REFRACTIVE ERRORS IN THE SOLDIER AND THEIR TREATMENT.

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The views on treatment advocated in this article are those of the writer, and should not be taken as an authoritative statement as to the treatment of refractive errors in the Army.

The soldier, like his brother in civil life, may, for optical purposes, be in one of three classes: the emmetropic, the hypermetropic, and the myopic, with their astigmatic variations.

We are often asked why we have not given glasses to Private So-and-So, and it is the purpose of this article to try and answer that question for the benefit of the medical officer in charge of effective troops, who is harassed by a company commander with an unduly large percentage of third-class shots.

With regard to the first class, the emmetropic, or normal-sighted, little need be said, except to comment on the relative rarity of perfectly normal vision.

The hypermetropes and hypermetropic astigmatics comprise by far the larger proportion of those who come within the purview of the ophthalmic surgeon, and also include a vast number of serving soldiers who, during their time with the colours, never feel the need for any aid to their eyesight.

The myopes in the Army, and in civil life, are a much smaller class; and it will be found convenient in this article to consider them first, as their needs are perhaps the most urgent, and are certainly the most simple and easily met.

Myopia or short sight is, roughly speaking, a condition in which the axis of the eyeball is too long for rays to be brought to a focus exactly on the retina.

The present standard of vision on enlistment is such that only myopes with a low degree of myopia (up to 1·5-2 dioptres) are able to pass the visual examination at enlistment, so that, as far as troops are concerned, the difficult questions that are met with in dealing with high grades of myopia do not arise. The myopic soldier's problem is simple. For all near objects his vision is clear and good. He does not get headaches but, when he goes on the range, he cannot see the target clearly, perhaps not at all. He cannot recognize his officers across the barrack square; he does not see the actors at the pictures unless he gets a front seat. With these disabilities it is obvious that it is usually early on in his career that...
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He is sent to the eye specialist; and in simple myopia it will be found that the prescription of a low concave lens will relieve him of all his troubles. Such glasses are always worth while prescribing; a low myope puts on his correcting spectacles and immediately looks through them on to a new world. Objects that before were indistinct now stand out clearly. He has no trouble in accommodating himself to the new glasses, he can put them on and off in the same way that we can use a pair of field glasses; and in taking them off suffers no derangement of his former vision. He wears them when he needs them and not otherwise.

Add to this the fact that the myope sees very poorly in the dark and, therefore, is at a great disadvantage as a sentry, and it will be seen how greatly he is helped by his proper glasses.

Before finally dismissing the myope, one might add that, for some reason not fully understood, the low grade myope is almost always of a fairly high grade of intelligence. In the public school classes this may be explained perhaps by the fact that his eyesight makes him inept at games and, therefore, he is driven to books; but this hardly applies to the class recruits are drawn from.

The facts which apply to the myopic soldier apply in slightly lesser degree to the man with myopic astigmatism. His refractive error will be a very low one; it may cause headaches, but probably not while he is employed on ordinary duties. He, too, is well worth his pair of spectacles.

When we come to consider the hypermetrope, and the hypermetropic astigmatic, we are faced with a very different state of affairs. In hypermetropia, or long sight, the eyeball is too short and rays of light are brought to a focus behind the retina; owing, however, to the accommodative power of the lens this can be successfully concealed.

The hypermetrope looking at the test types at twenty feet is in the same position as an emmetrope reading a book at two feet. He has to accommodate, that is, he has to alter the shape of his lens, making it more convex, to focus the letters clearly. The same applies to more distant objects in the higher grades of hypermetropia. In the young this power of accommodation is very great and remains at a high level in the young adult, gradually diminishing, till at the age of 40 to 45 the condition of presbyopia is reached, when it is necessary to supply a small convex lens to help the eye to read at normal distance (two feet).

In the Army at any rate, I think most ophthalmic surgeons will agree that there is a wide individual variation in the power of accommodation. In the writer's opinion, as long as the young soldier is not employed on clerical work or signalling, the more intelligent and resolute man appears to score over his more stupid comrades. The normal young soldier under 25 should certainly be able to overcome a simple hypermetropia of 2 dioptres,
and in many cases a considerably higher degree for all purposes of ordinary duty. I have known several men who were marksmen with a hypermetropia of 4.5 or 5.0, and who only experienced any trouble with their eyes on reaching 30 years of age, or when they attained the rank of C.S.M. with its attendant clerical duties.

