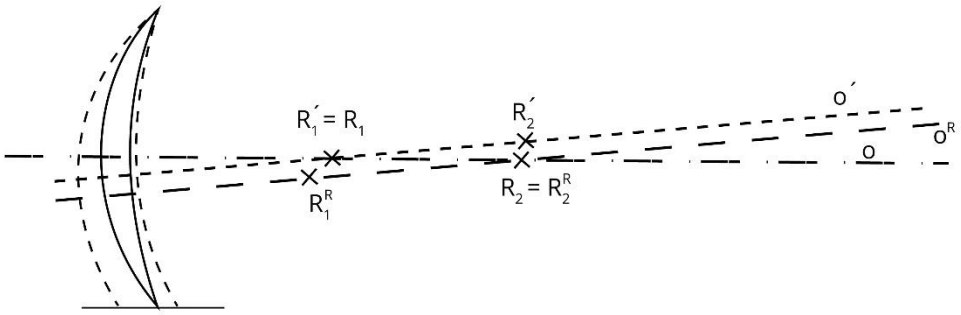
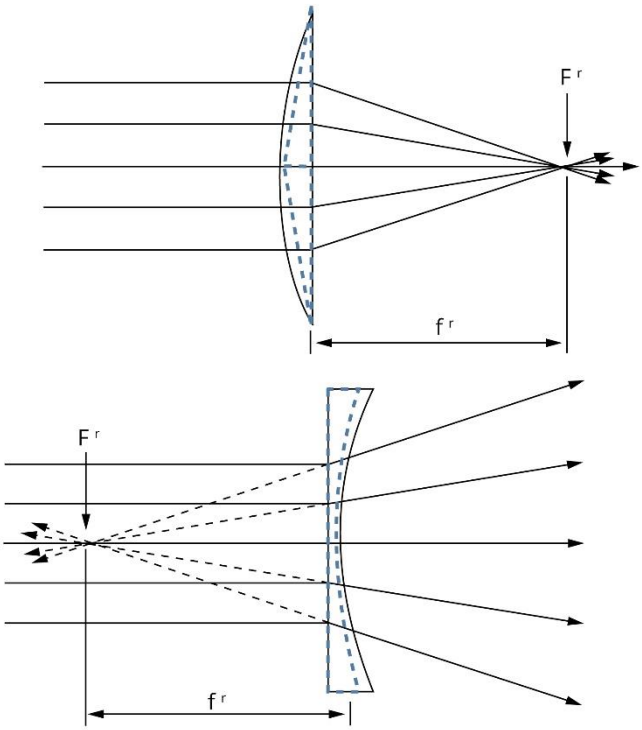
10 Prismatic effect of spherical and cylindrical lens inducement on lensmeter

10.1 Introduction

Prismatic effect of the spectacle lens can be induced by lens decentration and during lens manufacturing. Currently it is preferred prismatic effect manufacturing. De-centered lens with prismatic has different place for optical and geometric point. Contrarily manufactured prismatic lens has optical and geometrical point in one place. This lens could be centered according the basic point imaging rules.



Picture 10.1: Manufacturing of prismatic lens (Rutrle 1993).



Picture 10.2: Plus and minus lens with optic prismatic inside (F – focus, f – focusing distance, 2020mag.com 2013, adapted)

10.2 Goals

- Induce prismatic effect in spherical spectacle lens
- Induce prismatic effect in cylindrical spectacle lens

