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Why SiHy?

The many benefits of silicone hydrogel make it a preferred material for daily disposable lenses



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FACULTY

Casey L. Hogan, OD

Stephanie L. Woo, OD

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CASEY L. HOGAN, OD

Dr. Hogan is owner of Advanced Eye Care Professionals in Oak Lawn, IL, and founder of the Chicago Dry Eye Center of Excellence and the Chicago Scleral Lens Center of Excellence.



STEPHANIE L. WOO, OD

Dr. Woo owns Havasu Eye Center, Parker Vision Care, and Blythe Vision Care. She is the president of the Scleral Lens Education Society and a GPLI Advisory Board member.

LEARNING METHOD AND MEDIUM

This educational activity consists of a discussion and 20 study questions. The participant should, in order, read the Learning Objectives contained at the beginning of this activity, read the material, answer all questions in the post test, and then complete the Activity Evaluation/Credit Request form. To receive credit for this activity, please follow the instructions provided below in the section titled To Obtain CE Credit. This educational activity should take a maximum of 2.0 hours to complete.

CONTENT SOURCE

This continuing education (CE) activity captures key statistics and insights from contributing faculty.

ACTIVITY DESCRIPTION

The goal of this article is to better educate eyecare professionals on the ocular health benefits of fitting silicone hydrogel (SiHy) daily disposable contact lenses. A review of the literature will provide the reader with a better understanding of SiHy material benefits, consequences of corneal hypoxia, perceived SiHy barriers, and today's contact lens market trends.

TARGET AUDIENCE

This educational activity is intended for optometrists, contact lens specialists, and other eyecare professionals.

LEARNING OBJECTIVES

- Upon completion of this activity, participants will be able to:
- Better understand the ocular health benefits of silicone hydrogel material and the consequences of corneal hypoxia;
 - Better understand the latest advancements and today's trends within the contact lens market;
 - Overcome perceived patient barriers.

ACCREDITATION DESIGNATION STATEMENT

This course is NCLE approved for 1.0 hour of CE credit and COPE approved for 2.0 hours of CE credit for optometrists. COPE Course ID: 58157-CL

DISCLOSURES

- Casey L. Hogan, OD, has received honorarium from CooperVision and Shire.
- Stephanie L. Woo, OD, has received honorarium from the following organizations: Alcon, Art Optical, Bausch + Lomb, Bio-Tissue, Blanchard Contact Lenses, Contamac, Essilor, GPLI, Katena, Scleral Lens Education Society, Shire, SpecialEyes, STAPLE Program, SynergEyes, Visionary Optics, and X-Cel Contacts.

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Why SiHy?

The many benefits of silicone hydrogel make it a preferred material for daily disposable lenses

→ BY CASEY L. HOGAN, OD, AND STEPHANIE L. WOO, OD

Silicone hydrogel (SiHy) lenses have come a long way since they were first introduced for extended wear. From the plasma oxidation or surface treatment processes of the earliest lenses to the naturally wetttable options available today, materials have been repeatedly modified in an effort to provide a more comfortable wearing experience for patients.

SiHy lenses offers excellent ocular health benefits and patient comfort, and many clinicians have made SiHy contact lenses their preferred lens of choice for planned replacement lenses. However, despite the many benefits of SiHy material and good adaption rates in other modalities, SiHy daily disposable lenses are fit less frequently in practice.

The goal of this article is to better educate eyecare professionals on the ocular health benefits of fitting SiHy daily disposable lenses. A review of the literature will provide the reader with a better understanding of SiHy material benefits, consequences of corneal hypoxia, perceived SiHy barriers, as well as today's contact lens market trends.

