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Identify the Main Problems in the Manufacture for Cementing lenses and Methods of Treatment Practically

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ORIGINAL ARTICLE

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Identify the Main Problems in the Manufacture for Cementing lenses and Methods of Treatment Practically

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Abstract

Background: cementing lenses is consist of different types of lenses made up of two or more simple lenses paired together to reduce and eliminate all types of aberration to obtain the best image.

Objectives: The aim of this study was to solve the problem that occurs in the process of gluing the lenses or in fixing the double lens to the frame, as well as reducing the jumping (J).

Material and Methods: 100 cases were selected from patients who wear different types of glasses by virtue of age or according to the patient's need and who attend the educational clinic for optical refining at the College of Health and Medical Technologies – Baghdad for the period from 1-9-2022 up to 1-3-2023.

Results: The most of the patients were found working in the field of education. The number of males from the teaching staff was 80%, while the females were 20% under study and the number of patients who wear double (Bifocal) lenses is 67% out of 100%.

Conclusion: The lenses must not be exposed to heat more than (25°C) during the cement process, which causes their center to mismatch (the far lens does not match the center of the segment lens). After we knew that most of the patients needed this type of glasses, depending on their work in the field of education (under study).

Keywords: Cementing lenses, Jumping (J), Bifocal lenses, Epoxy resin

1. Introduction

As you reach your 40's, you may find that your eyesight has changed, necessitating some type of vision correction. If that's the case, bifocal lenses may be options you should consider. cementing lenses is consist of different types of lenses made up of two or more simple lenses paired together in the glass or plastic lenses [1]. To reduce and eliminate all types of aberration, including chromatic aberration, to obtain the best image Which is used in bifocal lenses [2]. Such an arrangement allows more optical surfaces, thicknesses, and formulations, especially as the space between lenses may be considered an "element". With additional degrees of freedom.

Bifocal lenses come in a variety of designs with various piece sizes and shapes. The D-shape is the most typical shape (section 28 mm wide). Also, the space is large enough for reading while yet allowing for clear view below the line of vision, which makes moving around much simpler than in a space that is larger. There may be circular, rounded, or sections that span the entire width of the lens [3].

The method of cementing for several forms of cementing, including optical contact by After thoroughly cleaning the surfaces of any dirt, adhere the two lenses by using strong pressure using epoxy resin- 650 or another type of cement [4, 5].

The three main drawbacks of bifocal glasses are the image jump (J) that occurs when the visual axis shifts

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from the far vision segment to the reading segment, the prismatic effect (P) on the near vision point that causes the fixed object to appear to be moved, and picture blurring. The image displays its mechanical dimensions to make the procedure of fitting the lenses together easier [6].

Lenses with two distinct optical powers are known as bifocals. These are simply two lenses that have been fused together [7]. The smaller "segment" connected to the lens' main portion is typically utilized for close-up work, whilst the main portion of the lens is typically employed for long distance [8]. It is simple to think of segmented lenses, such as separate single vision glasses in an era where the majority of presbyopia patients who need a distance prescription prefer progressive power lenses [9].

It is utilized for those over 40 years who are presbyopia and require an optical correction for two different distances, such as reading and long distance, because it eliminates the need for them to carry two sets of glasses with them. They may be helpful for drivers who need to be able to view their instruments clearly from a distance. Individuals who work at a desk all day may prefer a main lens with an intermediate correction and their reading power in the segment [10]. In the process of optically cemented lenses, no matter whether the resin glue method or the photo glue method is used, it must be centered to ensure that the optical axes of the positive and negative lenses coincide, otherwise it will affect the image quality of the optical system. Cementing different types of cementing such as (Optical contact, Cementing by epoxy resin-650 and others) [10]. Bifocal patients may feel the segment is too high for their needs and a frame with adjustable pad on arms can facilitate the raising or lowering of the lenses. Even where there is no adjustment in the bridge the effective height can be altered by adjusting the tilt – increasing it has the effect of lowering the heights and making it flatter has the effect of increasing the height [11].

Problems occur during work in fixing the double lens in the patient's frame and in the process of gluing the lenses in the source, causing problems Image jump (J) that mean the shift of image that an individual experiences when passing from the distance portion of a lens into the magnifying segment area in a lined bifocal. There are commonly prescribed to people with presbyopia who also require a correction for the reflective error [8] tilt can cause issues with bifocals. it can be seen that if a D-shape 28mm segment top aligns with the lower limbus then a patient with an average 10mm diameter iris will have the distance optical center 0.5mm below patient center if the segment drop is 5mm. The distance optical center

Fig. 1. Trail case.

should be placed 5mm below pupil if the frame has an average tilt of 10 degrees. With high prescriptions, especially those with significant astigmatism this may cause the patient problems relating to oblique astigmatic error [12].

