

# Glaucoma Patients and Contact Lenses – How to Fit – How to Treat?

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## ABSTRACT

*As the number of glaucoma patients rising up by aging population, importante is, to point out facts about glaucoma patients as contact lens carriers. Diagnostic and therapy options as well as quality of life are discussed and recommended. Glaucoma as chronic disease needs adequate specific diagnostic procedure as a visual field depending on the right / best visual correction, daily therapy, specific eye drop medication, but also needs daily quality of life for those patients. Advantages of both, quality of therapy and quality of life, is explained and discussed in connection together. It is possible to treat glaucoma patients with the mixture of different active eye drops because of the new glaucoma strategy recently presented, investigated and prescribed as the best therapy approach. The prostaglandines, or the combination of two in one different drugs (combi) bottle is reality. That means, active medication applied once a day, new preservatives strategy from different manufacturers are discussed and recommended.*

**Key words:** glaucoma, therapy approach, contact lenses, care solutions, preservatives, quality of life, advantages of fit /diagnostic

## Introduction

Glaucoma as a chronic disease increases also the need for daily quality of life by these patients. Many of them enjoy different sport activities, driving, serious computer connected work, all-day outdoor activities. Even more than, they are connected to some other conditions as presbyopia, diabetes, dry cornea, or allergy, different demanding refractives errors, cataract conditions or not properly corrected pseudophakia. Number of glaucoma patients increases with the aging population. Many of them are contact lens carriers or try to be in a near future or periodically. How to fit and how to treat glaucoma patients?

The prostaglandin analogues are highly advantageous since they offer a monotherapeutic approach and continuous mean intraocular pressure (IOP) control with minimal systemic side effects. The important question is, therefore, whether all current glaucoma medications are capable of controlling pressure over a full day. There are significant differences in the total percentage drop in IOP (30%) as well as the endurance of those IOP reductions over a full day<sup>6–10</sup> The evaluation of twenty four

hour efficacy is critical when selecting a treatment for the management of open-angle glaucoma.

With the full respect of the benefits the new fixed combination (two different drug) together for glaucoma therapy. The packaging for eye drops is only one bottle. Fixed-combination treatments are valuable options that may simplify treatment regimens while providing equivalence of efficacy for intraocular pressure lowering for patients with glaucoma. A recent meta-analysis shows that use of these treatments may increase adherence by 24–26% compared with unfixed concomitant therapies.<sup>11</sup>

Also with the full respect regarding efficacy and tolerability. Intraocular pressure reduction is usually greater with prostaglandin-timolol fixed combinations than the individual prostaglandin drug. The incidence of hyperemia was significantly less with fixed combinations than with individual prostaglandines<sup>1</sup>.

Once daily, evening application, or morning addition, depends of each individual plan and/or goal for every glaucoma patient.

**TABLE 1**  
TOPICAL GLAUCOMA MEDICATIONS: SYSTEMIC AND OCULAR SIDE EFFECTS

	Systemic effects	Ocular side effects
Nonselective beta-blockers	Decreased heart rate, bradycardia, arrhythmias, exacerbation of heart failure, masking of hypoglycemic symptoms, depression	Burning, redness, decreased ocular blood flow, decreased corneal sensation
Alpha-2 agonists	Hypotension, respiratory depression (in infants), central nervous system depression (in infants), sedation, fatigue	Redness, itching, pupillary dilatation, lid retraction
Carbonic anhydrase inhibitors	Allergy, bitter taste, low blood counts	Stinging, irritation, red eyes
Prostaglandin analogs	No significant side effects	Hyperemia, changes in periocular skin pigmentation, changes in iris colour, eye-lash growth

Table information adapted from Kwon YH, Fingert JH, Greenlee EC; A Patients Guide to Glaucoma. Coralville, IA: Med Rounds Publication, Inc; 2006 July/August 2008/ supplement to glaucoma today/9

Preservative free fixed combinations in case of allergy include better compliance of different agents. Considerable evidence points to significant direct toxic effects on the ocular surface caused by use of preservative benzalkonium chloride (BAK) in glaucoma treatments.<sup>14-17</sup>

Of particular interest is that polyquad-preserved travoprost/timolol fixed combination provides stabilizing control of IOP without the effects of BAK, and has greater levels of patient and doctor preference when compared to mono- or adjunctive therapy.<sup>12,13</sup>

On the other hand we must include maximum comfort regarding soft contact lenses only. With the full respect of the benefits the new generation of the silicon-hydrogel materials, possible astigmatic full correction, disposable on the daily wear bases soft contact lens (C.L.) or one day soft contact lenses.

