PROGRESSIVE MYOPIA

PROGRESSIVE MYOPIA
A Suggestion explaining its Causation, and
for its Treatment

BY
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About five years ago I had an idea that progressive myopia might be a "deficiency" symptom. In the year 1928 my colleague at the Sussex Eye Hospital Mr. C. G. Schurr suggested "that there were very good grounds for believing that the cause of myopia might be found in a consideration of aberration of growth in children." This fortunate coincidence encouraged me in my investigations. My ideas were somewhat as follows:

1. In myopia the globe of the eye is elongated, and in progressive myopia this elongation presumably increases. The sclera therefore must be stretching. As there is no hint of an increase of tension within the globe, it follows therefore that the sclera itself cannot be as tough and resistant to expansion as in the normal eye, and that this "weakness" must be evenly distributed throughout. In cases of staphyloma we find that there has been a local "weakening" and stretching of the sclera, and in total ectasis the stretching is general. If therefore we can demonstrate that the sclera in myopia is weakened, here is a link in the chain to explain the elongation of the globe in myopia. It has been suggested that the ocular muscles pull on the globe, thereby assisting in the elongation, this pull being due to an abnormal correlation between accommodation and convergence. This suggested that the treatment required is a full correction of the error of refraction by the constant use of concave lenses. But it is obvious to all of us that in spite of such correction the myopia increases in many cases. Progressive myopia therefore must be influenced by some more general condition.

2. Progression is mostly to be found during adolescence, which is a period of stress to the child, who is growing rapidly, and whose internal secretions are undergoing changes.

3. In the majority of cases progression appears to stop spontaneously when adolescence ceases, in other words in the early twenties.

4. In a great number of these cases there is an aberration of growth of the body. The weight of the child in not increasing proportionately to the height (cf. paper entitled "Myopia in Childhood." C. G. Schurr.)

5. In some of the cases under my care dental caries was present and I was told by the parents that the dentist had stated that in his opinion the child was suffering from calcium deficiency.
This latter statement taken together with the increase in the length of the long bones, due to growth, suggested to me a possible explanation of our question. If the bones are growing rapidly, they require calcium. Is progressive myopia a symptom of calcium deficiency? I asked therefore the doctors who had sent me myopic children for refraction and the prescription of glasses, to give them calcium for long periods. I started this administration of calcium about three years ago, and the results have been both suggestive and promising. To illustrate my investigations I will describe briefly three typical cases:

I.—The first case saw me in September, 1924, he was then aged 13 years. His vision was right eye 6/36, left eye 6/36. The refraction was −3·50 D. Sph. in each eye. I ordered him these lenses for constant use, and with them his vision was 6/6 with either eye. In 1925 his vision and refraction remained unchanged. He was not growing rapidly, in fact hardly at all. In January, 1926, his vision with his glasses was now 6/6 partly with either eye, and the refraction was −4·50 D. Sph. in each eye. I ordered him fresh lenses, which again brought his vision up to 6/6 with either eye. I now forbade him to bicycle up hills, or to play games which entailed stooping with exertion. In short the usual precautions in progressive myopia were taken, if one held the view that the pull of the ocular muscles during convergence influenced the progression. It was found possible to send him to a special school, where individual attention could be given to each boy, and I encouraged the parents to send him there, which they did. In April, 1926, his condition was unchanged. In September, 1926, his myopia had increased to −4·75 D. Sph. in each eye. In spite of all precautions, which included the prescription of the full correction of his refractive error, his myopia increased, and in January, 1931, his refraction was −5·25 D. Sph. in each eye. I then lost touch with him, as he had moved to London. In this case the boy did not grow rapidly until 1926, when he was 15 years of age. Up to this date the myopia was controlled by the correction of his error by suitable lenses. When he began to grow rapidly, his myopia increased in spite of our precautions. No calcium was prescribed.

II.—The next case is a boy, aged 15 years. He first saw me in December, 1929, and his error of refraction was right eye −2·0 D. Sph. left eye −2·25 D. Sph. His height was 4 feet 11½ inches, and his weight 6 st. 11 lbs. I ordered him the appropriate glasses, with which he saw 6/6 with either eye, and I also ordered him Calcium and Parathyroid (P. D. & Co.) by mouth. In July, 1930, his height was 5 feet 0½ inch and his weight 7 st. 7½ lbs. and in December, 1930 his height was 5 feet 2½ inches and his weight 8 st. During this time his refraction remained unaltered, and his
vision with his glasses was still 6/6 with either eye. He then had
an accident, another boy pushed him over and he broke his spec-
tacles, a piece of glass entering his left eye. Fortunately his globe
was not perforated. In April, 1931, his height was 5 feet 3½ inches
and his weight 8 st. 9 lbs. His refraction was right eye –2·50
D. Sph. and left eye –2·50 D. Sph. –0·50 D. Cyl. vert., an
increase of half a dioptre in his myopia. The astigmatism, I feel
sure, was due to the healing of the wound, which was near the
limbus. With these lenses he saw 6/6 with either eye. I saw him
again quite recently, and his myopia is unchanged.