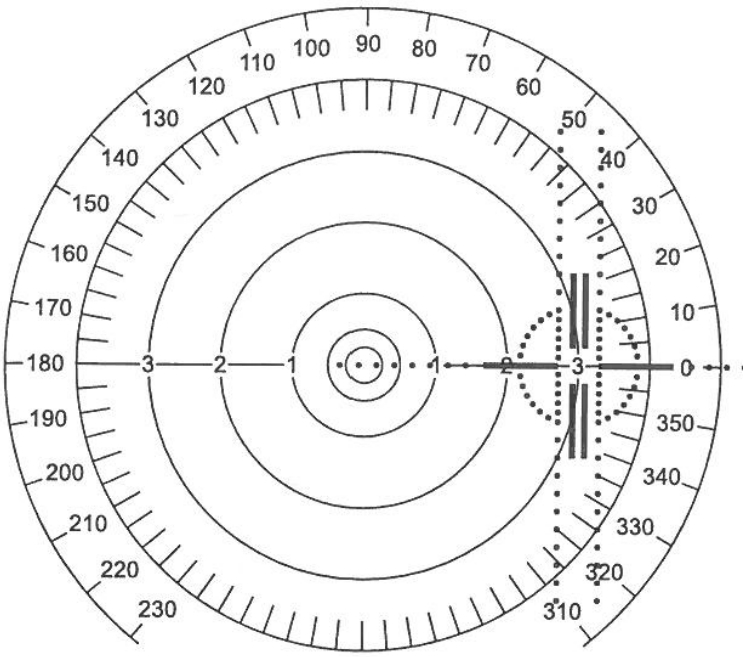
10.3 Equipment

Lensmeter, spherical and cylindrical lens.

10.4 Methods

Induce prismatic effect in spherical spectacle lens

Let's induce prismatic effect 1 prism diopter BI (OD). Use mechanical eyepiece lensmeter. Every circle in lensmeter means 1 prismatic. At first put the lens in the lensmeter's rest device. Further according to TABO-scheme de-center lens to induce 1 prismatic BI (OD). Finally with the lensmeter's marking device mark the lens' important points. After removing the lens from lensmeter mark the lens' base position.



Picture 10.3: Inducing of prismatic in spherical lens with de-centration (Rutrle 2001)

Induce prismatic effect in cylindrical spectacle lens

Rotate cylindrical lens in higher cut to axis 180 and shift the lens to induce 1 prismatic in base 270 degrees. With help of marking device mark centering important point on the lens. You need to know base of the prismatic and value of the prismatic.

10.5 Results

Induce prismatic effect in spherical spectacle lens

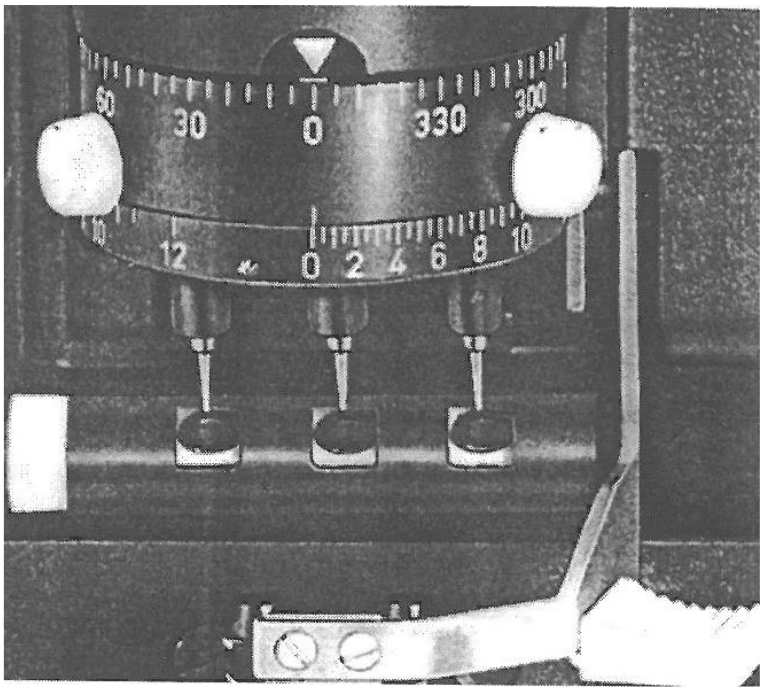
Draw schematically de-centration of spherical lens like you did it in lensmeter. Draw black TABO-scheme, green test mark and lens with de-centration

Induce prismatic effect in cylindrical spectacle lens

Draw schematically de-centration of spherical lens like you did it in lensmeter. Draw black TABO-scheme, green test mark and lens with de-centration

10.6 Discussion

Prismatic lens are used for correction of heterophoria and heterotropia. Prismatic lens helps to eye muscle to keep single eyepiece vision without diplopia. If we de-center plus lens we shift centering point against the basis and if we de-center minus lens we shift centering point to the basis. The size of de-centration is showed on lensmeter's circles or we can calculate de-centration with help of Prentice formula. If we have high prismatic effect we can use prismatic compensator from the lensmeter. If we use digital lensmeters we can read decentration in millimeters or prismatic diopters right from the display.



Picture 10.4: Prismatic compensator on projecting lensmeter (Rutrle 2001).

10.7 Conclusion, notes, comments

Which aberration does you know appear in lenses with high prism?

If we correct esophoria where we place the prismatic basis?