To ensure that the wearer can comfortably use both the far and reading portions of the lens, the near segments should typically be positioned with the segment top at the. The lower lid position is frequently used by patients as the segment top reference position, but it is important to keep in mind that this point's distance from the patient's center can vary significantly, for instance if the patient has asymmetric eyelids. The lower limbus position is a more reliable marker3mm, and its location must be inferred in cases where it cannot be observed [13]. The overuse of bifocal lenses has given rise to a number of issues, including blurry vision, headaches and astigmatism, Individuals were instructed to move from top to bottom while wearing bifocal lenses (shifting from far to near sight) [2].

2. Materials and methods

Among patients who attend the educational clinic for optical refining at the Faculty of Health and Medical Technologies Baghdad for the period from 1-9-2022 up to 1-3-2023 and who wear various types of glasses by virtue of age, 100 instances were chosen. They conducted the necessary medical evaluations, including tests to determine their visual acuity (VA), level of vision, Internal pupillary distance (IPD), and kind of strabismus. Renewing the medical prescription for patients by examining it with the following devices and equipment in (Figs. 1, 2 and 3).

The lenses must not be exposed to heat more than (25°C) during the cement process, which causes their

Fig. 2. Auto refractometer.

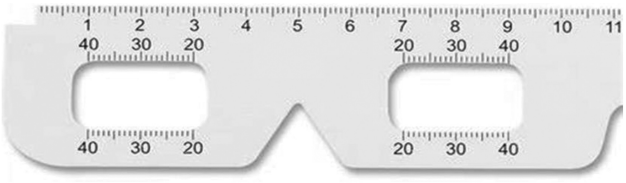

Fig. 3. Printable PD ruler in mm.

center to mismatch (the far lens does not match the center of the segment lens). Choosing a smaller frame to avoid the deviation that occurred in the reading area (segment), Carrying out the sliding process in the center of the lens to avoid manufacturing errors resulting from the origin without vision problems.

2.1. Ethical consideration

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. All subjects involved in this work are informed and the agreement was obtained verbally from each one before conducting the study. The study protocol and patient consent forms were reviewed and approved by College of Health and Medical Technology, Middle Technical University.

3. Results and discussion

In the current study, a total 100 patients included 80 males and 20 females, the smaller age of group in the samples was between (40–41) years (presbyopia) 27%, (41–42) years in percentage 61% and more than 43 up to 45 years = 12%. Table 1 shows the relation between age (years) & gender.

Table 1. The relationship between patients (gender/age in years).

Gender/Age (years)	Male	Female
40–41	15	12
41–42	28	6
42–43	17	2
43–44	12	–
44–45	08	–
total	80 = 80%	20 = 20%

Table 2. The relationship between patients who wear different types of medical glasses and ages (years) before treatment.

Glasses/Age (years)	Eye-glass	Bifocal	Progressive
40–41	6	18	3
41–42	4	25	5
42–43	8	10	1
43–44	4	8	–
44–45	2	6	–
total	24	67	9

Table 3. The relationship between methods of treatment with age (years).

Methods of treatment/ age	Before change the frame	After treatment	By using physical treatment	Strabismus patients	Others
40–41	18	12	2	–	4
41–42	25	16	4	3	2
42–43	10	4	1	–	5
43–44	8	3	1	2	2
44–45	6	2	–	–	4
total	67	37	8	5	17

In Table 2, it was found that 24% of people (single vision) wear eyeglasses, 67% (double vision) use bifocal lenses, and 9% (progressive lenses) was between the ages of (40 and 45). Most of patients are used between the ages of 40 and 42, and 9% of patients who use progressive lenses are more than 40 years old.

The issue was resolved by switching to a smaller frame size that matched the shape and size of the patient's face, and a significant portion of the treatment under study was completed. Patients who wear bifocal glasses and have problems with glasses due to manufacturing errors 67 patients (This table represents the relationship treatment methods) before and after treatment with the age such as in Table 3.

We have observed that the majority of the defects in the double lenses are caused by the original 60%, while the remaining 40% were the result of the workers' efforts to install the lenses in the frames, either because they lacked experience installing the double lenses or because they made a mistake in the arrangement of the lenses or their work.

4. Conclusion

Most of the patients under study are faculty members in medical colleges and institutes, and from the

age of 40 years and over (presbyopia), the shape we most like to examine and most commonly known as the D-shape, and some patients do not want to wear double glasses or leave them (neglect) as is Table 3 also shows the emergence of many problems due to misuse of bifocal lenses, including blurred images, headaches, and astigmatism. Some problems, including jump in (J) were eliminated or reduced by providing instructions to the patient not to move quickly from top to bottom and training workers on the process of cement glass and plastic lenses after providing appropriate conditions for the gluing process, including cleanliness and room temperature (T). And the ease in the process of separating the two lenses due to the appearance of a gap between the two surfaces, which causes the two axes to mismatch. The lenses must not be exposed to heat exceeding (25 °C) during the cementation process, which will lead to a mismatch in their center (distal lens does not match the center of the section lens). After we learned that most patients need this type of glasses, depending on their work in the field of education under consideration.

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Conflict of interest

The authors declare that there is no conflict of interest.

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