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ČASOPIS ZA PITANJA BEZBEDNOSTI I ZAŠTITE ZDRAVLJA NA RADU,  
MEDICINE RADA I ZAŠTITE ŽIVOTNE SREDINE ZA JUGOISTOČNU EVROPU

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# EFEKAT VEŠTAČKIH SUZA BEZ KONZERVANSA KOD NOSILACA KONTAKTNIH SOČIVA I KOD NENOSILACA KONTAKTNIH SOČIVA

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## *Sažetak*

**Cilj:** Evaluirati efekt gelovidnih polimer hidroksipropil guar (HP-guar) veštačkih suza bez konzervansa (Systane UD) u reduciranju subjektivnih simptoma suhog oka kod mladih nosilaca kontaktnih sočiva kao i kod nenosilaca kontaktnih sočiva.

**Ispitanici i metod:** Četrdeset tri (43) ispitanika (20 nosilaca kontaktnih sočiva i 23 nenosilaca kontaktnih sočiva) bili su uključeni u randomiziranoj prospektivnoj studiji provedenoj u jednom ambulantom centru u Skopju, R. Makedonija. Rezultati Mc Monnie-ovog upitnika za suho oko pokazali su da subjekti imaju simptome slabog stupnja suhog oka. Veštacke suze bez konzervansa Systane UD bili su testirani u toku perioda od 7 dana. Na danu 0 i na danu 7 bili su upotrebljeni protokoli koji su sadržali Likert-ova pitanja na 4 gradualna nivoa, anazilirajući 6 pitanja okularnog diskomfora.

**Rezultati:** Prosečna uzrast prve grupe bila je 25.2 godine dok u drugoj grupi bila je 20.8 godina, sa minimalnoj uzrastu od 18 godina a maksimalnoj uzrastu od 34 godina. Analiza na 0 dan i 7 dan u grupi nosioca kontaktnih sočiva, pokazala je statističku signifikantnost kod svakog analiziranog okularnog subjektivnog simptoma, sa isključkom na simptom suhoću ( $p = 0.088$ ).

Analiza na 0 dan i 7 dan u grupi nenosioca kontaktnih sočiva, pokazala je nepostojanje statističke signifikantnosti za svaki analiziran subjektivni simptom sindroma suhog oka.

**Zaključak:** Veštačke suze bez konzervansa kod mladih nosioca kontaktnih sočiva asocirani sa slabim stepenom suhog oka, smanjuju intenzitet subjektivnih simptoma suhog oka. Mladi nosioci kontaktnih sočiva imali su statistički signifikantno smanjenje intenziteta kod 5 od 6 simptoma okularnog diskomfora, posle 7 dana aplikacije veštačkih suza bez konzervansa Systane UD. Jedna od glavnih osobina idealnih veštačkih suza je formula bez konzervansa.

**Ključne reči:** veštačke suze, simptomi suhog oka, HP-guar gelovidne veštačke suze, polimer hidroksipropil gua r(HP-guar), suplementi bez konzervansa.

## UVOD

Sindrom suhog oka je termin koji označava skup objektivnih znakova i subjektivnih simptoma okularne površine (1).

Sva stanja u kojih dolazi do sindroma suhog oka, nastaju iz poremećaja suznog filma, šta je rezultat deficiencije suza ili ekcesivne evaporacije suza (2).

Kada dolazi do kompromitiranja suznog filma, zdravi kornealni i konjunktivalni epitelium ne može biti održan i pacijent ima diskomfor koji je povezan sa subjektivnim simptomima suhog oka (3).

Objektivni znaci suhog oka uključuju: kornealno bojenje, konjunktivalno bojenje, brzo BUT („Break Up Time“) vreme i niske Schirmerove vrednosti (4).

Subjektivni simptomi suhog oka uključuju: suhoću, žarenje, grebenje, bockanje, osećaj peska u ocima i osećaj stranog tela u očima. Ovi subjektivni simptomi su najizraženiji ujutro i uvece (5, 6).

U odsustvu kauzalnog terapijskog rešenja za suho oko, predominantni terapijski izbor bili su i još uvek ostaju lubrikantni suzni suplementi (7).

Suzni suplementi su generalno hipotonici ili izotonično puferirani rastvori koji sadrže surfaktante, elektrolite i viskozni agens, koji agens ima za cilj produžiti vreme koje suplement ostaje na okularnoj površini (7).

Lubrikantne očne kapi koje sadrže polietilen glikol 400 (0. 4%) i propilen glikol (0. 3%) demulcente sa polimer hidroksipropil guar (HP-guar) kao gelovidnim agensom, su odnedavno dostupne pacijentima. Kada postoji ekspozicija ph okularne površine i na suzni film, HP-guar u preparatu Systane, formira gel koji pojačava viskozitet i bio-adhezivnost, koje sa svoje strane omogućava retenciju oba demulcenta vršeći zaštitu okularne površine (8).

Ovako formuliran preparat je konzerviran sa Poliquad-om (0.0001%) i sadrže esencijalne jone, kalium, kalcium, magnesium, cink i natrium.