SILICONE HYDROGEL: HISTORY

Like silicone hydrogel, daily wear lenses have also evolved, and the marriage of material and the daily disposable modality has led the industry to create options that more closely align with the needs of modern patient populations. In 1984, the seminal study by Holden and Mertz¹ evaluated the relationship between corneal edema and hydrogel lens oxygen transmissibility for daily and extended lens wear. They determined the critical oxygen levels to avoid corneal edema for daily and extended wear contact lenses to be values of 87×10^{-9} oxygen

transmissibility (Dk/t) for overnight wear and 24×10^{-9} for daily wear.¹

That study was the last time anyone looked closely at oxygen needs for daily wear, and it only addressed the necessity of oxygen to avoid corneal swelling in the average eye. How different are patients' lives today than they were in 1984? How much has technology and our understanding of the ocular surface evolved since then? Are 1984 standards still relevant today?

Respectfully, Holden and Mertz established the original benchmark on oxygen transmission and corneal edema, but recent literature substantiates the need to reevaluate these standards. A 2015 article by Fonn and Sweeney² addresses the fact that the Holden and Mertz daily wear benchmark has not been challenged, and reviews why silicone hydrogel daily disposable lenses are their preferred option for daily wear. Fonn and Sweeney describe how "the criterion does not address the potential chronic effects of exposing corneas to a lower level of oxygen, nor does it address individuals' corneal needs for oxygen." There is an assumption that some patients who exhibit high levels of corneal swelling will develop signs and symptoms of hypoxia when wearing contact lenses with the 24×10^{-9} level of Dk/t, even though this Dk/t meets the criteria for daily wear.²

The authors cite numerous studies as evidence that all hydrogel contact lenses cause hypoxia, which can result in some unacceptable — and sometimes irreversible — corneal and ocular changes.² Although the risks are smaller with daily wear than they are with extended wear, the bottom line is that the risks still exist.

However, these risks can be reduced by prescribing silicone hydrogel daily disposable contact lenses. The authors assert that "sentiment has been expressed that

silicone hydrogel lens materials should be routinely prescribed over traditional hydrogel lenses for daily wear.” The authors also state that given “the availability of SiHy daily disposable lenses on the market today, this is especially sensible for patients who have greater oxygen demands and who have to wear thicker lenses because of higher and more complex prescriptions.”³

While often prescribed in hydrogel materials, daily disposable lenses may not be “good enough” to maintain ocular health in all wearers. Research shows that even daily disposable wearers often don’t follow safe wearing instructions and have lifestyles that present significant challenges to safe, comfortable lens wear.⁴

In 2015, Dumbleton and colleagues⁴ investigated compliance with daily disposable contact lens (DDCL) wear and investigated the re-use of lenses according to country and DDCL material worn. During this study, optometrists in four countries asked 805 daily disposable contact lens wearers to participate in a survey regarding their wearing habits. They found that the average daily disposable lens wearer wore their lenses for an average of 14 hours per day. In addition, 75% of respondents reported napping in their lenses, 28% reported sleeping overnight in their lenses, and 59% reported wearing their daily disposable lenses for 7 days. The authors also noted

that overnight lens wear of DDCL may place patients at a greater risk of corneal infection. They concluded that it is imperative that eyecare professionals (ECPs) exercise caution in what materials they are dispensing for DDCL wearers who may be napping and sleeping in their lenses. They recommended that ECPs properly educate and counsel all DDCL-wearing patients on the importance of appropriate lens wear and compliance.

MATERIAL BENEFITS OF SILICONE HYDROGEL

The benefits of oxygen transmissibility should not be understated. Good oxygen transmissibility lessens the incidence of chronic and acute hypoxia, limbal hyperemia, and corneal neovascularization. In 2006, Holden and colleagues⁵ asserted that Dk (oxygen permeability) and Dk/t (oxygen transmissibility) do matter. According to the authors, “the clinical imperative remains to maximize oxygen transmissibility for all lens wearers.” The authors pointed out that the eye has the greatest likelihood of good health if it receives the highest possible levels of oxygen, and that wearers need the highest Dk possible for one simple reason: the cornea is designed for normoxia during the day and the (lower) levels of oxygen provided through the eyelid at night. Any reduction in oxygen availability requires some adjustment by the cornea, and long-term compromise will, ultimately, be deleterious to corneal health (see Table 1).

