Research Article

Criteria for Recommending One Day Disposable Silicone Hydrogel Contact Lens

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**ARTICLE INFO**

**ABSTRACT**

**Purpose:** To understand the criteria for recommending one day disposable silicone hydrogel contact lenses for occasional wearers after comparing the subjective comfort response and objective findings on a trial of silicone hydrogel and hydrogel contact lenses in university students. Practitioners recommend 1 day disposable hydrogels to occasional wearers and a neophyte and ignore the afternoon / evening naps in the lifestyle. **Setting:** Amity Optometry Clinic, Amity University Haryana. **Methods:** 30 spectacle users and neophytes were given a trial of one day disposable hydrogel contact lens in the right eye (Etafilcon-A) and silicone hydrogel daily disposable lens in the left eye (Narafilcon- A). The subjects were unaware of the difference in lens material in the two eyes. They were not given any instruction on allowance of taking a nap during the day with the lenses on first day. The same trial was repeated after a week and this time they were permitted to nap with the lenses if desired. Subjective response was assessed by a questionnaire filled at the end of the day (after 12 hours of wear). Objective findings were assessed in the campus clinics after 12 hours of wear. Subjective and objective evaluation was done to evaluate the benefits and need of Silicone hydrogel material recommendation over the hydrogel material in one day disposable occasional wearers who have a lifestyle that includes taking naps during the day. **Results:** Both the hydrogel and silicone hydrogel lens material were reported to be equally comfortable after a one day trial (p=0.027). Patients who wore lenses and slept felt heaviness in the hydrogel wearing eye. There was one grade change in limbal redness as per the CCLRU grading. Both the hydrogel and silicone hydrogel lens material were reported to be equally comfortable at the end of 12 hours of wear (p=0.027) in subjects who did not nap with the lenses. Subjects who wore lenses and took a nap felt heaviness in the hydrogel wearing eye. There was a change in limbal redness, from very slight to slight as per the CCLRU grading in the subjects who took a nap while wearing the lenses. 3 out of 7 removed both the lenses on their own and did not continue wearing it post napping. 4 out of the 7 continued wearing the lenses but with complaint of heaviness in the hydrogel wearing eye. Objective findings only showed increase in limbal hyperemia. At the end of the study a survey of napping was done and it was found to be 1.23 hours out of 27 University students who take a nap during the day. **Conclusion:** Napping is a major factor that indicates recommendation of silicone hydrogel lenses among University student.
INTRODUCTION:
Despite advances in technology and short modality of soft lens wear, many patients are still not happy subjectively or are advised to discontinue lenses after objective findings by practitioner, as reflected by the high annualized number of contact lens dropouts, with discomfort consistently being the primary driver. Efforts to address symptoms of ocular discomfort and dryness that worsen toward the end of the day have included the development of contact lens materials that exhibit low levels of on-eye dehydration, lens materials and blister-pack solutions that incorporate components to enhance wettability, such as polyvinyl alcohol and polyvinyl pyrrolidone, disinfecting solutions incorporating various surfactants and wetting agents, and rewetting drops and tear substitutes containing hydrophilic polymers and other substances such as hyaluronic acid.
A study by Tonge et al has shown clearly that new Etafilcon A lenses do not exhibit significant changes in wettability during the initial four hour wearing period. Pre-treatment of such lenses with a polymeric surfactant results in wetting of the lenses due to the adsorption of surfactant. The surfactant is retained by the lens for at least eight hours of wear, resulting in significant improvements in subjective comfort, especially over the first 30 minutes of wear. Etafilcon A hydrogel lenses, comprising poly[2-hydroxyethyl methacrylate-co-methacrylic acid] and 58% water, were soaked for 12 hours in either 0.9% saline (control) or a 1% aqueous solution of poloxamine 1107 (treated). The advancing and receding contact angles were subsequently determined ex vivo after various periods of wear in six adapted contact lens wearers using a single-blind, randomised protocol. Contact angles were measured with a dynamic contact angle tensiometer, using the Wilhelmy plate technique. Patient comfort scores were recorded and the static surface tensions of the probe fluids assessed.

1-Day Acuvue TruEye was the first silicone hydrogel daily disposable contact lens, a development that allowed the benefits associated with higher oxygen transmission to be available to patients who preferred the convenience and comfort of a single-use lens. The narafilcon A lens has a higher oxygen transmission, with a Dk/t of 118 compared to 65 for the narafilcon B lens. This higher Dk/t is achieved through slightly higher silicone content, and thus slightly different water content (46 per cent water for narafilcon A compared to 48 per cent for narafilcon B). This small difference in water content has a very minimal effect on the lens modulus, resulting in nearly identical lens handling characteristics.

