated chart on the retinoscope, starting with the large letters. During this period a quick flash from right to left usually discloses quite a substantial lag. Plus is added to reversal and then subtracted until neutral is reached. From this is taken the lag for the respective age and what is left is added to the distance correction. Even if this difference is as much as +0.50, the addition will eventually be accepted by the patient, although it is not accepted at the time.

Dynamic Retinoscopy discloses, Latent Hypermetropia, which over-stimulates convergence. Excessive Convergence, however, should not be measured with base-out prisms because it stimulates further convergence.

Strained convergence

This occurs on over-use of the eyes on fine near work. A low hyperopic or myopic condition is usual for distance, but exophoria is revealed for near. Sometimes it is impossible to give any positive correction for distance, or, if any is possible, it is only small. Sometimes exophoria is found for distance, but always exophoria for near. This means that the patient's near vision convergence has broken down and the eyes are'revolting' against their binocular function. They have probably passed through the stage of excessive convergence and are now at the stage when vision is exceedingly uncomfortable for close work.

Having checked the distance refraction and bearing the binocular balance conditions in mind, the patient is directed to look immediately at the smallest letter on the illuminated chart of the retinoscope, whilst the light is flashed quickly from right to left. It is unusual to find an objective lag and +0.50 0.U. is added and the retinoscope flashed again. A slight 'against' movement may be observed. Resistance then suddenly gives way and a further 'with' movement observed. Adding'plus' additions is continued until reversal point is reached, and then reduced to obtain the Dynamic Neutral. The lag is deducted —usually +1.00 — and the remainder added to the distance prescription. If no addition is necessary, then a prism of 3-4 base in, divided between the tuwo eyes is given for near use.

Straned accomodation

This condition is usually present in combination with strained convergence. There is generally esophoria for distance and exophoria for near. The patient is directed to read the retinoscopy chart, commencing with the large letters, and observation acted upon when he starts to read the smaller letters. Mostly there is little or no lag to begin with, and the procedure is as in the previous case of strained convergence. Any additional plus is incorporated in the distance correction.

Accomodation below the normal

If the 'lag' is larger than the normal for the age (with the patient wearing his full distance correction), there is usually orthophoria for distance, but a large exophoria for near —very much in excess of the physiological exophoria — and often as higt as 8 P.D. This condition usually results from some debility or prospective illness, e.g..., boils, bad teeth, operation, convalescence, or maternity weakness and lassitude. It is a Paresis of Accomodation and the patient is referred.

Myopia and Dynamic Retinoscopy

So far the application of the technique for near vision has been dealt with in cases of hypermetropia, presbyopia, convergence excess, etc. It should be noted that in all these errors accommodation and convergence are strongly linked. In many cases of myopia however, these functions are only loosely linked. Some cases of myopia respond in every way to the technique of Dynamic Retinoscopy as with other ametropic conditions. Unfortunately a great many myopes do not respond in this way at all. The lags are usually higher in most hyperopic cases, giving the impression that the myopia is less than it is, until it is realised that the phenomenon is the result of inadequate accommodation. It seems, therefore that each case of myopia must be regarded as having its own etiology.

Conclusions

For comfortable reading corrections there must be a comfortable balance between the Negative Relative Accommodation and the Positive Relative Accommodation. If the presbyopic addition is calculated by subjective means alone, there is the possibility of over-correction because the Negative Relative Accommodation, when taken subjetively is that amount of plus sphere which can be added without actual blurring of the reading matter used for the test. The eyes are not being tested for Negative Relative Accommodation, but to find the correct presbyopic addition which can be worn with comfort. If the reading addition is too strong, the Negative Relative Accommodation-Positive Relative Accommodation balance is disturbed, and restriction of range with comfort will ensue.

The following chart devised by Colin B. Fryer, and based on values recorded by L. Swaan is reproduced as a reference guide of the many phenomena observed with the Dynamic Retinoscope. Basically the chart summarises all the available information concerning the four main conditions likely to be encountered in the presbyopic years.

High (dynamic) neutral (or final reversal point) values.