HYPOXIA AND HYPEREMIA

Brennan and Morgan⁶ asserted that all hydrogel lenses induce corneal hypoxia. They further reported that open eye wear of hydrogel lenses leads to limbal hyperemia, the most obvious sign of hypoxia that occurs in most people during hydrogel lens wear. The oxygen permeability benefits of silicone hydrogel lenses, therefore, provide significant health advantages for the wearer.

A study by Morgan and colleagues⁷ was designed to derive central and peripheral Dk/t thresholds for soft contact lenses to avoid hypoxia-induced corneal swell-

TABLE 1. The Consequences of Limited Oxygen

TO INCREASE THE LIKELIHOOD OF GOOD HEALTH, THE EYE SHOULD RECEIVE THE HIGHEST POSSIBLE LEVELS OF OXYGEN. THE CONSEQUENCES OF LIMITED OXYGEN INCLUDE:

- Corneal edema
- Epithelial microcysts
- Limbal hyperemia
- Corneal neovascularization
- Refractive error changes and corneal distortion

ing (increased corneal thickness) during open eye wear. Central and peripheral corneal thicknesses were measured in a masked and randomized fashion for the left eye of each of seven subjects before and after 3 hours of afternoon wear of five conventional hydrogel and silicone hydrogel contact lens types offering a range of Dk/t from 2.4 to 115.3 units. Curve fitting for plots of change in corneal thickness versus central and peripheral Dk/t found threshold values of 19.8 and 32.6 units necessary to avoid corneal swelling during open eye contact lens wear for a typical wearer.

Although some conventional hydrogel soft lenses are able to achieve this criterion for either central or peripheral lens areas (depending on lens power), in general, no conventional hydrogel soft lenses meet both the central and peripheral thresholds. However, silicone hydrogel contact lenses typically meet both the central and peripheral thresholds, and the use of these lenses, as the authors concluded, avoids swelling in all regions of the cornea.⁷

The oxygen advantage appears to be equally as important in daily wear as it is in extended wear. As described earlier, oxygen capabilities also must apply across the entire lens. According to Brennan and Morgan,⁸ most values for hydrogel lenses give a false impression of their oxygen capabilities. They suggested that a Dk/t of above 20 is the desirable range for daily wear. Many hydrogel lenses on the market today provide a Dk/t of 10 across the entire lens — center to periphery — and due to this, Brennan and Morgan recommend SiHy daily wear contact lenses to avoid hypoxia.⁸

In addition, Covey and colleagues⁹ studied whether subjects wearing SiHy lenses could be discriminated from non-wearing subjects. This study was a prospective masked assessment of 32 subjects, 16 of whom wore experimental high-Dk soft contact lenses and 16 of whom did not wear contact lenses. Tear film characteristics, staining and vascularization of the cornea, conjunctival staining, and the presence of microcysts in the corneal epithelium were assessed using slit lamp microscopy.

The endothelium was examined for polymegethism. No differences were found between the two groups in any of the studied parameters with the exception of the high-Dk lens-wearing group, which had twofold more tear film debris and 2.5-fold more conjunctival staining than the nonlens-wearing subjects. There were no observable hypoxia-associated effects in SiHy lens wearing eyes.⁹



In 2013, Sweeney reviewed the literature to determine whether or not silicone hydrogel lenses have eliminated corneal hypoxia. ... Sweeney concluded that SiHy lenses have effectively eliminated hypoxia for most patients, regardless of wearing schedule."¹⁰

In 2013, Sweeney¹⁰ reviewed the literature to determine whether or not silicone hydrogel lenses have eliminated corneal hypoxia. Results from clinical studies, including short-term laboratory studies and retrospective and prospective clinical trials that have assessed the cornea's response to silicone hydrogels, were evaluated. The review revealed that silicone hydrogels have eliminated the physiologic signs associated with lens-induced hypoxia, including ocular and limbal redness, neovascularization, epithelial microcysts, and endothelial responses. Responses to these markers are similar to those observed with non-lens wearers. Sweeney concluded that SiHy

lenses have effectively eliminated hypoxia for most patients, regardless of wearing schedule.¹⁰

In addition, Morgan and colleagues¹¹ compared neophytes who wore daily disposable silicone hydrogel lenses to non-lens wearing controls and, after 1 year, bulbar and limbal hyperemia were clinically equivalent between the wearers and non-lens wearing controls.