Naša studija sa svojim dizajnom, je usmerena ka ispitivanju efekta HP-guar gelovidnih lubrikantnih vešackih suza bez konzervansa – Systane UD, u tretiranju subjektivnih simptoma suhog oka u dve grupe ispitanika: mladih nosioca kontaktnih sočiva i mladih nenosioca kontaktnih sočiva.

## ISPITANICI I METODE

Ovo studija sprovedena je u jednom ambulantnom centru, randomizirana, jednopregledna – jednonedeljna prospektivna studija. Četrdeset tri (43) ispitanika regrutirani od svakodnevnih oftalmoloških pregleda u Ordinaciji za očne bolesti u privatnoj poliklinici „Medika plus“ u Skopju, Republika Makedonija, u uzrastu od 18 godina do 34 godine, u periodu od marta 2008 do februara 2010. Prospektivna studija je obuhvatila dve grupe ispitanika: prva grupa od 20 ispitanika nosilaca kontaktnih sočiva i druga grupa 23 ispitanika nenosilaca kontaktnih sočiva. Ispitanici u grupi nosilaca kontaktnih sočiva nosili su isti tip mekih mesečnih kontaktnih sočiva.

Subjekti koji su bili uključeni u studiju dali su izjavu da: „Osećaju njihove oči suhe i uoptrebljavaju veštačke suze, bar povremeno“.

Veštačke suze bez konzervansa Systane UD bile su testirane u periodu od 7 dana. Nenosioci kontaktnih sočiva bili su zamoljeni da upotrebljavaju veštačke suze dva puta dnevno. Nosioci kontaktnih sočiva bili su zamoljeni da doziraju Systane UD dva puta dnevno, 10-15 minuta prije lentalne insercije i ponovo uveče posle vađenja sočiva.

Na 0 dan aplikacije Sustane UD, ispitanici so lično posetili oftalmološku ordinaciju i bio je popunjen protokol pitanja. Na 7 dan aplikacije Systane UD, ispitanici su bili kontaktirani telefonskim putem i bila su postavljena serija pitanja pol Likert-ovom sistemom sa ciljem da se utvrdi dali upotreba Systane UD posle 7 dana poboljšuje okularni komfor kao i komfor nošenja kontaktnih sočiva.

Subjektivni simptomi suhog oka koji su analizirani:

- 1) Suhoća,
- 2) Žarenje,
- 3) Grebanje,
- 4) Osećaj stranog tela,
- 5) Bockanje,
- 6) Osećaj peska u očima.

Stepen diskomforta šest subjektivnih simptoma suhog oka bio je registriran na standardnoj četvorostepenoj lestvici (0-odsustvo, 1-slabo, 2-umereno, 3-izraženo).

Posle toga, dodatno, ispitanicima je bilo postavljeno 6 pitanja za suho oko i odgovori su bili rangirani prema lestvici Likert-ovog sistema: 1 – odlučno nesaglasan; 2 – nesaglasan; 3 – neopredeljen; 4 – saglasan; 5 – odlučno saglasan.

Sledeća pitanja su bila postavljena:

- 1) „Osećam moje oči suhe ujutro“
- 2) „Osećam moje oči suhe na kraju dana“
- 3) „Osećam moje oči prijatno posle aplikacije veštačkih suza“
- 4) „Osećam moje oči sveže kada koristim veštačke suze“
- 5) „Često zaboravljam na moje simptome kada koristim veštačke suze“.

Statistička analiza svakog pojedinog subjektivnog simptoma sindroma suhog oka bila je napravljena Fisher-Exact testom.

## REZULTATI

Prosečna uzrast prve grupe nosioca kontaktnih sočiva iznosila je 25.2 +/- 2.31 godinu, i 70% od ispitanika bili su ženskog pola.

Prosečna uzrast druge grupe nenosioca kontaktnih sočiva bila je 20.8 +/- 3.29 godina, i 100% od ispitanika bili su ženskog pola.

Rezultati frekvencije pojedinih okularanih subjektivnih simptoma suhog oka (suhoca, žarenje, grebenje, osećaj stranog tela, bockanje i osećaj peska u ocima) na 0 dan i 7 dan od aplikacije veštačkih suza, za prvu grupu nosioca kontaktnih sočiva prikazani su na Slikama 1-6 (str. 546-547), dok za drugu grupu nenosioca kontaktnih sočiva na Slikama 7-12 (str. 548-549).

Analiza na 0 dan i 7 dan u grupi nosioca kontaktnih sočiva, pokazala je statisticku signifikantnu značajnu razliku za svaki analiziran subjektivni simptom suhog oka, sa iskljućkom na simptom suhoću ( $p = 0.088$ ).

Analiza na 0 dan i 7 dan u grupi nenosioca kontaktnih sočiva, pokazala je nepostojanje statisticke značajne razlike za svaki analizirani subjektivni simptom suhog oka.

Odgovori ispitanika prikazani u strukturnim procentima na svako pitanje za subjektivni komfor posle aplikacije veštačkih suza, dati su u Tabeli 1-2 (str. 550-551).

## DISKUSIJA

U prikazima tačne prevalencije subjekta sa suhim okom u različitim epidemiološkim studijama postoje različite vrednosti, ali većina referentnih studija sugeriše da prevalencija suhog oka u populaciji iznosi od 5% do 28 % (10,11).