Even UVA/UVB protection can be included in the silicon-hydrogel material.

Additionally comfort depends on compatible »store branded only« multipurpose cleaning solution included. It is necessary to be optimized contact lens experience through disinfection, cleaning and wetting components together. Uptake and release of preservatives as a key concepts for break in the epithelium is the first step for bacteria to get a foothold into the cornea<sup>2</sup>.

Therefore, extremely important is to educate adequate and continuous each candidate about glaucoma disease, diagnostic and therapy options as well as about contact lenses and cleaning solutions options.

Wearing schedule included regular control for glaucoma and/or contact lenses. To evaluate the intraocular pressure requires a quart of C.L. on the control.

To evaluate visual field, recommendation is with contact lenses correction because C.L. are the preferred optical device regarding on possibility to give the real size picture and better correction of astigmatism.<sup>3,4</sup>

## Patient and Methods

This observational study involves prospectively for three months (February – April 2012) a total of 40 patients already under glaucoma medication and soft, disposable (two weeks / one month / one day) on daily bases Silicon-Hydrogel contact lens carriers.

Age from 21 to 68. Most active 30 women and 10 men were included. Educational profile ranges from high school to college.

Glaucoma medication included eye drops only as fixed combination prostaglandin-timolol mostly evening application and/or evening/morning additionally another glaucoma drug or combination.

The first step in the evening procedure was the removal of contact lenses. Active drug application was a second step and by some with the application of artificial tears before bedtime.

Objective and subjective parameters are evaluated through Visual acuity (Snellen test chart), Visual field comparative findings with previous, biomicroscopy evaluation and subjective visual field expression.

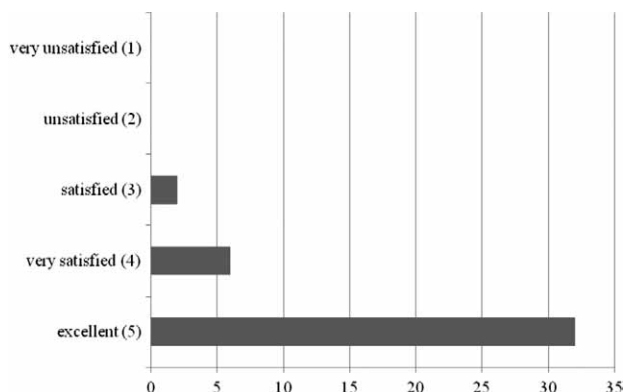
Therapy compliance including hyperemia and evaluation quality of life through questionnaire (Lickert five point scale).

## Results

All objective parameters (visual acuity, visual field and biomicroscopy evaluation) show the absence of pathological changes or worsening of findings. Subjective parameters as visual field expression and therapy compliance regarding hyperemia show median score<sup>4,5</sup>.

Evaluation quality of life through questionnaire (Lickert 5 point scale) show median score of patient satisfaction (1 = no satisfaction, 5 = excellent satisfaction)<sup>4,7</sup>. (Table 2)

**TABLE 2**  
EVALUATION QUALITY OF LIFE THROUGH QUESTIONERY  
(LICKERT 5 POINT SCALE) SHOW MEDIAN SCORE OF PATIENT  
SATISFACTION



1= no satisfaction , 5= excelent satisfaction

## Discussion

The long-term use of antiglaucoma medications may induce ocular surface changes, causing ocular discomfort, tear film instability, conjunctival inflammation, induce ocular surface changes, epithelial apoptosis, corneal surface impairment, and increase the potential risk of failure for further glaucoma surgery.

Studies have shown that the incidence of ocular surface disease is significantly associated with age.<sup>23,24</sup> In general, the incidence of ocular surface disease rises with age. For example, it has been noted in various large epidemiological studies that approximately 5% of the population 45 years of age or younger are diagnosed with ocular surface disease and that percentage jumps to approximately 35% by 80 age.<sup>25,26</sup>

Given that aging is a risk factor for glaucoma. Ophthalmologists are likely to see glaucoma patients with concomitant ocular surface disease. It is, therefore, incumbent upon clinicians to choose the most efficacious glaucoma treatments that will not compromise corneal integrity.

These undesirable effects may also lead to treatment discontinuation and reduced quality of life in patients with glaucoma.<sup>18</sup>

Antiglaucoma medications usually contain BAK as a preservative. Benzalkonium chloride (BAK) a cationic detergent, and the most commonly used preservative in topical ophthalmic preparations – is used in a concentration ranging from 0.02 to 0.004%.