REFRACTIVE ERROR CHANGES

It has also been demonstrated that Dk affects refractive error stability. Data from a retrospective chart review of myopic soft contact lens (SCL) wearers aged 8 to 22 years were analyzed for rate of progression of myopia and associated characteristics.¹² Myopic subjects (n = 912) with at least 6 months of follow-up were observed (4,341 visits; mean follow-up of 25 months). Thirty-seven percent of subjects wore hydrogel and 63% wore SiHy



SCLs. During observation, 36% of subjects experienced a change in SCL power of -0.50 D or more. Significant predictors of a future increase in minus lens power included: age (8 to 13 years), shorter time to the first increase in minus power, and hydrogel SCL material. Increases in minus power were less common among users of SiHy materials than hydrogel daily disposable lenses after controlling for age.

COMFORT

A common concern among eyecare practitioners is contact lens comfort. Some practitioners believe hydrogel lenses perform better on the comfort scale compared

with silicone hydrogel lenses. One reason for this assessment could be the hydrophobic nature that is inherent in silicone. The good news is that many manufacturers have discovered that combinations of different materials as well as changing the shape and structure of silicone can improve the hydrophilic properties, while still maintaining great oxygen transmissibility. A retrospective analysis¹³ by Diec and colleagues on approximately 40 participants compared a silicone hydrogel daily disposable with hydrogel daily disposable contact lenses. No differences in comfortable wearing time were found between groups (P=0.41; Comfort at insertion, during day, and end of day was also no different [P≥0.71]).

Research shows that when soft lens patients in low Dk materials switched to a high Dk/t silicone hydrogel daily wear, they experienced improvements in corneal and conjunctival signs of health and a reduced prevalence of uncomfortable wear and end-of-day

dryness. A large, multisite (United States and Canada), single-masked study¹⁴ enrolled experienced daily wear, low Dk/t, 2-week replacement soft contact lens wearers.

Patients were refitted into a silicone hydrogel lens for a 2-week period. After 2 weeks, subjects returned for assessment to compare the silicone hydrogel lenses with their habitual lenses. Data from 760 subjects were analyzed. Biomicroscopy evaluations showed improvements in signs related to corneal health with silicone hydrogel. Conjunctival and limbal redness, corneal neovascularization, corneal edema, and corneal and conjunctival staining all decreased significantly from baseline. Silicone hydrogel lenses performed better than habitual lenses in terms of comfort, symptoms, and overall preference. When wearing silicone hydrogel lenses, significantly fewer subjects reported problems compared with their habitual lenses, including uncomfortable lens wear (-20.3%), redness (-44.5%),

dryness during the day (-40.2%), and dryness at the end of the day (-34.4%). What's more, 47.9% of subjects reported that they could wear the silicone hydrogel lenses longer than their habitual lenses. At the end of study, among



Silicone hydrogel lenses on a daily wear basis can result in a decrease in hyperemia, which may be significant for some subjects and also results in improvement in symptoms of dryness and a decrease in discomfort.”¹⁵

those with a preference, a significantly greater proportion of patients (60.3%) preferred the silicone hydrogel lenses to their habitual lenses.¹⁴

Refitting existing low Dk lens wearers with SiHy lenses on a daily wear basis can result in a decrease in hyperemia, which may result in an improvement in symptoms of dryness and discomfort. Investigators¹⁵ studied the clinical performance and physiological responses in successful long-term wearers of conventional hydrogel lenses when refitted with daily wear SiHy contact lenses. Eighty-seven successful soft lens wearers were refitted and returned after 1 week, 1 month, and 2 months of daily wear with SiHy contact lenses. Ninety-three percent of subjects were successfully refitted. Both objective and subjective evaluations showed that bulbar and limbal hyperemia decreased significantly in all quadrants during the study. Subjects reported a reduction in end-of-day dryness and improved end-of-day comfort compared

with their habitual lenses. No significant changes in refractive error, tarsal papillary response, corneal curvature, or corneal thickness were found during the study. The authors concluded that “Silicone hydrogel lenses on a daily wear basis can result in a decrease in hyperemia, which may be significant for some subjects and also results in improvement in symptoms of dryness and a decrease in discomfort.”¹⁵