U grupi najčešćih rizik faktora za suho oko, ubrajaju se ženski pol i uzrast preko 50 godina (12,13).

Naša prospektivna studija sprovedena na mali broj pacijenta jednećnog ambulantnog centra, prikazuje efekt veštačkih lubrikantnih suplementa bez konzervansa kod grupe mladih nosioca kontaktnih sočiva i mladih nenosioca kontaktnih sočiva.

Ispitanici u prvoj grupi mladih nosioca kontaktnih sočiva imali su statistički signifikantno smanjenje intenziteta subjektivnih simptoma suhog oka i to u 5 od analiziranih ukupno 6 simptoma subjektivnog okularnog komfora, posle 7 dana aplikacije Systane UD bez konzervansa. Dok ispitanici druge grupe nenosioca kontaktnih sočiva pokazali su nepostojanje statistički signifikantnog smanjenja intenziteta svih analiziranih 6 subjektivnih simptoma suhog oka.

Ranije publicirane studiji (14,15) su pokazali efikasnost Systane veštačkih suza sa konzervansom u redukciji simptoma suhog oka. Kod ispitivane populacije dokazano je da HP-guar lubrikantne veštacke suze sa konzervansom, reducirali su subjektivnu simptomatologiju suhog oka. Dosada studija o efikasnosti Systane UD bez konzervansa, nije publicirana.

Systane veštacke suze sa konzervansom efektivno smanjuju simptome asocirane sa umerenim stepenom suhog oka (16,17). Naša studija je pokazala efikasnost Systane veštackih suza bez konzervansa kod mladih nosioca kontaktnih sočiva sa slabim stepenom suhog oka.

Evaporacija akvoznog dela suznog filma bitno pridonosi gubitku akvozne komponente suza i zavisna je od procenta vlažnosti. Suplementi koji sadrze HP-guar smanjuju evaporaciju akvozne komponente suza (18). Sa obzirom na pH senzitivnost, Systane adaptira svoj viskozitet okularnoj površini i njenoj pH, koja pH vrednost kod suhog oka pokazuje povišene vrednosti. Preparat postaje viskozniji kada je oko suhije, time obezbeđuje bolju okularnu protekciju (19).

Lipidni sloj suznog filma (LLT) uočena je kao kritična komponenta kod sindroma suhog oka, i isti je pojačan od strane Systane preparata (20).

Veštacke suze bez konzervansa sa povremenom diskontinuiranom upotrebom, mogu biti alternativa za tretiranje kornealne konjunktivalizacije, koja se javlja sekundarno na nošenje kontaktna sočiva (21).

Upotreba veštackih suza bez konzervansa je isto tako asocirana sa poboljšanjem simptoma za vreme nošenja kontaktnih sočiva i upotrebe personalnih kompjutera (23).

Naša studija je vredna u razumevanju efekta HP-guar lubrikantnih gelovidnih veštackih suza bez konzervansa, u neutralizaciju subjektivnih simptoma sindroma suhog oka. Jedna od kritičnih osobina idealnih veštackih suza je formula bez konzervansa.

Dalja istraživanja trebalo bi uporediti rezultate kod mladih nosioca kontaktnih sočiva i nenosioca kontaktnih sočiva sa većim brojem ispitanika, kao i efekt HP-guar lubrikantnih gelovidnih veštackih suza bez konzervansa kod strijih nosioca kontaktnih sočiva kao i kod starijih nenosioca kontaktnih sočiva, što nije analizirano našom studijom.

### ZAHVALNOST

*Naša prospektivna studija o efektu Systane UD bez konzervansa, kod mladih nosilaca kontaktnih sočiva i mladih nenosilaca kontaktnih sočiva, podržana je od oftalmološke farmaceutske kuće Alcon-Makedonija, koji su nesebično donirali testere veštackih suza Systane UD bez konzervansa.*

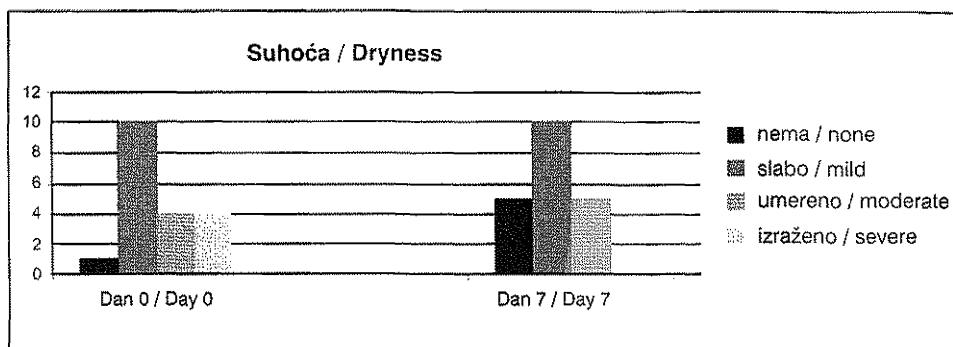
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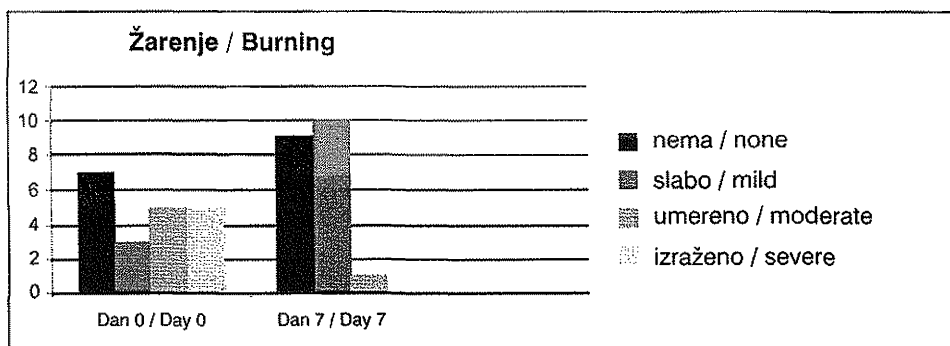