It interacts with high affinity with membrane proteins and may change the ionic resistance of the cornea by intercalating into the cellular membrane.<sup>22</sup> BAK can accumulate and remain in ocular tissue for relatively lengthy periods and may induce cell toxicity and/or death in a dose-dependent manner.<sup>7</sup>

Three types of mechanisms have been described for BAK: these are detergent effects, causing loss of tear film stability, toxic effects to the stability, toxic effects to the corneal a conjunctival epithelium and immunoallergic reactions.

Recomandation is one day soft contact lens. So they can escape even minimal influence of multipurpose cleaning solution and different preservative included in, and keep cornea healthy and in optimized condition.

Studies comparing travoprost BAK-preserved and travoprost polyquad-preserved showed equivalence of IOP-lowering efficacy at all timepoints,<sup>19</sup> and consistent evidence that polyquad helps to maintain conjunctival epithelial cells health.<sup>20,21</sup> It would be advisable to use BAK-free solutions whenever possible, especially in patients with the greatest exposure to high doses or prolonged treatments, in those suffering from preexisting or concomitant ocular surface diseases, and in those experiencing side effects related to the ocular surface.

Also those patients experienced as contact lens carriers. Recomendation is one day soft contact lens.

So they can escape even minimal influence of multipurpose cleaning solution and keep cornea healthy and in optimized condition.

Wearing schedule included regular control for glaucoma and/or C.L.

Contact lens correction and comparation visual field for evaluation therapy through the time is better with contact lens correction even for astigmatism. We prefer to chose toric soft Silcon hydrogel contact lenses for astigmatism. This choice include maximum comfort regarding soft contact lenses only, glaucoma therapy once daily, evening application, or morning addition depends of individual plan as the goal for glaucoma and contact lens patient.

Every decision about therapy for glaucoma, type of C.L. and fitt procedure (not to tight, not too losse), that means optimume balance fit, must also have a maximum comfort and safety in primary approach.

## Conclusion

The purpose of this obsrvational study was explaine how to fit and treat chronic glaucoma patients as carriers of soft, dispible silicon-hydrogel C.L. with reference to quality of every-day life.

Quality of every-day life is possible thanks to new fixed combination glaucoma drugs as eye drops dose once daily because of efficacy and good tolerability.

Also new silicon-hydrogel soft materials and wearing schedule C.L. (shorter is better) improve compliance additionally. Choice of compatible and safe cleaning sollutions is necessary.

It is possible to treat good glaucoma patients under contact lenses correction and affect positive on their quality of life. It is important continuously conduct educational training and regular controls to meet the patients needs.

Specially younger persons included in sport activities expected good vision, good glaucoma control and good quality of life. The same recommendation for all of glau-

coma patients is what we want to have in near future. We can now effectively treat glaucoma while minimizing the impact on our patients and their quality of life.

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## GLAUKOMSKI PACIJENTI I KONTAKTNE LEĆE – PRISTUP – LIJEČENJE

### SAŽETAK

Sa starenjem populacije raste i broj glaukomskih pacijenata. U fokusu je i porast broja glaukomskih pacijenata koji su i nosioci kontaktnih leća. Raspravljene su i preporučene dijagnostičke / terapijske mogućnosti uvažavajući kvalitetu vida i života glaukomskih pacijenata. Glaukom je kronična bolest koja zahtijeva adekvatne specifične dijagnostičke postupke poput vidnog polja koje opet ovisi o točnoj/najboljoj mogućoj postignutoj korekciji vida jer direktno utječe na kvalitetu pretrage. Posebnost je u kontinuiranoj dnevnoj terapiji očnim kapljicama lokalno i više puta dnevno i / ili više različitih medikamenata što ima utjecaja na kvalitetu života glaukomskih pacijenata. Kvaliteta u terapiji kroz kvalitetu života i vida poveznica je s korekcijom mekim kontaktnim lećama. Glaukom je moguće liječiti kombiniranim preparatima više aktivnih lijekova što je odnedavna istražena i potvrđena nova strategija u liječenju glaukomske bolesti. Realnost su prostaglandini ili kombinacije više aktivnih supstanci u jednom lijeku (bočici). To daje mogućnost aktivnog liječenja u primjeni lijeka jednom dnevno uz korekciju mekim kontaktnim lećama. Uloga novih konzervansa različitih proizvođača strateški je važana činjenica u kvaliteti života, liječenja i korekciji kontaktnim lećama kod glaukomskih pacijenata.