Another two-part study¹⁶ estimated the prevalence of problems occurring with soft contact lenses wearers and tested the effect of refitting patients with silicone hydrogel lenses. Part 1 utilized 1,092 lens wearers. Fifty-two percent (564 wearers) had some qualifying criteria, with dryness reported by 23%, discomfort reported by 13%, and 27% reported at least 2 hours of uncomfortable wear. Six percent of subjects had qualifying limbal hyperemia; 10% had bulbar hyperemia; and 12% had corneal staining. In Part 2, 112 of the 564 wearers classified as “problem patients” were refitted with silicone hydrogel lenses and reassessed 2 weeks later. After refitting all 112 problem patients, 75% had less dryness; 88% had better comfort ($P < 0.0001$ each); and 76% had fewer uncomfortable hours of wear ($P = 0.004$). Although the average wearing time was unchanged, comfortable wearing time increased significantly (10.4 to 11.6 hours) ($P = 0.004$). All 35 eyes with qualifying limbal hyperemia before the refit also improved ($P < 0.0001$), as did 80% (40 of 50) of those with bulbar hyperemia ($P < 0.0001$) and 76% (26 of 34) of those with corneal staining ($P = 0.005$). The authors noted that “Significant improvement in both signs and symptoms ... less dryness, better comfort and fewer hours of uncomfortable wearing time were achieved with silicone hydrogel refitting.”¹⁶

REDUCING CONTACT LENS DROPOUT

When patients experience problems with their contact lenses, it can result in contact lens dropout, which can have a negative effect on the financial side of a practice. Silicone hydrogel contact lens fits may be key in maintaining a happy, healthy contact lens population,

which, in turn, would help maintain a successful contact lens business.

Current and lapsed contact lens wearers residing in Canada were recruited using Facebook to take part in an online survey investigating contact lens-wearing experiences during 2008 to 2010 and to establish the percentage of participants who temporarily and permanently discontinued CL wear during the period surveyed.¹⁷ Their primary reported reasons for discontinuation were discomfort (24%), dryness (20%), red eyes (7%), and expense (7%).

PERCEIVED BARRIERS

Commonly reported obstacles to SiHy fits are cost, allergic response, and parameters. Let's discuss these in more depth.

- **Cost.** In a 2015 survey,¹⁸ patients considered health one of the most important factors when choosing between two contact lens brands. Ninety-five percent of contact lens wearers who said health was important reported willingness to pay more for contact lenses that

ensure eye health. Practitioners should also be mindful to communicate the difference between perceived cost versus actual cost after rebates. Showing patients the “retail price” compared with the cost of an annual supply from your office after rebates can help bridge that gap.

- **Allergy.** Silicone allergy is still up for debate. A literature review¹⁹ was undertaken to review evidence concerning the role of an allergic reaction to silicone as the basis for the reported increase in contact lens-associated infiltrates in wearers of silicone hydrogel contact lenses. As the authors clearly state, immune cells cannot interact with silicone directly. Inflammatory reactions associated with silicone hydrogel contact lens wear aren't caused by an allergic reaction to silicone alone. Antigens found on lenses could be due to tear film deposits, microbial contamination, or components of care systems.

The authors concluded that “Silicone cannot elicit a response from the immune system ... Clinicians do a disservice to their profession, their scientific training, their



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patients, and to industry by invoking the phrase ‘silicone allergy’ as the explanation for problems their patients might encounter with silicone hydrogel lenses.”¹⁹

- **Parameters.** Limited parameters are no longer an obstacle in the daily disposable SiHy market. More fitting options, and a broad range in spheres, torics, and multifocals exist, allowing practitioners to fit a wider range of patient needs. Each year, it seems more and more manufacturers are coming out with extended parameters, which has significantly helped practitioners meet the needs of their patients.