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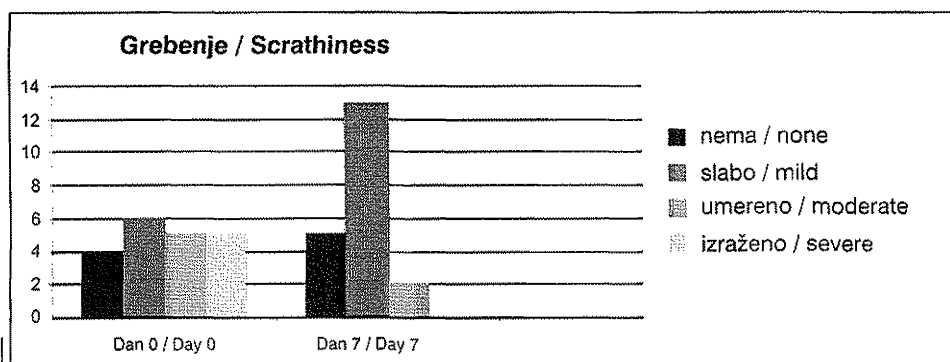
## GRAFIKONI I TABELE / CHART END TABLE



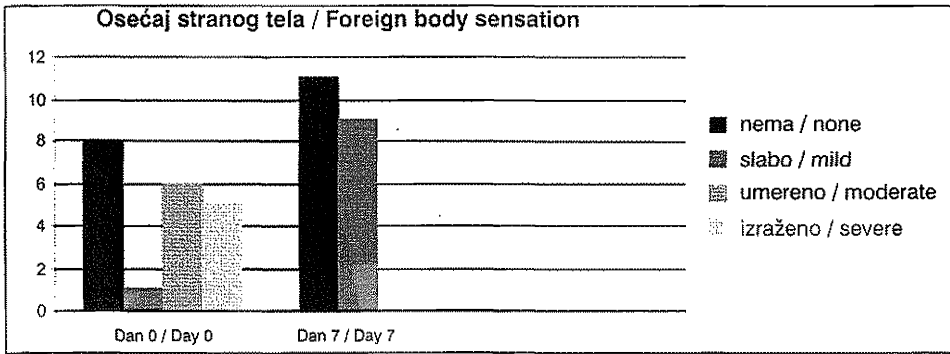
Slika 1. Subjektivni simptom – suhoća kod nosilaca kontaktnih sočiva  
Figure 1. Subjective symptom – dryness in contact lens wearers



Slika 2. Subjektivni simptom – žarenje kod nosilaca kontaktnih sočiva  
Figure 2. Subjective symptom – burning in contact lens wearers

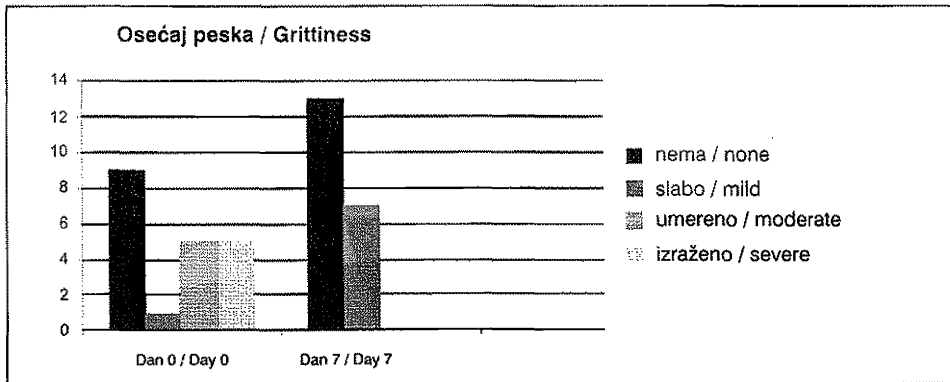


Slika 3. Subjektivni simptom – grebanje kod nosilaca kontaktnih sočiva  
Figure 3. Subjective symptom – scratchiness in contact lens wearers



