MEDICAL PRACTICE

Clinical Topics

Eyes run on light

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A major series of articles on basic ophthalmology published recently in the *BMJ*¹ displayed a lacuna on one particular topic, prompted, no doubt, by shortage of space.

The nature of this lacuna may best be illustrated by a recent conversation I had with a registrar in ophthalmology. When I asked him what were the most important questions to ask when a patient complained of deficient or defective vision he gave several replies. Many had merit and included two responses which are almost universal from primary health care workers faced with a similar problem—namely, “Have you had your eyes tested recently?” and “Have you been to your optician recently?” When I suggested that there were only two correct questions—firstly, was it in fact correct that the individual could not read or see, and, secondly, were they using appropriate and adequate lighting—he answered, “But, surely that is common sense?”

Poor domestic lighting

It is indeed common sense that eyes run on light and that the most efficient optical appliances and medical and surgical techniques are likely to be ineffective in the dark. But, like so much common sense, the truth that eyes receive and measure light energy is so self-evident as to be largely ignored.

It has been estimated that 60% of British homes have insufficient lighting for ordinary visual purposes. This insufficiency stems not necessarily from the inadequacy of the primary light sources (though these often are deficient) but mainly from inappropriate arrangements of lighting and inaccurate beliefs—for example, about the desirability of having a small light sitting on the television set.

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Shortly before the second world war the then electricity board started a programme to promote better domestic lighting. These endeavours were soon lost in the energy-saving measures of wartime, when the 15-watt bulb on the staircase and the associated fractured femurs became a feature. Recently the electricity authorities have considered reviving their campaign for higher levels of lighting, better arranged. Apparently when the Department of Energy heard of this it tried to veto the suggestion, observing that extra use of energy by the populace should not be encouraged, even though the electricity authorities were talking about 60- and 100-watt bulbs, not electric heaters.

Much of the resistance to even attempting to understand the science of illumination probably arises because of difficulties introduced by units such as lux and lumens (and who knows what other more recent standards the SI classification has foisted on us). The Institute of Illuminating Engineers publishes a most comprehensive and efficient code on appropriate lighting arrangements for virtually every conceivable form of office and industry,² ranging from abattoirs to hospitals and woodworking shops. The needs of domestic lighting are equally well understood, and several straightforward explanatory texts are available.^{3-5 7}

A simple test

The ordinary health care worker who tries to treat the visual problems of patients does not need to know about the scientific units of illumination. Quite simply he needs to establish in any patient of any age who complains of visual difficulty whether the difficulty is an objective one rather than the patient's subjective impression. For example, when Granny is reported as being unable to read several options immediately present themselves: that she is wearing her distance glasses instead of her reading ones; that she has no real desire to read; or that, being elderly, she simply finds the effort of holding a book or paper steady for any length of time beyond her physical capacity (and how sad it is that mention of an ordinary bookrest is yet

another topic that seems to excite derision or incomprehension these days). This type of problem merely needs simple testing with either a practical reading type (see figure)* or an everyday object such as *Radio Times* or the evening paper to ensure that with these matters adjusted Granny cannot in fact read.

Common problems with lighting

If home lighting arrangements are examined a large number of easily remedied but major deficiencies will be found. Many concern the traditional single bulb hanging from a variety of shades situated in the middle of the ceiling. Simply turning round the furniture so that the incident light falls directly on the page may be more than enough to convert the non-reader into a contented customer. Alternatively, many people sit facing the window in daylight while reading. The only illumination that reaches the printed surface is that which has managed to inveigle itself through the window and the outside vegetation on to some other reflecting surface inside the room and thence to the printed page.

These problems are common in patients attending ophthalmic clinics. The patient who complains of inability to read at home happily reads the smallest print (N5) when this is adequately illuminated at the clinic desk and responds to the assurance that there is no apparent deficit in his reading ability with, "Oh, but I can't read that at home, doctor."

When such patients are advised about the importance of getting a better light they will often ask what is meant, and often they will proudly remind the doctor or health visitor that they have put a much stronger bulb in their traditional central ceiling-mounted light.

This leads to the second great law of common-sense illumination (the first being that there shall be light)—namely the manner in which to achieve adequate light. In relation to light the inverse square law states that the illumination on a surface varies directly with the power of the light illuminating the surface and inversely with the square of the distance away from the surface of that light.

When the patient has been persuaded that he or she does not need bigger, better, stronger, or, very occasionally, weaker glasses (or more particularly a tint), he will often ask how he can get a better light. The inverse square law provides a ready and in most cases a practical reply: "Move the light nearer."

Whenever inadequate or deficient lighting is suspected of forming part of an individual incapacity the simple measure of bringing the light nearer the patient will in many cases produce an increase in vision totally out of proportion to the simplicity of the solution.

In the closest to anything like a lux or lumens that I will resort to, I cite the example of the old lady who increased the strength of her ceiling light from 100 watts to 200 watts. That doubled the illumination to her *Radio Times* page. But if she had brought the 100 watts from eight feet away to four feet away (not unreasonable in domestic distances) the illumination on her page would have been quadrupled with no extra energy loss or increase in her dreaded electricity bill.

An adequate light

Added illumination on the object being looked at increases the amount of light available to, as it were, push its way past any impediments in the visual media, such as early cataract or

N. 18 The print which you are now reading is exactly the same size as that used in the large print books made especially for those with defective sight. There are several hundred titles and stocks are kept at almost all public libraries. Apart from the large print you will find that reading is greatly assisted by the use of a book rest.

N. 14 Not only is the power and distance of lighting important, but, in older people even when the eyes are completely normal it may be very difficult to see when sitting facing a light. When reading always ensure that the lighting falls obliquely from one or other side.