THE SILICONE HYDROGEL MARKET

A vast majority (77%) of reusable fits are silicone hydrogel, presumably due to the superior material benefits. However, adoption is still lagging in the daily disposable modality (22% of total).²⁰ Use of SiHy in specialty daily lenses (torics and multifocals) lags even further behind planned replacement modality fits, according to industry reports.²⁰

HOW TO MEET PATIENT DEMANDS

The demands of the modern patient are perhaps the best argument for making the switch to a one-day SiHy contact lens. As patients increase their daily wearing time, a hydrogel one-day contact lens may become a concern. Think about how many hours your typical contact lens patient is wearing his or her lenses. Many patients are wearing their lenses for 14 hours or more. Patients have busy lifestyles that often require the maximum breathability and corneal health maintained by a one-day silicone hydrogel contact lens. Consumers are also on a quest for healthier lifestyle choices. Health and wellness are becoming more and more important to people across the world. Take, for example, the organic food industry — consumer demand for foods without preservatives and chemicals has become increasingly popular throughout the past decade. There are many documentaries, advertisements, and books all pushing the importance of prevention and well-being in cosmet-



Limited parameters are no longer an obstacle in the daily disposable SiHy market. More fitting options, and a broad range in spheres, torics, and multifocals exist, allowing practitioners to fit a wider range of patient needs.”

ics, beauty, food, and drink. Daily disposable silicone hydrogel use is aligned with that interest because daily lenses maintain a healthy ocular surface that could be even healthier than non-daily lens counterparts.

What is the relevance of oxygen to contemporary contact lens practice? A review of the literature was conducted,¹⁰ and results indicate that oxygen is required for a number of processes that occur in the normal, healthy eye to ensure ideal function. These processes could potentially be affected by the presence of a contact lens. Evidence from laboratory, clinical, and modeling studies indicates that normal oxygenation depends on the physiological system under consideration, corneal location, and the state of eye closure. This diversity is reflected in the wide range of minimum lens Dk/t requirements that are present in the literature. As a result of these findings, the authors suggest that “... it does not seem unreasonable for a clinician to attempt to satisfy the highest [oxygen criterion] that available lens technology will permit. This pragmatic approach has considerable appeal, particularly when, as is increasingly the case, access to suitable materials and lens designs can be had.”²²

CONCLUSION

More oxygen to the eye is a good thing and is essential to eye health. We've seen a huge reduction in oxygen-related problems as new and improved lens designs and materials have been unveiled in recent years, and we continue to see improvements in contact lens technology. Most practitioners have made the switch to silicone hydrogel in monthly and 2-week lens modalities, so why not embrace those advantages for one-day contact lens patients as well? The evidence strongly supports offering silicone hydrogels to all new and existing patients, regardless of modality.^{10,22} Even if patients don't opt for a silicone hydrogel daily lens, it could still be presented as a new option, especially if they are having issues with their current lenses.

Knowledge is power. Educating patients about new contact lens options will help to keep them interested in the latest innovations in contact lens design and materials. Educating patients about their eye health and how certain contact lenses can benefit their eyes is usually all it takes for patients to make a change. Patients look to you — their doctor and an expert in the field — to help them make the best contact lens decisions based on their prescription, eye health, and lifestyle needs. ■

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Why SiHy?