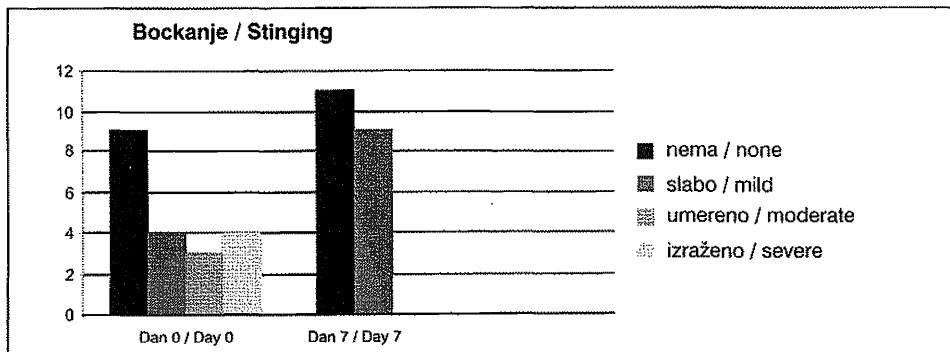
Slika 4. Subjektivni simptom – osećaj stranog tela kod nosilaca kontaktnih sočiva

Figure 4. Subjective symptom-foreign body sensation in contact lens wearers



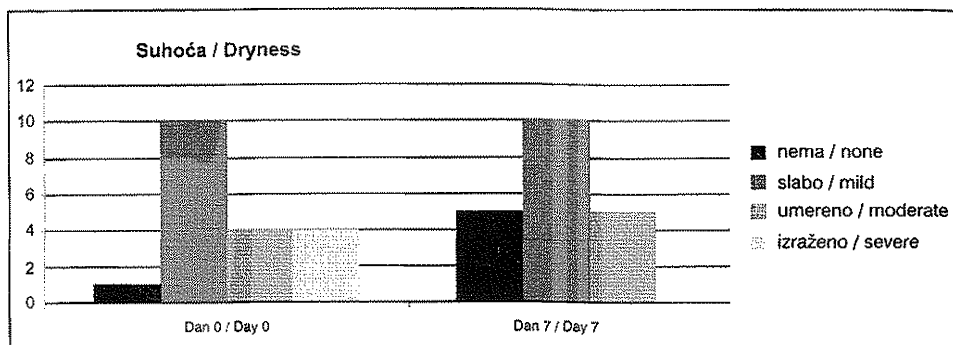
Slika 5. Subjektivni simptom -osećaj peska kod nosilaca kontaktnih sočiva

Figure 5. Subjective symptom-grittiness in contact lens wearers

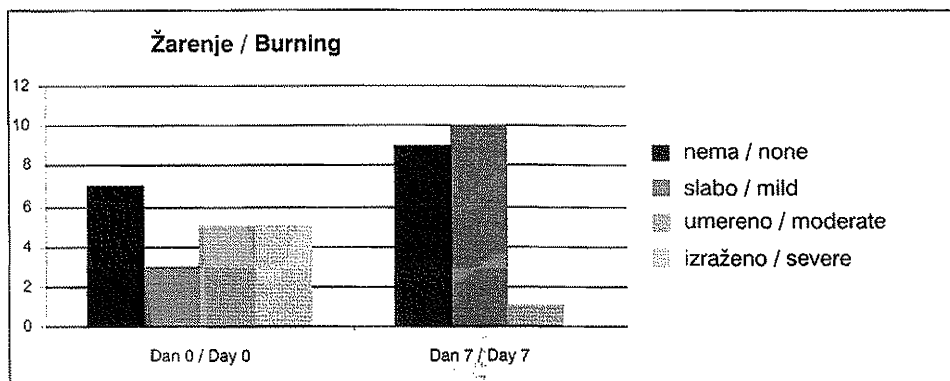


Slika 6. Subjektivni simptom – bockanje kod nosilaca kontaktnih sočiva

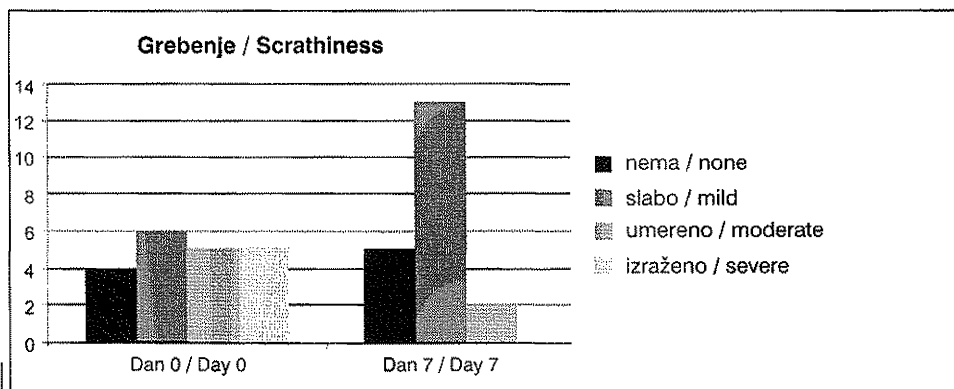
Figure 6. Subjective symptom-stinging in contact lens wearers