This power of accommodation is, however, liable to a great falling off under any circumstances which throw an undue strain on the individual, such as ill-health, worry, climate, etc., and it is a common experience in India to find a soldier's eyesight decline from $\frac{2}{8}$ to $\frac{1}{8}$ within twelve months of his arriving in the country.

The cases of hypermetropia which the ophthalmic surgeon sees fall into two distinct groups, which for the most part require different consideration and treatment.

In the first group are those who report sick on their own initiative, chiefly for headaches. This group will be found to consist mainly of men who have recently been employed as clerks, or who are working for examinations, or signalling, or occasionally of old soldiers who are marksmen and find that they can no longer see to shoot properly.

The second group consists mostly of young soldiers who are sent off the range by their company commander, as they cannot hit the target, and a few older men who are third-class shots, and whom the C.O. wishes converted into first-class shots. The men in this group, unlike the first, make no complaint of any symptoms.

The treatment of these two sections of hypermetropes raises very different and much more difficult questions than the treatment of myopes.

Owing to his power of accommodation, the young hypermetrope unconsciously treats his own condition and, in consequence of this habit, is frequently unable to relax his accommodation fully when his correcting lens is supplied, with the result that the correcting lens plus his own accommodation render him temporarily myopic and makes his vision less keen than it was without any glass at all.

It is only by wearing his glasses constantly that he will learn to relax his accommodation sufficiently to get the benefit of them. Unlike the myope, he cannot use his spectacles as field glasses and take them on and off quite happily. These remarks, of course, apply only to the wearing of spectacles for distant objects. For near work, the hypermetrope will always feel the benefit of his correcting glass, though he may not be able to tolerate his full correction at first, owing to his inability fully to relax his own accommodation.

What then is the ophthalmic surgeon to do for these hypermetropic cases?

Group I is fairly simple. Those employed in clerical work should be given the strongest correcting glass they can tolerate up to their full correction; if they cannot tolerate full correction at first, the power of the lenses can be increased in six months' time. The warrant officer type will take his
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full correction for near work and may require a distant glass as well. These are not supplied by the Army, but he will generally purchase his own.

The signaller falls into a different category for treatment, and for the reasons advanced in dealing with Group II the writer has found that it is a better policy to recommend that he be relieved of signalling duties, except in special cases, than to prescribe glasses.

With regard to the men in Group II, one has to consider the following points:

1. The man has no symptoms and, as far as he knows, no disability.
2. It is quite possible for a man to be a marksman with 4:5-5:0 of hypermetropia.
3. Other factors than those of eyesight are involved in the production of a good shot; muscular co-ordination, adequate cerebration, keenness, etc.
4. A healthy young soldier ought to be able to overcome a refraction error of at least 2:5-3:0 without strain while employed on ordinary duty.
5. His ordinary duties do not involve any eye-strain.
6. The provision of glasses is allowed by Regulation only to increase a man's efficiency, not to assist him to gaze at Miss Greta Garbo or help him in his studies or the more lurid Sunday journals in his off-duty time.
7. The glasses to be of benefit must be worn constantly.
8. We may be quite sure that his own vanity and the concern of his C.S.M. and company commander for the smartness of the company will conspire together to prevent his wearing his glasses constantly.

Bearing these facts in mind, it will not be difficult to arrive at the conclusion that it is hardly worth while to provide a symptomless soldier with glasses that will only benefit him if worn constantly, the more especially as it is very doubtful in most of these cases whether the soldier's inefficiency as a shot is caused by defective vision.

The observations that apply to hypermetropia apply similarly to hypermetropic astigmatism, except that a lower degree of defect will involve a greater degree of disability, and will cause symptoms in soldiers performing ordinary duties.

It is therefore advisable in these cases to correct all but the lowest degrees, and to attempt to ensure the constant wearing of the glasses; though again it will be found that many natural forces conspire to prevent this, and that personal vanity will prefer headaches to spectacles, and inefficiency to the jest of the barrack-room.

To sum up, the provision of spectacles to the myopic soldier is always desirable; to the hypermetrope it is desirable only in certain cases. In the majority of the cases of young soldiers who are sent to the ophthalmic surgeon because they are third-class shots, it is a waste of public funds to prescribe spectacles to correct their refractive error.