In this case the boy remained at his public school, and beyond
forbidding him to read in bed, and care as to the proper illumina-
tion of his reading matter, no special instructions were given. He
has been working extra hard so as to pass the London Matricu-
lation examination, thus his eyes have not been rested, but have,
rather, been severely tested. His case is in marked contrast to the
one preceding.

III.—The next case is perhaps even more striking. This boy
I first saw in March, 1929, when he was 14 years of age. His vision
was only 6/18 with either eye with the glasses he was then wearing,
and his refraction was right and left eye –2·50 D. Sph. –1·0 D. Cyl.
vert. In December, 1930, his myopia had increased to right and
left eyes –3·75 D. Sph. –1·0 D. Cyl. vert. and with these lenses
he saw 6/6 with either eye. I now started the administration of
Calcium and Parathyroid. In August, 1931, he had grown in the
previous six months 3 inches and his weight had increased 12 lbs.
and he was now just 17 years old. In December, 1931, his vision
with glasses was still 6/6 with either eye, and since the calcium
had been started there had been no increase in his myopia. This
boy had continued his studies at his school, and he had been
working extremely hard, as he was entering for his London
Matriculation.

When one surveys these three cases, which are typical of many I
have observed at the Sussex Eye Hospital and in my private practice,
I think that one is forced to admit that the administration of calcium
influenced the course of the latter two considerably. In the first
case no calcium was administered, and the myopia increased in
spite of very careful precautions, and in the other two the myopia
was arrested, although these precautions were omitted. I should like
to note in passing that I have tried various preparations of calcium,
but obtained no results unless they were administered with para-
thyroid extract.

In the second case calcium was given from the beginning, and
except for the increase of half a dioptre in the middle of his treat-
ment, the myopia did not increase. In the third case the myopia
advanced at the start until calcium was given, and from that time
there was no further increase.
So far we have only discussed the clinical aspect of the question. In the works of the various authorities, which I have consulted, I can find no mention of the presence of calcium in the scleral tissues, but its presence has been demonstrated for me by an analyst with the micro-spectroscope.

I think that I have made out a fairly strong case for supposing that progressive myopia is in reality a symptom of calcium deficiency. I have heard that the administration of Bemax has been of use in arresting progressive myopia. I have not had sufficient experience of its use as yet to speak of it as a substitute for calcium and parathyroid, but on observing its analysis table one sees that calcium is present in a fairly high proportion. Bemax contains vitamins, and they may assist in the introduction of the calcium into the tissues. Thus, if Bemax is really efficacious in arresting progressive myopia, its action may well be due to its calcium content.

I hope that this paper may induce other oculists to try the administration of calcium in cases of myopia under their care, so that they may see if they obtain results similar to mine.

In the Brit. Jl. of Ophthal., Vol. XI, No. 5 (May, 1927) Mr. D. J. Wood of Cape Town in his paper states that for some years he "had been aware that some ocular conditions are associated with or caused by a deficiency in the amount of calcium in the blood." He then describes several cases in young children suffering from myopia. He points out that progression goes hand in hand with calcium deficiency. This observation of his has certainly been borne out by my own. He also points out the necessity of prescribing parathyroid extract with the calcium.

Oxford Ophthalmological Congress
XXIInd Annual Meeting, 1932

The meeting of the Congress took place on July 7, 8 and 9 at Keble College, Oxford and the papers were read in the Department of Human Anatomy and in the University Museum.

The retiring Master, Mr. Bernard Cridland, extended a welcome to all those present and in particular to those who had travelled a long way to attend the Congress, among whom were Dr. Luther Peter of Philadelphia, Professor van der Hoeve (Leiden), and Professor Pascheff of Sofia. Mr. Cridland paid a special tribute to the Secretary, Mr. Russ Wood, whose work and efforts were invaluable to the success of the Congress.

He welcomed Mr. Cyril Walker as the New Master and performed the ceremony of installation.
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