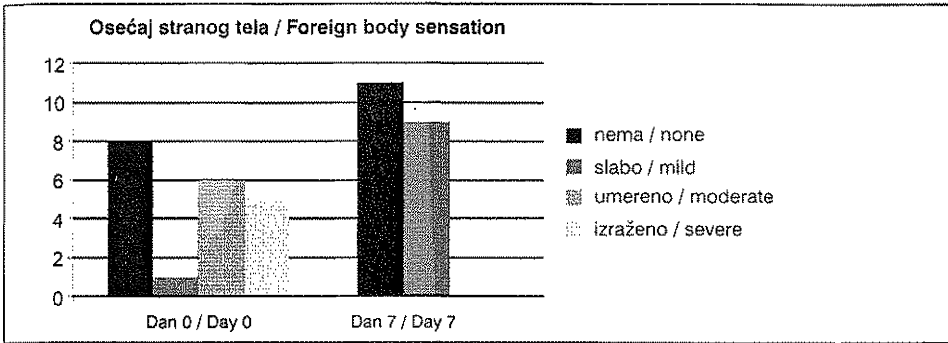
Slika 7. Subjektivni simptom – suhoća kod nosilaca kontaktnih sočiva  
 Figure 7. Subjective symptom – dryness in non- contact lens wearers



Slika 8. Subjektivni simptom – žarenje kod nosilaca kontaktnih sočiva  
 Figure 8. Subjective symptom – burning in non-contact lens wearers

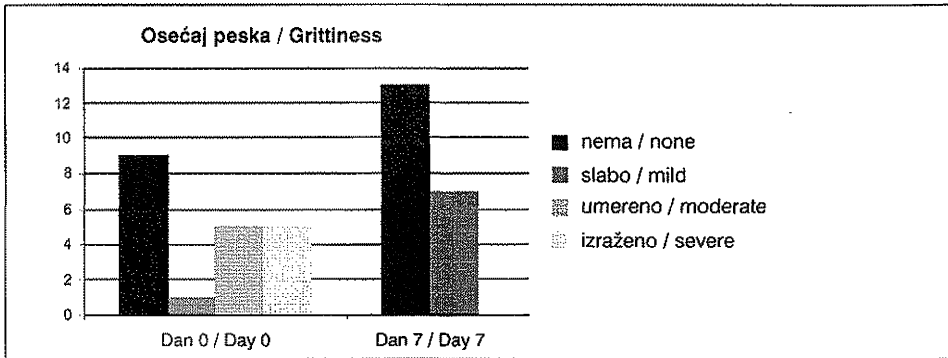


Slika 9. Subjektivni simptom – grebanje kod nosilaca kontaktnih sočiva  
 Figure 9. Subjective symptom – scratchiness in non-contact lens wearers



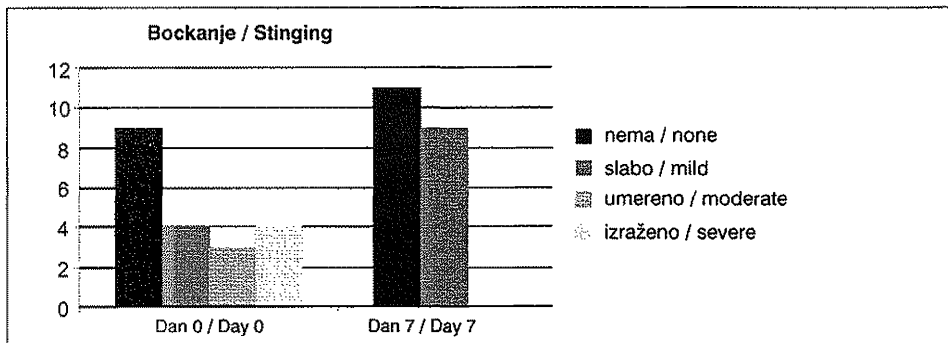
Slika 10. Subjektivni simptom – osećaj stranog tela kod nosilaca kontaktnih sočiva

Figure 10. Subjective symptom – foreign body sensation in non-contact lens wearers



Slika 11. Subjektivni simptom – osećaj peska kod nosilaca kontaktnih sočiva

Figure 11. Subjective symptom – grittiness in non-contact lens wearers



Slika 12. Subjektivni simptom – bockanje kod nosilaca kontaktnih sočiva

Figure 12. Subjective symptom – stinging in non-contact lens wearers

Tabela 1. Pitanja subjektivnog komfora i Likert-ov system odgovora kod nosilaca kontaktnih sočiva

Table 1. Comfort subjective questions and Likert style statements in contact lens wearers

Pitanja / Questions		Jako nesaglasan / Strongly disagree	Nesaglasan / Disagree	Neopredeljen / Undecided	Saglasan / Agree	Jako saglasan / Strongly agree
1)	„Moje oči osećam suhe ujutro“	15%	15%	15%	20%	35%
	„My eyes feel dry in the morning“					
2)	„Moje oči osećam suhe na kraju dana“	15%	20%	20%	25%	20%
	„My eyes feel dry at the end of the day“					
3)	„Moje oči osećam prijatno posle instalaciji suza“	10%	15%	15%	25%	35%
	„My eyes feel comfortable on installation of the drops“					
4)	„Moje oči osećam sveže posle instalaciji suza“	5%	5%	35%	20%	35%
	„My eyes feel refreshed when I use the drops“					
5)	„Osećam moje oči svežije više nego što sam očekivao posle instalacije suza“	5%	20%	25%	25%	25%
	„My eyes feel refreshed longer than expected when I use the drops“					
6)	„Često zaboravim na svoje simptome posle instalacije suza“	20%	20%	10%	40%	10%
	„I frequently forgot my symptoms during the use of these drops“					

