



Introducing a Scleral Lens Fit Assessment Guide Based on Tear Layer Thickness

Amy Dinardo, OD, MBA, FAAO; Josh Lotoczky, OD, FAAO; Chad Rosen, OD, FAAO; Craig W. Norman, FCLSA; Robert Buckingham OD, PhD, FAAO; Alyssa Spalding; Allison Middleton

Introduction

Scleral lenses are the fastest growing lens type within the gas permeable marketplace. Even with this widespread use, many fitters have not received formal training on how to fit and evaluate these lenses. In an effort to improve the fitting ability of novice lens fitters, the Michigan College of Optometry Vision Research Institute has developed a reference card designed to aid the practitioner in the evaluation of the lenses.

This study investigates practitioners' accuracy and confidence level when determining the vault/clearance of various scleral lenses before and after being introduced to the scleral lens fitting guide. Experienced and novice scleral lens fitters of various backgrounds were compared. Their answers to an online survey were statistically analyzed in order to investigate the potential effectiveness of the reference guide in practice.

Methods

Participants of an online survey were asked questions regarding location, residency training, years of practice, and number of scleral contact lens fits performed. The concept of scleral lens vault was then briefly described. Then participants were given the contact lens parameters of the lenses imaged and asked to judge the central vault of four lenses (choosing from a list of answers) along with their confidence level of each.

Participants were then shown the scleral lens fit scales with a detailed description and pictures of lens vault. Again, they were asked to grade the central lens vault of four different lenses and confidence level for each. A Chi Squared analysis was used to compare the accuracy and confidence levels of various subgroups prior to and after viewing the guide.

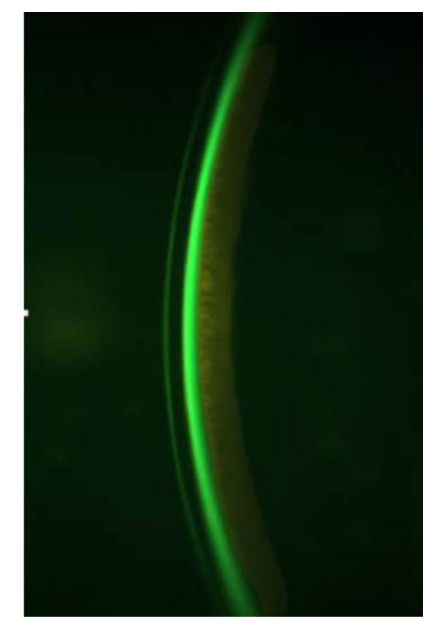
Scleral Lens Vault

Image 2

7. Please estimate how much central vault there is in Image 2 shown below

150 microns
 250 microns
 350 microns
 450 microns
 550 microns

Amount other than listed above? _____



8. How do rate your confidence level in determining how much clearance there is underneath the scleral lens shown in the above image # 2

