Coll. Antropol. **37** (2013) Suppl. 1: 133–136
Professional paper

Comparison of Spectacle Classical Progressive and Office Progressive Lenses

Marek Kozlík and Libuše Nováková Knollová

Masaryk University, Faculty of Medicine, Department of Optometry, Brno, Czech Republic

A B S T R A C T

This paper elaborates on analysis of progressive spectacle lenses, to correct presbyopia, which are nowadays offered at the market. The paper describes different types of progressive lenses, their parameters, length and width of their progressive segments. It also describes degressive spectacles lenses – progressive lenses on middle and near distance. The main part of the paper is a comparison of functional differences among different types of progressive spectacles lenses. The paper also addresses correctness of choice of progressive lenses for different works and professions. Lastly, it elaborates on differences of centration of different types of progressive lenses and parameters for correct choice of glasses frame for progressive spectacles lenses.

***Key words**: progressive spectacles lenses, progressive segment, degression, addition*

Introduction

The progressive spectacle lenses are other option to correct ametrops in presbyopic age. These lenses are nowadays the most advanced lenses on the market. They do not have any transition edges from an aesthetic point of view and also show no jump of image. The upper part of the lens is for correction to the distance and the bottom to the near. Both parts are together connected with progressive corridor (Figure 1). There is a continuous increase of dioptric value addition towards to the bottom of the lens.

Ideas and the first attempts to design progressive lenses are dated back to 1909. The first successful attempt which was patented was launched by Grandperret in 1956.

Lenses manufactured by ESSILOR called »VARILUX 1« are considered as the first generation of progressive lens. The design of the lens was symmetrical, hard and with progression on the front (convex side) of the lens surface. In 1965 there was launched an analogue of the lens called »VARIPLAS« with progression on the back (concave) surface.

The second generation of progressive lens »VARILUX 2« was invented in 1972. The lens had asymmetric corridor which was in two versions (soft or hard) according to the width and length of the corridor.

In 1988 the third generation lens »VARILUX MULTI--DESIGN« was created. As the addition of design increases, the hardness of design increases at the lens.

The fourth generation of progressive lenses called »VARILUX COMFORT« came to the market in 1993. This lens has a short progressive corridor with features of soft design. It was possible to achieve 85% of addition 12 mm below the centre mark. Lately progressive atoric area located at the rear of the lens was used. These lenses were introduced on the market in 1998 under the name »GENIUS GRAND« by the company SEIKO.

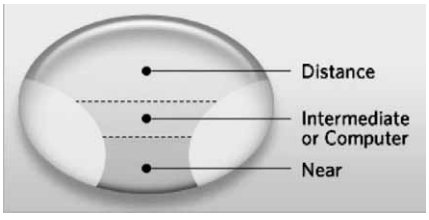

Fig. 1. Diagram of multifocal lenses.

Received for publication June 25, 2012

After two years, in 2000, the fifth generation appeared on the market. The lens was characterised by advanced progressive corridor and was given a name »VARILUX PANAMIC«.

The sixth generation of lenses brought the big leap in the production. A new production technology called Free-Form that is based on CNC machines with 3D tool began to be used. This technology is able to sharpen any shape on the surface of the lens. The sixth generation with the aspherical front surface and using the Free--Form technology on the back surface were launched under the name »MULTIGRESSIV 2«.

The new method of manufacturing called Free-Form by firms ESSILOR and SEIKO in 2000 was used for the production of atoric progressive lenses by the companies ZEISS and Rodenstock. The first lens with the progression on the front and back surface called »DUAL ADD« was launched by Johnson & Johnson. The company HOYA introduces dual integrated surface »Hoyalux ID« The progressive aspherical front surface ensures a continuous dioptric change values in the vertical direction and progressive aspheric on the rear surface provides a continuous change in the horizontal.

The progressive lenses are nowadays produced from plastic materials with different refractive index. Glass as a material is for this type of corrective lenses on decline and is used in a very limited extent.

On the market at the present days there are many variants of progressive lenses in terms of design as well as progressive corridor length. Customer can choose the most appropriate optical power and size of the addition of progressive lenses. With regard to the very wide range of offered lenses a large part of these lenses are economically affordable. There is not also much price difference between certain types of multifocal lenses and trifocal lenses.

The most modern lenses with the highest possible viewing comfort are »individual« progressive lenses. These lenses are tailored to a person. They have progression on the front and rear surface. They are manufactured not only according to parameters such as vertex distance, inclination, size frame, but also the shape of the frames, lifestyle and current correction, etc.