Tabela 2. Pitanja subjektivnog komfora i Likert-ov system odgovora kod nenosilaca kontaktnih sočiva

Table 2. Comfort subjective questions and Likert style statments in non-contact lens wearers

Pitanja / Questions		Jako nesaglasan / Strongly disagree	Nesaglasan / Disagree	Neopredeljen / Undecided	Saglasan / Agree	Jako saglasan / Strongly agree
1)	„Moje oči osećam suhe ujutro“	96%	4%	0%	0%	0%
	„My eyes feel dry in the morning“					
2)	„Moje oči osećam suhe na kraju dana“	57%	39%	0%	0%	4%
	„My eyes feel dry at the end of the day“					
3)	„Moje oči osećam prijatno posle instalaciji suza“	4%	0%	4%	9%	83%
	„My eyes feel comfortable on installation of the drops“					
4)	„Moje oči osećam sveže posle instalaciji suza“	0%	0%	4%	9%	87%
	„My eyes feel rfereshed when I use the drops“					
5)	„Osećam moje oči svežije više nego što sam očekivao polse instalacije suza“	30%	0%	40%	4%	26%
	„My eyes feel refreshed longer than expected when I use the drops“					
6)	„Često zaboravim na svoje simptome posle instalacije suza“	48%	35%	4%	4%	9%
	„I frequently forgot my symptoms during the use of these drops“					

## EFFICIACY OF PRESERVATIVE - FREE ARTIFICIAL TEARS IN CONTACT LENS WEARERS AND NON-CONTACT LENS WEARERS

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### **Abstract**

**Aim:** To evaluate the efficacy of preservative- free polymer hydroxypropil guar (HP-Guar ) gellable lubricant eye drops (Systane UD lubricant eye drops), in reducing dry eye symptoms in young contact lens wearers and non- contact lens wearers.

**Material and methods:** Forty-three patients (20 contact lens wearers and 23 non-contact lens wearers) were enrolled in this single – center open label study. The result from Mc Monnie ´s questionnaire showed all subjects with mild dry eye symptoms. The preservative- free eye drops Systane UD were tested over 7 days period. At day 0 and day 7 patients were asked a series of 5-point Likert questions, concerning six ocular discomfort symptoms.

**Results:** The mean age in the first group was 25.2 years, and in the second group was 20.8 years ,with a minimum age of 18 years and maximum of 34years. Analyzed on 0 day and on 7 day in contact lens group, statistical significance was observed in each ocular symptom, except symptom dryness ( $p=0.088$ ).

Analyzed on 0 day and on 7 day in non- contact lens group, no statistical significance was observed in each ocular symptom.

**Conclusion:** Preservative- free lubricant eye drops relived symptoms in younger contact lens wearers associated with mild dry eye. Young contact lens wearers experienced significant symptomatic relief in 5 from 6 ocular discomfort symptoms, after 7 days of application of preservative – free Systane UD. One of the critical features of ideal artificial tear is preservative-free formulation.

**Key words:** artificial tears, dry eye syndrome, HP-Guar gellable lubricant eye drops, polymer hydroxypropil guar, preservative- free tear supplements.

### **INTRODUCTION**

Dry eye syndrome is the term commonly used to describe the collection of signs and symptoms of the ocular surface (1).

All conditions causing dry eye can be characterized by tear film disorders, which result from a tear deficiency or excessive tear evaporation (2).

When the tear film is compromised, a healthy corneal and conjunctival epithelium cannot be maintained, and patients experienced the symptoms of discomfort that are associated with dry eye (3).



Signs of dry eye commonly include corneal staining, conjunctival staining, rapid tear break up time (BUT), and low Schirmer test scores (4).

Symptoms felt by patients may include dryness, burning, grittiness, scratchiness, stinging and foreign body sensation. They tend to be most intense in the morning and the evening (5,6).

In the absence of any causal cure for dry eye, the predominant therapeutic choice has been, and continues to be, lubrication with tear supplements (7).

Tear supplements are generally hypotonic or isotonic buffered solutions containing surfactants, electrolytes and viscosity agent, intended to increase the time the tear resides of the ocular surface (7).

A lubricant eye drop, containing polyethylene glycol 400 (0.4%) and propylene glycol (0.3%) demulcents with the polymer hydroxypropyl guar (HP-Guar) as a gelling agent has recently become available. When exposed to the pH of the ocular surface and tears, the HP-Guar in Systane eye drops forms a gel with increased viscosity and bio-adhesive properties that are designed to promote the retention of the two demulcents protecting the ocular surface environment (8).

This formulation is preserved with Polyquad (0.0001%) and contains the essential ions, potassium, calcium, magnesium, zinc and sodium.

Our study was designed to investigate the efficiency of the preservative free HP-Guar gellable lubricant eye drops Systane UD, in treating patients with dry eye symptoms in two groups of young contact lens wearers and non-contact lens wearers.

## MATERIAL AND METHODS

This is a single-center, randomized, 1-visit / 1-week prospective study. Forty-three subjects from ophthalmological practice, private polyclinic „Medika plus“, at age from 18 to 34 years, in the period from March 2008 to February 2010, were enrolled in the study. Prospective study involving 20 subjects contact lens wearers and 23 subjects non-contact lens wearers, were recruited from a clinical setting over a 2-year period. All contact lens wearers had the same brand of monthly soft contact lenses.