Age:	Up to 35	35/40	40/45	45/50	50/55	55/60
H. N.	+1.50	+1.75	+2.0	+2.25	+2.50	+2.75

Negative relative accommodation

Age:	Up to 30	30/35	35/40	40/45	45/50	50/55
N. R. A.	1.50D	1.25D	1.00D	0.75D	0.50D	0.25D

N. B. To be deducted from H. N. — Remainder given as near correction.

Primary insufficient accommodation

(due to Excessive Convergence)
Muscle balance: Dist. and near: Eso.
High Neutral: High.
Correction: Add plus to Dist.
Denotes Latent Hyperopia.

Primary excessive accommodation

(due to Excessive Convergence)
(Over-activated; or strained)
Muscle balance: Dist: Eso Near: Exo/Eso.
High Neutral: Low remaining low on covering one eye.
Correction: Add plus to Dist.
Latent Hyperopia.

Secondary insufficient accommodation

(Accommodation below normal Exhausted; or Paresis of Accommodation)
Muscle balance: Dist: Ortho/Exo. Near: High Exo.
High Neutral: High.
Refer to Medical Practitioner.

Secondary excessive accommodation

(Strained of Weak Convergence) due to Convergence Insufficiency
Muscle balance: Dist: Ortho/Exo. Near: High Exo.
High Neutral: Low-normal on covering one eye.
Correction:

I Add plus to dist.

If no addition required.

II Add 3º - 4º divided between both eyes for near use only.
III Orthoptic excersises.

Dynamic and duochrome target retinoscopy.

A recent development in the technique of dynamic retinoscopy is the Cockerham Method, in which the fixation target consists of an atachment to the luminous retinoscope, making use of the duochrome filtres, red and green.

Cockerham claims that there are a number of advantages with this duoprobably passed through the stage of oxcessive convergence and are now at the chrome fixation attachment over the ordinary illuminated target.

1. Coloured targets encourage the patient to maintain fixation to a greater degree than the black and white.

2. The progressive size and character of the objects permit coarse and fine fixation.

3. The examiner can obtain duochrome equality at a prescribed working distance.

4. Since the target consists of diagrams rather than letters there is a universal application.

With a critical determination of green dominance as the retinoscope is moved a fraction nearer to the patient and red dominance when the instrument is taken a similar distance away, the result is confirmed.

Since the reflex is watched during the final manoeuvre it follows that with the presbyopic condition at least a firmer measure of control is added to the reading or close work addition.

Cockerham states that with the cylinders axes and powers carefully checked and the spherical modification controlled throughout with the duochrome dynamic target, the practitioner is in a position to prescribe for any presbyopic correction with greater certainty, since a purely subjective test alone is only as accurate as the patients confirmation will allow. It cannot be argued, he says, that the dynamic test is only an objective method of measuring the negative relative accommodation for the duochrome is acting as a control factor at all stages of the test.

In mentioning the above Cockerham method and his opinion this is to bring Dynamic Retinoscopy to its full conclusion and is not an expression of results obtained by myself personally, due to lack of experience with duochrome dynamic targets.

CONCLUSION

As it will be fully appreciated, the written explanation takes considerably longer to describe than the practical application of this relatively simple routine. The practitioner's ability with the retinoscope, irrespective of what type is preferred, is an objective method of refraction well worth becoming skilled in.

The time spent in developing this skill being more than compensated for by the results obtained.

189 Jeppe Street
P. O. Box-2018

REFERENCES

MCKAY FERGUSON, Retinoscopy. London Technical Monograph Nº 5.
BERENS and ZUCKERMAN, Diagnostic Examination of the Eye.
WELCH ALLYN PAMPHLET, Streak Retinoscopy.
J. PASCALL, Modern Retinoscopy.
L. SWANN, Pamphlet.
KEELER, Pamphlet.
S. TAYLOR, Dynamic Retinoscopy and Binocular Reflexes.
A. L. SAVELL, An Introduction to Dynamic Retinoscopy, Vol. 2. Nº 2 (S. A. Refractionist April/June 1955).
D. COCKERHAM, Dynamic Streak Retinoscopy with duochrome fixation targets. Optician 1954, CXXVIII, 58.