Not confident at all
 Somewhat confident
 Very confident

Scleral Lens Fit Scales

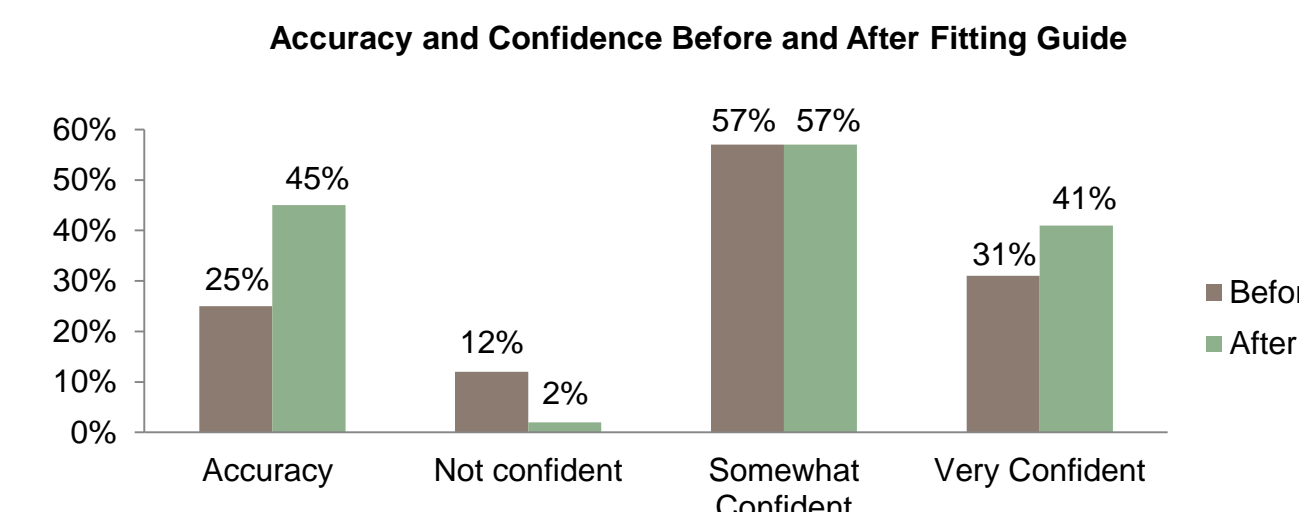
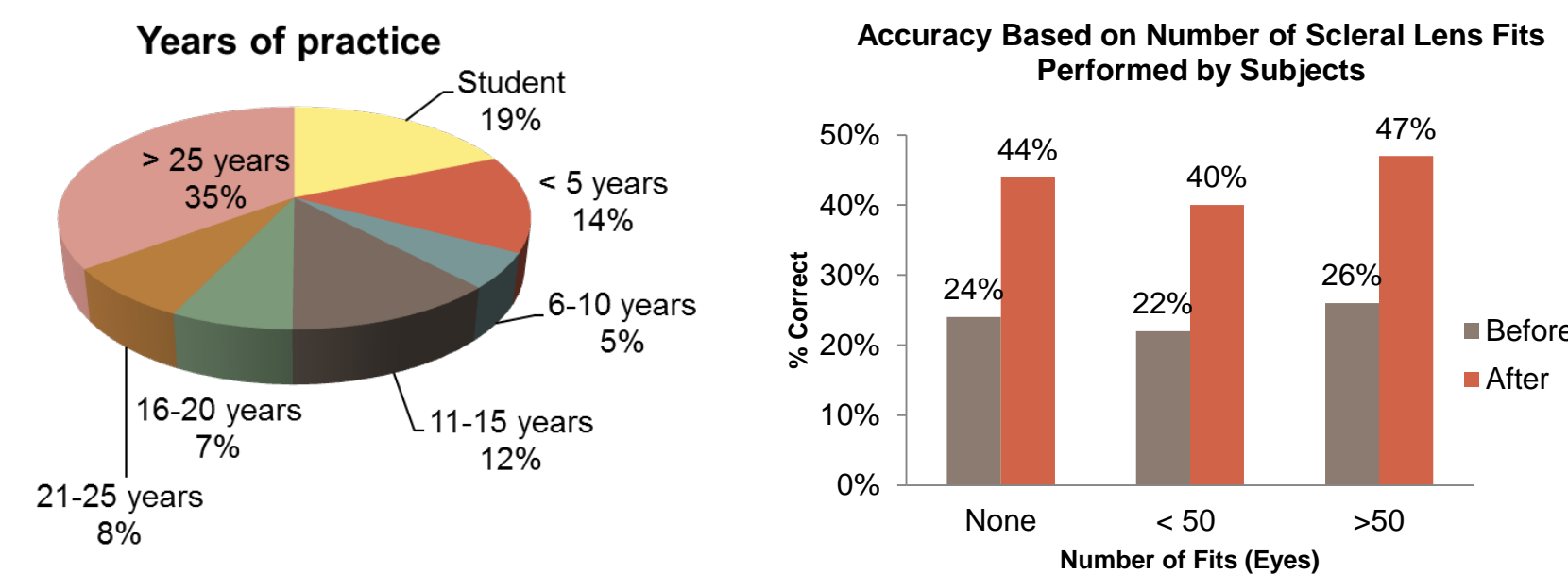
To accurately estimate the amount of vaulting (clearance) underneath the posterior surface of a scleral lens necessitates a reference point for comparison. Although some have suggested corneal thickness for this reference, we prefer the center thickness (CT) of the scleral lens itself which will be listed on the manufacturer's invoice. In each of the examples below the CT is .30mm (300 microns). In most scleral lens designs the ideal amount of clearance is about 300 microns.

1) Front surface of lens
 2) Center thickness (CT) .30mm (300 microns)
 3) Clearance 150 microns (approximately 1/2 CT)
 4) Corneal thickness

Results & Discussion

Demographics of the 156 participants were as follows:
(not all respondents answered every survey question)

Demographic	n	%	Accuracy (Pre)	Accuracy (Post)	Δ
Student	29	19%	21%	47%	26%
1-5 years of practice	22	14%	31%	55%	24%
6-10 years of practice	8	5%	22%	60%	38%
11-15 years of practice	19	12%	29%	42%	13%
16-20 years of practice	11	7%	26%	37%	11%
21-25 years of practice	12	8%	25%	37%	12%
>25 years of practice	55	35%	26%	37%	11%
Residency-trained	47	31%	26%	48%	22%
Not residency-trained	76	50%	26%	42%	16%
Zero Fits performed	24	15%	24%	44%	20%
< 50 fits performed	59	38%	22%	40%	18%
> 50 fits performed	74	47%	26%	47%	21%



Results & Discussion

- **The accuracy of the entire group increased after the use of the fitting guide by a statistically significant amount (p < 0.001).** Overall accuracy amongst all fitters increased by 20% (+/-8%).
- **Regardless of level of experience, years of practice, and residency training, participant accuracy prior to viewing the scleral lens guide remained relatively similar.** About 75% of all attempts were inaccurate and 25% of all attempts accurate.
- **Viewing the scleral lens guide increased the confidence level for most users by a statistically significant amount (p<.001).** The individuals who rated their confidence level the lowest were the most positively effected by viewing the fit scales.
- **Confidence and accuracy are not necessarily related.** Many people were very confident on their initial assessments prior to seeing the guide and yet performed similarly to people who were less confident.

Conclusion

Utilizing the MCO scleral lens fitting guide can result in improved accuracy as well as increased confidence in the assessment of scleral lens vault.

The guide is useful for practitioners of all backgrounds and levels.

Even if confidence is good, practitioners must ensure they aren't overlooking steps when evaluating the fit of scleral lenses