Subjects enrolling in the study reported their eyes „Felt dry enough to want to use eye drops at least some of the time“.

The result from Mc Monnie's questionnaire (9) showed all subjects with mild dry eye symptoms.

The preservative-free artificial tears Systane UD were tested over a 7 days period. Non-contact lens wearers were required to be using Systane UD two times per day. The contact lens wearers were asked to use Systane UD two times per day, 10-15 minutes prior lens insertion and again after lens removal in the evening.

At day 7, patients were contacted by telephone and asked a series of 5-point Likert questions designed to determine if using Systane UD after 7 days improve comfort as well contact lens experience.

Following dry eye symptoms were analysed:

- |                 |                           |
|-----------------|---------------------------|
| 1) dryness      | 4) foreign body sensation |
| 2) burning      | 5) grittiness             |
| 3) scratchiness | 6) stinging               |

The severity of six ocular discomfort sensations was recorded on a standardized four-point scale (0-none, 1-mild, 2-moderate, 3-severe).

Afterwards, patients were asked 6 questions for dry eye and the answers were ranged. Likert ranging included: 1-strongly disagree, 2-disagree, 3-undecided, 4-agree and 5-strongly agree.

Following questions were asked:

- 1) „My eyes feel dry in the morning“
- 2) „My eyes feel dry at the end of the day“
- 3) „My eyes feel comfortable upon instalation of drops“
- 4) „My eyes feel refreshed when I use the drops“
- 5) „My eyes feel refreshed longer than expected when I use the drops“
- 6) „I frequently forgot my symptoms during the use of the drops“.

Statistical analysis of each dry eye symptom, in both groups, was performed by Fisher -exact test.

## RESULTS

Avarage age of the first group (contact lens wearers ) was 25.2 +/- 2.31 years, and 70% of the patients were female.

Avarage age of the second group (non-contact lens wearers) was 20.8 +/- 3.29 years, and 100% of the patients were female .

Results of ocular symptoms frequency scales of dryness, burning, scratchiness, foreign body sensation, grittiness and stinging for contact lens group are ilustrated in Figures 1-6 (p. 546-547), and for non-contact lens group in Figure 7-12 (p. 548-549).

Analyzed on 0 day and on 7 day in contact lens group, statistical sifgnificance was observed in each ocular symptom , except symptom dryness ( $p=0.088$ ).

Analyzed on 0 day and on 7 day in non- contact lens group, no statisti- cal sifgnificance was observed in each ocular symptom.

Responses of participants to the comfort subjective questions are summarised in the Tables 1-2 (p. 550-551).

## DISCUSSION

Some variability exists in the prevalence of dry eye observed through various epidemiological studies, but the the currently available body of work suggests that the prevalence of dry eye is between 5% and 28% of the population (10.11).

Among many risk factors involved, being female in gender and over the age of 50 years have been found to be relatively common characteristics in those suffering from dry eye (12,13).

This study was performed using an open label study design and measured the efficiency of a preservative-free lubricant eye drops on dry eye symptoms in younger contact lens wearers and non-contact lens wearers.

Subjects in contact lens group, experienced significant symptomatic relief for 5 from 6 ocular discomfort symptoms, after 7 days of preservative-free Systane UD. However, induced blur appeared to be a complication for many participants. Subjects in non-contact lens group experienced no significant symptomatic relief of 6 ocular discomfort symptoms.

Previous studies (14,15) have demonstrated Systane's with preservative efficiency, when compared to a marketed control by reducing the symptoms associated with dry eye. Within the patient population studied, the test drops (HP-Guar gellable lubricant eye drops) with preservative, reduced subjective symptoms of dry eye.

Systane with preservative, effectively relieved the symptoms associated with moderate ocular dryness (16,17). Our study have demonstrated preservative-free Systane's efficiency in young contact lens wearers with mild ocular dryness.

Aqueous tear evaporation contribute significantly to aqueous tear loss and is humidity dependent. An HP-guar containing solution decreased aqueous tear evaporation (18).

By being pH sensitive, Systane adapts its viscosity to the ocular surface pH, which tends to be higher in dry eye. It becomes more viscous when the eye is drier, thus, providing better ocular protection (19).

Lipid layer of the tear film (LLT) is recognized as a critical component in dry eye disease. The LLT is increased from Systane (20).

The use of preservative-free artificial tears with temporary discontinuation, may be alternative for the management of corneal conjunctivalization secondary to contact lens wear (21). The use of preservative-free eyedrops is also associated with an improvement in symptoms during contact lens wear and computer use (22).

Preservative-free artificial tears may reduce activity of the endogenously produced antimicrobial peptides (23).

Our study is valuable in understanding the efficiency of preservative-free HP-Guar gellable lubricant eye drops, in relieve dry eye symptoms. One of the critical features of ideal artificial tear is preservative-free formulation.

Further research should compare the results in younger contact lens wearers and non-contact lens wearers with greater number of patients, as well in older contact lens wearers and non-contact lens wearers.

#### **ACKNOWLEDGMENT**

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