A Study of the Best Specifications of Lenses (Polycarbonate) and the Least Used in Baghdad

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Abstract

The lack of the use of polycarbonate lenses that have the best characteristics compared to other lenses (glass or plastic) by patients in Baghdad. (50) patients were chosen who wear different types of glasses with different lenses. 35 males' patients and 15 patients were females in the educational clinic for optical techniques in the College of Health and Medical Technologies-Baghdad, a period of 8 months was spent for the age groups of 15 up to 22 and were potential scientific students. Most of the devices for eye examination was used, and preparations were taken for comparison between the lenses in terms of the basic specifications of the work. our study shows 84% of patients do not wear polycarbonate lenses or others, as well as 60% of the patients do not have any knowledge of the polycarbonate lens, also the failure to provide the required equipment to manufacture such lenses in Baghdad, which caused poor acceptance of patients to wear them, in addition to the high price compared to other lenses.

Keyword: *Polycarbonates, SpecificationsCR-39, Equipment manufactures of PC Lenses.*

دراسة أفضل مواصفات العدسات (البولي كربونات) والأقل استخداما في بغداد

أ.م.د. منذر سمين شكر

الخلاصة

بسبب عدم استخدام عدسات البولي كربونات ذات الخصائص الأفضل مقارنة بالعدسات الأخرى (الزجاجية أو البلاستيكية) من قبل المرضى في بغداد. تم في هذه الدراسة اختيار جميع المرضى (50) الذين يرتدون أنواع مختلفة من النظارات بعدسات مختلفة. بلغ عدد الذكور 35 مريضاً و15 مريضاً إناثاً في العيادة التعليمية للتقنيات البصرية في كلية التقنيات الصحية والطبية – بغداد، خلال فترة 8 أشهر للفئات العمرية من 15 إلى 22 سنة وكانت ذات إمكانيات علمية من طلاب. تم استخدام معظم الأجهزة الخاصة بفحص العيون واتخاذ الاستعدادات للمقارنة بين العدسات من حيث المواصفات الأساسية للعمل. تبين من خلال دراستنا أن 84% من المرضى لا يرتدون العدسات البولي كربونات و60% من المرضى ليس لديهم أي معرفة بعدسات البولي كربونات، وفضلا عن عدم توفير المعدات اللازمة لتصنيع مثل هذه العدسات في بغداد مما تسبب في ضعف قبول المرضى لارتدائها، إضافة إلى ارتفاع سعرها مقارنة بالعدسات الأخرى.

الكلمات المفتاحية: *البولي كربونات، المواصفات البلاستكية، الشركات المصنعة بالمعدات الخاصة بعدسة البولي كربونات.*

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Introduction

Polycarbonates (PC) are a class of carbonate-containing thermoplastic polymers. They may be easily manipulated and molded to assist fit into various materials and are used for a range of produced items**.** The most commonly used type is CR-39 lenses, however when compared to regular plastic lenses, polycarbonate lenses (PC) are made of a form of plastic that is more impact-resistant. They are regarded as a plastic with a high index (n=1.591). Additionally, (PC) lenses feature UV [1][2] built-in protection. It means that PC lenses are a type of tough yet lightweight material used in eyeglasses**.** They are made to be thinner and lighter in weight, as well as to endure impact, scratch, and rectify (refractive error) eyesight problems [2]. Since making their debut in the 1980s, PC lenses have grown to be one of the most widely used lens materials for glasses. It can be used in both safety glasses or goggles; they're often found in children's and sports men and in fashion eyewear [3]. They are particularly distinctive since they are utilized to make smart devices and electronic components in addition to lenses. [4،5]. They're also the lens of choice for highly active people and kids. Since the 1980s, when PC lenses were first made available to us, they have improved the optical industry.

A lens with UV protection is a need because it is smaller and more durable than CR-39. They are renowned for being lightweight and protective, however glass needs a UV coating while PC completely prevents UV rays [5]. Along with other eye conditions, this can include cataracts [6]. PC lenses cost (expensive)more than their plastic CR-39 counterparts; however, the price can be brought down with vision insurance and frame allowance. While plastic lenses are generally cheaper and these types of lenses can be tinted easily [7]. typically have a higher price tag than other eyeglass lens and durable as material but a lens that's optically clearer provides a better picture. as shown in Table (1). The extent of its resistance to breakage and shock has also been tested 10 times more than others [8], PC lens is a naturally soft material, making it more subject to scratching without adequate protection with a scratching-resistant coating (SiO_2) as show in figure (1) Show number of scratches on the surface of the plastic lens for PC lens.

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Fig. (1): Show scratches on the surface of the Polycarbonate lens.

When CR-39 lenses were originally introduced in the 1939s, they completely changed the optical industry. these lenses are much less likely to break. They are made of polymers (PMMA), just like PC lenses, which aid in the durability of the lenses. Depending on the prescription, CR-39 lenses could be thicker than PC lenses [9].

PC is less scratch-resistant than glass, hence anti-scratch coatings are more common among those who use glasses. Better images are produced by lenses with greater optical clarity. Binoculars, telescopes, and cameras all use glass because it excels in this area. Its advantage does not imply that PC lenses do not produce clear images; rather, glass provides images with greater clarity glasses are thinner and lighter than regular plastic lenses. They provide 100% UV protection and are up to 10 times more impact-resistance than plastic or glasses lenses. IF anti-reflective coating is applied to the lenses of polycarbonate glasses, they can also provide clearer and more comfortable vision [10], which can remove distracting lens reflections that impair vision, especially when driving at night or in other low-light situations when glare sources are present. [11]. In addition to the possibility of the PC Lens which cannot be shattered, whatever the patient working conditions than others, as show in figure (2).

