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CROSS-FIRE TECHNIC FOR OPACITIES

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At your last annual assembly the writer verbally presented a technic for Syntonically handling opacities of the senile cortical type. It seems that because this presentation was verbal that many who heard it did not grasp the full significance of the method, nor did they get a full understanding in the reasons for the method. Because of the many questions asked in correspondence since that time, it was deemed best to make the presentation this year in a more formal manner, and to at the same time go somewhat into the background material necessary for a more correct understanding of its use.

Many theories of the cause of lenticular opacities have been advanced, but it seems to have remained for Duke-Elder in a series of articles in the Lancet in 1926 to have struck a note which is easily understood by those versed in Syntonics. Duke-Elder[1] holds that the "primary cause of cataract, generally, is probably to be associated with the direct action of incident radiant energy of any wave-length on the lens, increasing the liability of its colloidal system and deranging the auto-oxidation system on which its metabolism depends. This renders the lens proteins more prone to coagulation by changes in the hydrogen-ion concentration or in the salt content, osmotic changes determined locally by the action of radiant energy on the lens capsule, or by general metabolic disturbances, and by possible continuous photosensitization." To say it another way, it seems that Duke-Elder holds that radiant energy – light – so alters the microscopic functioning ability of the lens cells and tissues that it loses is transparency. His remarks anent possible photosensitization are worthy of more than passing notice, in view of the fact that certain food substances are known to photosensitize both man and animals. Woodbury[2] lists, among others, buckwheat, oatmeal, egg albumen, all of which are common foods. He also lists quinine sulphate, mercurochrome, eosin, acriflavine and esculin, all of which are drugs or dyes in common use. At some future time it would seem that a paper should be presented to this college on the subject of photosensitization in order to enable members and Fellows to inquire more closely into the history of their patients showing opacities. Weeks[3] in a discussion of poisoning by ergot, a fungus found on cereals, says in part, "With ergotism of the spasmodic and gangrenous types, violent spasms and cramps with subsequent contraction occur, affecting non-striated muscular tissue especially. During the spasms, the fundus becomes pallid, in the interval it may be hyperemic. <u>The formation of cataracts in these cases is attributed by many observers to interference of the nutrition of the crystalline lens due to spasm of the intraocular blood-vessels</u>." Thus we see another apparent physiological reason for the formation of lenticular opacities as a result of possible irritants in the blood stream which are capable of continuously or spasmodically constricting the blood-vessels and consequent alteration of local metabolism by relatively small changes in the re of nutritional supply and the rate of waste removal.

The factor of permeability of the lens capsule here enters into the problem, yet Friedenwald[4] finds that the following conclusions may be drawn in reference to this permeability, which by undue alteration may cause lenticular opacities: 1. All electrolytes and true water solutions may permeate the capsules; 2. The capsule is a semi-permeable membrane but that its permeability is increased by calcium, proteins and cyanides; 3. That the permeability is greater in youth then in age. From the foregoing it seems logical to conclude that lessened permeability tends to the formation of lenticular opacities, possibly with deposit of calcium salts, and protein coagulation by altered by hydrogen-ion concentration, if the incident radiant energy be such as to foster these changes.

Duke-Elder[5] reaches conclusions which have a more deeply entrenched Syntonic significance and at the same time encompasses what has been said above:

1. A denaturation of the proteins of the lens, resulting most obviously from the absorption of radiant energy in any form.

2. An increase or derangement of the permeability of the lens capsule either by the incident of radiant energy or by metabolic or traumatic influences.

3. A derangement of the auto-oxidation system of the lens. This may be caused by the direct action of radiant energy upon the lens itself.

Since the best scientific thought today inclines to a radiant energy cause as the primary cause of opacities, and since radiant energy within the visible range is peculiarly the “sphere of activity” of the optometrist and syntonist, then there can be so real or fancied reason why this problem of lenticular opacity should not be attacked by treating light within the visible range so as to if possible reverse some of the processes which have resulted in the formation of lenticular opacity. Obviously, the reader sphere of systemic metabolic causes, such as certain circulating toxins in the blood stream are not within the sphere of activity of the optometric syntonist, yet he should get as complete a history as possible looking to the determination of the possible presence of certain photosensitizing substances in the blood stream. Upon finding which the patient should be referred to one trained to effect a neutralization of such photosensitization. Incidently, it must be said that time seems to be the most potent factor in removing photosensitization, if further ingestion of the offending substance is stopped.

Having determined that the most probable cause is the absorption of deleterious radiant energy, and consequently an optometric case, sight must not be lost of the fact that most opacities in the aged are of the so-called cortical type. By this we mean that the outer borders of the lens substance have the greater opacity, and that the central or nuclear region remains clear or relatively so. Syntonically, the problem of reaching the outer borders of the lens caused considerable difficulty in the early applications, because of the ever present pupil which limited the selected frequency to the nuclear or central region. If permeability of the peripheral portions is to be accomplished it seems to be necessary to in some manner direct the selected frequencies into these regions. But how? The Syntonizer is a rather weighty instrument and to move it angularly about the patient’s face would require rather massive mechanical devices, increasing the cost of construction, which would in not wise be justified because about 98 percent of all cases o not have opacities.

Happily it occurred to the writer that perhaps the 'cross-fire" techniques used in Roentgenology might be applied. This method was developed to prevent x-ray burns of the skin. Underlying tissues are much more resistant to x-rays than is the skin. Underlying tissues are much more resistant to the x-ray than is the skin. Technicians, therefore, developed a method of aiming the emission at the point within the body and irradiating it for a time. The angle is then changed in such a way that a new skin area is interposed between the tube and the point to be e-rayed, and another dose was given. Three to five such changes are made, each through a new skin area, but all irradiation is as directed as to impinge upon the point to be treated. This method was termed the "cross-fire" method.

In the instant case, the application of selected frequencies in the visible range to the cortical type opacity, it was found to be possible to have the patient rotate his eyes as his face was being directed into the visor of the syntonizer. To be sure that this was properly done, a "fixation: object was devised. This consisted of a strip of three ply calendered white Bristol board about two inches wide and long enough when rolled into a cuff, to just overlap enough to permit gluing the ends together. The cuff was made of such size and shape as to fit in the visor of the syntonizer with its nearest edge five inches from the patient's eyes as they looked into the visor. In the old type instrument the device would obviously have to be rectangular in order to fit into the visor, but this is easily accomplished by using adhesive tape, or the gummed paper used for sealing parcels. Before the cuff, or rectangle, is glued it should have several characters made on its inner surface with so-called india ink. The characters should be bold and large enough to be seen, even if not recognized as to shape. When the ink is dry, the cuff should be glued or the rectangle assembled.

In use, when applying syntonics to the type of case under discussion the cuff is passed into the visor to the proper position – about five inches from the patient's end of the visor. The patient is seated at the syntonizer, nascentized "L" and the selected frequency μυ – is turned on. The patient is instructed to look at the characters on the cuff and to make one complete circuit of the cuff in about ten seconds. Another method is to have the flasher in use and to have the patient make one complete circuit of the characters on the cuff during the time the light is on and to rest during the dark period. Of course, the period of syntonization must be doubled at each sitting because of the absence of the selected frequency energy during the time the light is out.

In addition to the use of this method for direct radiation of the periphery of the lens, there is another factor which undoubtedly enters into the speed with which some of these cases respond and that is the effect upon local circulation brought about by the motion and exercising of the intra and extraocular muscles, thus aiding in nutrition, waste removal and the possible carrying away of debris.

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