PATIENTS AND METHODS
30 spectacle users and neophytes were given a trial of one day disposable hydrogel contact lens in the right eye (Etafilcon-A) and silicone hydrogel daily disposable lens in the left eye (Narafilcon- A). The subjects were unaware of the difference in lens material in the two eyes. They were not given any instruction on allowance of taking a nap during the day with the lenses on first day. The same trial was repeated after a week and this time they were permitted to nap with the lenses if desired. Subjective response was assessed by a questionnaire filled at the end of the day (after 12 hours of wear). Objective findings were assessed in the campus clinics after 12 hours of wear. Subjective and objective evaluation was done to evaluate the benefits and need of Silicone hydrogel material recommendation over the hydrogel material in one day disposable occasional wearers who have a lifestyle that includes taking naps during the day.

RESULTS
The hostel students of Amity University Haryana were approached for the study. Out of the 30 participants, 5 (16.6%) were males and 25 (83.3%) were females. The spectacle powers of all the participants were found out by doing lensmetry. The average power came to be -2.825. The average power in the right eye was -2.725 and the average power in the left eye was -2.925.

![Gender distribution](image)

Both the hydrogel and silicone hydrogel lens material were reported to be equally comfortable after a one day trial (p=0.027). Patients who wore lenses and slept felt heaviness in the hydrogel wearing eye. There was one grade change in limbal redness as per the CCLRU grading. Both the hydrogel and silicone hydrogel lens material were reported to be equally comfortable at the end of 12 hours of wear (p=0.027) in subjects who did not nap with the lenses. Subjects who wore lenses and took a nap felt heaviness in the hydrogel wearing eye. There was a change in limbal redness, from very slight to slight as per the CCLRU grading in the subjects who took a nap while wearing the lenses. 3 out of 7 removed both the lenses on their
own and did not continue wearing it post napping. 4 out of the 7 continued wearing the lenses but with complaint of heaviness in the hydrogel wearing eye. Objective findings only showed increase in limbal hyperemia. At the end of the study a survey of napping was done and it was found to be 1.23 hours out of 27 University students who take a nap during the day.

DISCUSSION AND CONCLUSION
25 of the patients did remove their lenses any time before completing 8 hours of wear. 5 of the patients said they had to remove both the lenses before completing 12 hours of continuous lens wear. The reason for removal was that the subjects had to sleep. Since they were not instructed to nap with the lenses or not in the first trial, they removed the lenses by themselves and took a nap. This is found to be a common tendency observed in hostel students. They sleep after returning to the hostel. In Amity University the classes are over by 4.45pm and most of the students are back to their rooms by 5.15pm. The first thing done is to take a nap. A study conducted by Noushad B et al also showed that 32% of students of a University in south India slept for short while with their lenses on. A survey conducted post the trials in students of Amity University found out that 23.33% of the university students take a nap post university working hours. The average napping hours was found to be 1.23 hours (p=0.022). A study in female Arab students was conducted by Abahussin et al and they found that there is a high prevalence of contact lens use by female university students in Saudi Arabia, especially for cosmetic purposes. A high prevalence of lens use and a tendency to take a nap with lenses on is a signal for contact lens induced hypoxia if the right types of lenses are not worn. All the 30 subjects were refitted with the contact lenses and this time instructed to take a nap, if desired during the day. 7 patients were found to sleep during the day while wearing their lenses. Subjective comfort response was asked after they woke up. All the 7 subjects who slept wearing the lenses had one CCLRU grade change in limbal redness. 3 of the subjects who wore lenses and took a nap felt heaviness in the hydrogel wearing eye and had to remove both the lenses after the nap (p=0.023). 4 of the subjects who continued wearing their lenses post a nap had one grade change in limbal redness as per the CCLRU grading in the hydrogel wearing eye (p=0.012). 7 out of 30 (23.33%) subjects were indicative for silicone hydrogel lenses as they opted to nap with their lenses.

The fact that students need to sleep post college hours serves as a reason for contra-indication of hydrogel lenses in the student population. Hydrogel lenses are cheaper than silicone hydrogel lenses which make a lucrative deal for the student population as they prefer to save as much as possible. Silicone hydrogels are expensive but prove to be safer in such population who is prone to take frequent naps.

The university students have a higher tendency to take short naps and sleep post university hours; hence silicone hydrogel lenses are indicated in such wearers. Knowing the patients history and lifestyle background becomes essential.

The practitioner must enquire about the life style and the frequency of naps during the day and accordingly choose the appropriate lens material. It is important to ask the patient about the napping hours in their day to day routine as it will be indicative of which lens material to be used. Occasional lens wearers can easily drop out if they experience discomfort post sleeping after wearing hydrogel lenses.

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