CE TEST QUESTIONS

- In _____, the seminal study by Holden and Mertz evaluated the relationship between corneal edema and hydrogel lens oxygen transmissibility for daily and extended lens wear.
 - 1980
 - 1982
 - 1984
 - 1985
- In a 2015 article by Fonn and Sweeney, the authors assert that "sentiment has been expressed that _____ lens materials should be routinely prescribed over traditional hydrogel lenses for daily wear."
 - Silicone Hydrogel
 - Toric
 - Ridge
 - Soft
- Research shows that even _____ contact lens wearers often don't follow safe wearing instructions and have lifestyles that present significant challenges to safe, comfortable lens wear.
 - Monthly
 - Weekly
 - Daily disposable
 - Disposable (2-week replacement)
- In a 2015 study of daily disposable contact lens wearers, _____ reported sleeping overnight in their lenses.
 - 14%
 - 16%
 - 18%
 - 28%
- To increase the likelihood of good health, the eye should receive the highest possible levels of oxygen. One consequence of limited oxygen includes:
 - Corneal edema
 - Lid margin disease
 - Dryness
 - Meibomian gland dysfunction
- Brennan and Morgan asserted that all _____ lenses induce corneal hypoxia.
 - Silicone hydrogel
 - Hydrogel
 - Ridge
 - Toric
- According to _____, most values for hydrogel lenses give a false impression of their oxygen capabilities.
 - Brennan and Morgan
 - Cover and colleagues
 - Sweeney
 - Holden and Mertz
- Covey and colleagues studied whether subjects wearing SiHy lenses could be discriminated from non-wearing subjects. No differences were found between the two groups in any of the studied parameters with the exception of the high-Dk lens-wearing group, which had twofold more tear film debris and _____ more conjunctival staining than the nonlens-wearing subjects.
 - 1.5-fold
 - 2.5-fold
 - 3.5-fold
 - 4.5-fold
- In 2013, Sweeney reviewed the literature to determine whether or not silicone hydrogel lenses have eliminated corneal hypoxia and concluded that _____ lenses have effectively eliminated hypoxia for most patients, regardless of wearing schedule.
 - Traditional hydrogel
 - Silicone hydrogel (SiHy)
 - Soft
 - Daily disposable
- Data from a retrospective chart review of myopic soft contact lens wearers aged 8 to 22 years were analyzed for rate of progression of myopia and associated characteristics. During observation, _____ of subjects experienced a change in soft contact lens power of -0.50 D or more.
 - 16%
 - 26%
 - 36%
 - 46%
- From that same review, which of the following was indicated as a significant predictor of a future increase in minus lens power:
 - Age
 - Ethnicity
 - Longer time to the first increase in minus power
 - Modality

- 12.** In a large, multisite (United States and Canada), single-masked study, experienced daily wear, low Dk/t, 2-week replacement soft contact lens wearers were refitted into a silicone hydrogel lens for a 2-week period. Conjunctival and limbal redness, corneal neovascularization, corneal edema, and corneal and conjunctival staining all _____ from baseline.
- Slightly increased
 - Increased significantly
 - Slightly decreased
 - Decreased significantly
- 13.** In that same study, silicone hydrogel lenses performed better than habitual lenses in terms of
- Wetness
 - Symptoms
 - Overall preference
 - Comfort, symptoms, and overall preference
- 14.** In a study investigating the clinical performance and physiological responses in a group of successful long-term wearers of conventional hydrogel lenses when refitted with daily wear SiHy contact lenses, investigators found that ___ percent of subjects were successfully refitted into SiHy lenses.
- 73%
 - 83%
 - 93%
 - 94%
- 15.** In that same study, both objective and subjective evaluations showed that bulbar and limbal hyperemia decreased _____ in all quadrants during the study.
- Slightly
 - Significantly
 - Marginally
 - Moderately
- 16.** In Part 2 of a two-party study estimating the prevalence of problems occurring with soft contact lens wearers, how many subjects were classified as “problem patients”?
- 110
 - 111
 - 112
 - 113
- 17.** After being refitted with silicone hydrogel contact lenses, _____ of these “problem patients” reported better comfort.
- 88%
 - 89%
 - 90%
 - 91%
- 18.** In a recent online survey, current and lapsed contact lens wearers residing in Canada, which of the following was reported as a primary reason for discontinuing contact lens wear:
- Dryness
 - Cost
 - Comfort
 - Availability
- 19.** Commonly reported obstacles to SiHy fits include _____.
- Cost
 - Cost and allergic response
 - Cost and parameters
 - Cost, allergic response, and parameters
- 20.** A vast majority (____) of reusable fits are silicone hydrogel, presumably due to the superior material benefits.
- 76%
 - 77%
 - 78%
 - 79%

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