A special sort of multifocal lenses are »office lenses«. These special lenses are designed for a work in the office, at middle and near distance. The basic parameter of these lenses is value of optical power at the near distance. The other parameter is a degression (the opposite of addition). The degression is deducted from the optical power at the near distance according to what the maximum distance is where the client needs to see. There is the correction at the near distance at the bottom of the lens and the correction at the middle distance in the upper part at the digressive lenses.

In contrast to the bifocal or trifocal lenses progressive lenses bring many advantages.

Advantages:

- good aesthetic
- continuous transition of optical power
- more types of designs
- vision at all distances
- wide variety of types
- affordability

The progressive lenses are the most commonly used correction for presbyopia on the base of these benefits.

Classic Types of Multifocal Lenses

These lenses are used as a tool to correct presbyopic patients. They are used for looking into the distance – the normal viewing distance, driving, middle-distance – work on a computer and at close distance – reading, writing, ect. There is nowadays a large number of progressive lenses of this type on the market. As shown in Figure 2. they differ in:

- Width of the zone at the far distance
- Progressive corridor width
- Progressive corridor length
- Width of the zone at the near distance
- Length of the zone at the near distance

All these parameters are very important to know when a selection of glasses is made. The most appropriate types of lens should be chosen according to these parameters and client needs. Of course, as growing vision comfort of client (wider zones of lens) the price increases.

Fig. 2. Types of progressive corridors.

Fig. 3. Visualization of progressive lenses for office use.

Office Progressive Lens

A special type of progressive lenses is lenses for a work at computers. They are called office progressive lenses. This type of lens is not designed for correction of ametropia, but only for correction of presbyopia. They are mentioned as a complement to the progressive lenses at this paper. Their primarily use is the correction for customers who need to see at near and middle distance at the same time such as work at a computer (Figure 3). A sufficient width of channel on medium and near distance is a significant advantage compared to conventional progressive lens.

It is possible to choose from different types of office progressive lenses which are specially adapted to the nature of the work at the computer. It depends whether the customer only needs to see on the computer, keyboard and documents, or whether he works at the computer in an open area where he needs to see on different distances (such as a desk in the bank, etc.).

Centration of this type of spectacle lenses is performed as well as progressive lenses. The centre cross mark of lenses is placed at the centre of the pupil at native look into the distance.

Another possible correction for work at the computer is degressive lenses. The lens is monofocal lens with degression. The lens is manufactured according to the correction to near distance and decrease of refraction power – degression. The refraction power decreases as the patient looks up according to degression. The most common values of degression is –0.75 D which is suitable for young presbyopes at aged till fifty years and the value of –1.5 D for the users over fifty years old.

This type of lens is centred according to pupils distance to the near horizontally and the centre of the eye rims of spectacle frames vertically.

Individual Progressive Lens

Progressive lenses have become a part of our optical life. Their development has significantly changed and accelerated for last three years. Classical (standard) progressive lenses have been gradually shifted to lenses which are prepared on individual basis. The reasons for these changes are an increasing in individual needs of users and a new method of production technology. Due to today there are advanced PC controlled manufacturing machining that are able to create every curve, shape and surface of the lenses with a high accuracy, the users' differences can be taken into account.

While in the past the value of pupillary distance and parameters of the spectacle frame were assigned to preciously make glasses, today these values are taken in account directly in the design of manufactured lenses. Other important parameters are the vertex distance, spectacle frames inclination. More complex parameters opticians provide to manufacturers, more individually prepared lens can be produced. Entering of the parameters leads to optimization.

REFERENCES

1. NOVÁKOVÁ KNOLLOVÁ L: Srovnání parametrù a materiálových vlastností brýlových èoček na èeském trhu, Masaryk University, Brno, 2012. — 2. LAVÁKOVÁ K: Vývoj optických èlenù pro korekci ametropických presbyopù, jejich optické principy, správná centrace souèasných multifokálních. Masaryk University, Brno, 2011. — 3. ŠTROFOVÁ A: Free-Form technologie výroby brýlových èoček. Masaryk University, Brno, 2011. — 4. Hoya Lens CZ a.s., Available from: URL: http://wwwhoyavision.

M. Kozlik

Pustkovecka 187, Ostrava – 8, 708 00, Czech Republic
e-mail: marek.kozlik@centrum.cz

KOMPARACIJA NAOČALA KLASIČNIM PROGRESIVNIM I »OFFICE« PROGRESIVNIM LEĆAMA

S A Ž E T A K

Opisuju se optičke karakteristike, danas najčešće upotrebljavanih progresivnih leća, osobito kod presbiopije. Iznosi se studija o promjeni različitih progresivnih leća u određenim profesijama. Na kraju studije opisuje se centriranje raznih tipova progresivnih leća, kao i adekvatni odabir naočalnog okvira.