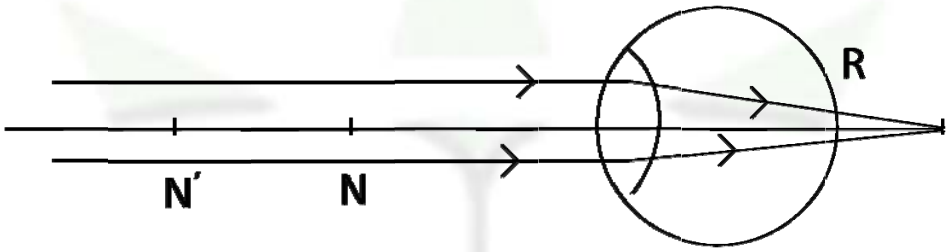
Hypermetropia (Long sightness)

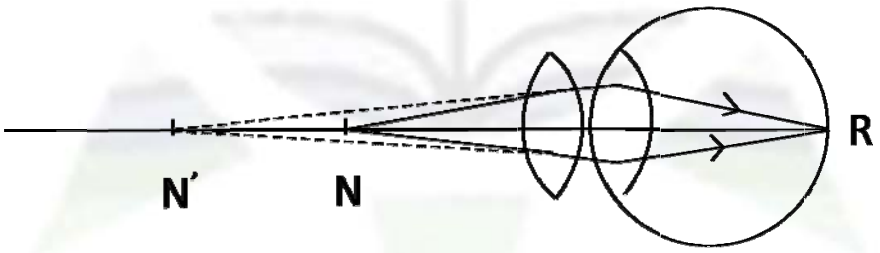
(2)**Long sightness (Hypermetropia):** Long sighted people can see distant objects distinctly but cannot see nearer objects. Due to some reason normal focal length of eye lens increases i.e. normal power p1 of eye lens decreases and hence parallel rays from distant object come to focus behind the retina. Hence to see distant objects focal length of eye lens is decreased by exerting pressure with the ciliary muscles i.e. accommodation starts right from infinity.

As the objects moves towards the eye, accommodation continues since it has been started earlier it will be exhausted earlier that is it will get exhausted at N′, much before reaching the near point N for the normal eye. Thus for this defective eye near point has shifted from eye.



Remedy: Since the normal power P1 of the eye lens has decreased hence to increase the equivalent power P (P>P1) a power +P2 should be added to P1 i.e. and auxiliary lens convex in nature should be used.

The auxiliary lens produces the image of the object kept at N (near point for the normal eye) at N′ this image serves as object for the eye lens, image is now produced at retina by eye lens. Therefore object kept at N can be seen.



Calculation:

Given x & D = least distance of distinct vision for the defective eye and the normal eye respectively.

let f = the focal length of the auxiliary lens.

Using the formula for a lens $\frac{1}{-x}+\frac{1}{D}=\frac{1}{f}$

$$\frac{1}{D}-\frac{1}{x}=\frac{1}{f}$$

$$f=\frac{xD}{x-D}$$

$\because x > D$ hence f is positive, the auxiliary lens must be convex.