N. 12 It may not be widely known that it is fully in order for a consultant to order clinically necessary lighting appliances on an N.H.S. hospital prescription.

N. 10 It may well be asked, what is meant by good lighting? If you take a light away to twice the distance it has only a quarter of the lighting power which it had in its original position. Within practical limits any light 10 feet away can never be as effective as a much weaker one within a foot of the page.

N. 8 Eyes run on light in rather the same way as a car runs on petrol. There is little point in making repeated changes of spectacles if there is a strong possibility that lighting arrangements are at fault.

N. 6 This size of print is similar to that which is used in telephone directories. If you can read it now, but cannot read it where the directory is usually kept at home, this may be because the lighting arrangements by your telephone are not satisfactory.

N. 5 Printing of this size is only used for special purposes, for example the small advertisements and financial columns in some journals, for small index lines and references, and pocket bibles and prayer books.

vitreous opacities, or even to give added stimulation to an aging retina. It also increases pupillary constriction with a consequent increase in depth of focus. This may well enable the early presbyope who is experiencing difficulty with focusing to do without near-vision glasses for a little longer or to see that much closer and with greater range of focusing with the glasses he already has.

The lesson follows from these simple concepts that the vast majority of older people who experience any kind of visual difficulty, particularly with their near vision, should use some form of lighting system that delivers an adequate amount of light on to the printed page or other object of study; that does not shine into their eyes; and that can be deployed at a satisfactorily close range without undue heat or lighting disturbance to other occupants of the room.

While there are many forms of reading lamp and lighting appliance, most ophthalmic surgeons still consider that these aims are still best achieved by a traditional Anglepoise lamp, fitted with a 40- or 60-watt bulb, and with the narrow shade originally developed with the lamp. It should be used not only during the hours of darkness but at any time when the individual experiences visual difficulty. The only reasonable initial response to the cry, "I can't see" is "Are you sure you have got an adequate light?"

Understanding lighting

Understanding and implementation of the need for adequate illumination would drastically reduce ocular morbidity in Britain, particularly among the elderly. But there are also other straightforward improvements that can be made to improve vision through understanding illumination.⁸

A gradual reduction in the transmissibility of the ocular media, whether it be the cornea, lens, or vitreous, is natural with age. Such partial opacification can disperse transmitted light, producing an effect akin to that experienced when attempting to drive a car with a dirty windscreen in bright, oblique sunlight. As we drive from the open into the shade of a building, or trees, we suddenly see things much clearer.

Similar considerations apply in so many of the conditions in which there is a complaint of defective and inadequate vision. The common complaint of being unable to see bus numbers out of doors or to recognise other people in the street is so often caused by a "dirty windscreen" effect in the individual's eyes. This will not be overcome by changing spectacles, which in most cases have only recently been changed. Still less will it be affected by providing greater or lesser degrees of tint to the spectacles.

Where there is some degree of opacification of the media the retina wants all the light that can get to it. What is required is elimination of the glare effects from oblique lighting while still obtaining all the light possible along the visual axis. Tints will merely reduce the overall lighting. In such cases the wearing of hats, with appropriate brims, and the much more widespread use of car visors will often provide dramatic improvement. The persistence of "old ladies hats," is almost certainly due to their wearers' unconscious understanding that they can see better with their hats on.

Another common problem arises when elderly people move into new picture-windowed flats and council homes and immediately complain of visual disability. The health visitor calls on them, discovers the drawn curtains, and chides them for their lack of appreciation of the beautiful view. The old people have insufficient knowledge to explain that being elderly, with sclerotic ocular media, they would really rather prefer to live in dimmed surroundings. The health visitor or doctor who commends their understanding and ensures that they provide themselves with personal reading lamps, preferably of the Anglepoise type, has earned a substantial bonus from the finances of the social services.

There are, of course, many other aspects of illumination, relating to such matters as reflectivity, glare, and intolerance of certain kinds of lighting. The widespread dislike of fluorescent lighting relates not to the nature of the light emitted, but to the variability of frequency and lack of synchronisation between multiple fluorescent units with associated unconsciously perceived flicker. But, like lux and lumens, thorough understanding of these factors, though valuable, is much less important to a major amelioration of the visual lot of the nation than a widespread understanding of the simple matters about illumination.

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What is the treatment and prognosis of milk allergy in a 3-month-old baby?

Cows' milk protein allergy can result in a wide variety of symptoms ranging from mild eczema, through gastrointestinal disturbances with failure to thrive, to severe life-threatening angio-oedema. Complete avoidance of the allergen, particularly for the more severe manifestations, is usually the only reliable treatment. Unfortunately, milk antigen is present in many commercially produced infant foods, and parents must check the contents of all feeds very carefully. Some children have intolerance not only to cows' milk but also to other allergens,¹ which will confuse diagnosis and hinder successful treatment. Recent publications have suggested that high dose sodium cromoglycate may offer some protection from food allergens,^{2,3} but this remains to be proved. Antihistamines do not usually help, except to relieve urticaria, topical steroids are helpful for eczema, and adrenaline would be required for anaphylaxis. Prevention of the problem seems to be the most positive approach at present,^{4,5} but this is no consolation to those patients already sensitised, and complete breast-feeding does not guarantee protection.⁵ It is generally thought

that cows' milk allergy becomes relatively less of a problem with age, but there are no satisfactory prospective studies to prove this. Furthermore, many older atopic children have histories suggestive of food allergy in early infancy. The prognosis of milk allergy in infancy is, therefore, still uncharted territory.

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Are individuals with Down's syndrome invariably sterile?

Children with Down's syndrome are mostly but not always infertile, and if a female sufferer has a child there is an almost equal chance that the child will be normal.¹ The subject was reviewed in 1970.²

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