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Fig. (2): shows an unbreakable polycarbonate lens.

Everyone has their own recipes. We provide CR-39 and PC lenses. In terms of your glasses, having options is always a plus. Your lenses play a critical role in the wellbeing of your eyes, the clarity of your vision, and the general comfort of wearing glasses. All of the lens sets we sell also come with extra AR coating as an additional choice to keep your eyes healthy and glare-free. For children's safety, [12] Here are a few differences between the two lenses in the table (1) below to determine which one is better for our lives.

Table (1): shows the most important scientific differences between the two kinds of lenses.

Items	Polycarbonate (PC).	Plastic (CR-39).
Impact resistant	10 times stronger	Low impact resistant.
Weight	Light weight	Heavy (40%)
Scratch resistance	less scratch-resistant	more scratch-resistant
Cost	Experience	Cheaper
Index(n).	1.59	1.499
Manufacturing	Difficult- Operation	Easy
Fits all kinds of frames	Plastic Frames	all kinds of frames.
Tint lens	resistant to tint compared	Easy tint.
flexibility	More flexibility	Less flexibility
provide	100% UV protection	plastic do not provide
optical clarity	polycarbonate lenses low optical clarity.	Plastic glasses have a higher.
Thickness(mm)	3.7 (-2.00Ds)	4.0 (-2.00Ds)

Material and method

50 patients with ages of 15 – 22 years who wore medical glasses of different types were selected from among the students and auditors to participate in the educational clinic for visual technologies in the College of Health and Medical Technologies, Baghdad, the study was done since August 2022 to April 2023. For a period of 8 months of age, gender and diseases that the student

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suffering from reasons for not wearing glasses, no of students were 35 cases of males. Within the framework of our investigation, there were 15 female cases, the patients under our study were examined in the above clinic in order to find out what problems they had with the use of all optical devices [13].

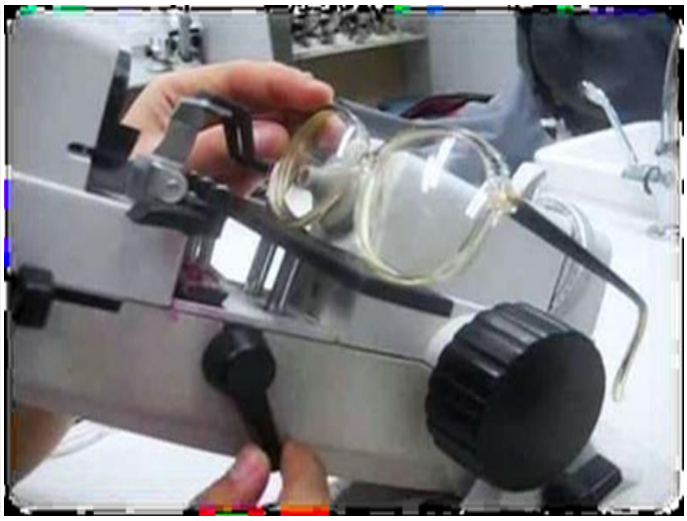

Fig. (3): Snellen Char **Fig. (4):** Method for measuring lens power.

Fig. (5): trail case.

Results and Discussion

However only 8 patients out of 50 patients used urinary lenses. In addition to conducting a comparison study between the plastic lenses and PC lenses, all special devices were utilized to test each individual's (VA) and eye degree. and also, we have 35males and 15 Females as shown in the table (2).

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Table (2): shows the relationship between gender wearing type of lenses and age groups (years).

Age (years)	Male	Female	CR-39	Polycarbonate (PC).
15-16	15	5	20	3
17-18	12	4	10	1
19-20	5	4	4	2
21-22	3	2	8	2
Total	35	15	42	8

To find out the causes of patients who wear plastic lenses CR-39 is 42 feeling uncomforted, it turned out that 8 patients do not want to buy PC lenses because they are expensive (high price), and they are students. then Due to the patient's lack of knowledge of the presence of PC lenses, the reasons for not using them by patients were analyzed as shown in the table (3).

Table (3): The number of patients who have no knowledge of the type of lens.

Age(years)	Cost	Not fit with all types of frames	Lack of knowledge of the lenses	Others.
15-16	2	2	13	1
17-18	2	1	12	-
19-20	1	-	3	-
21-22	1	1	2	1
Total	6	4	30	2

An analysis of the reasons for non-use of PC lenses by 42 patients (under study). 30 patients out of 42 patients who do not have any knowledge of polycarbonate lenses, as the instructions explain to them about the extent of benefit from using it more than others and for different ages due to its expensive cost compared to other lenses, knowing that many of the patients did not use them because of the cost of the lenses. Finally, the required instructions were provided regarding the possibility of using PC lenses more than others.

Conclusions

PC lenses beat other widely used spectacle lenses that satisfy current eyewear requirements in terms of impact resistance under the testing conditions used in this study. They didn't use by any of the patients because most patients in Baghdad wear lenses made of glass or plastic. In addition, fully qualified technicians operating PC lenses because there are no local producers of the required equipment. Everybody has their own set of guidelines and preferences. Both PC and CR-39 lenses are available. Having options is always beneficial, especially when it comes to the most crucial aspect

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of your glasses. lenses hold the key to maintaining healthy eyes, clear vision, and general eyewear comfort. All of the lens packages found in the market come with an extra AR-coating as an additional choice to help keeping eyes a little bit healthier and glare-free. We only have PC lenses available for youngsters due to safety concerns. This indicates that, they are perfect for protecting children's safety. eyewear.

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