A comparative survey of optometrists' utilization of the binocular indirect ophthalmoscopy procedure

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Abstract
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Results: A 50% response rate was achieved from the mailing. Respondent practice setting was predominately private practice. Comparing the two cohorts of optometrists, statistically significant variance was revealed in practice setting, confidence levels in utilization of the procedure, total binocular indirect ophthalmoscopy procedures performed, and instrument utilization for particular patient encounters. When only private practice optometrists were compared in terms of perceived confidence level in the binocular direct ophthalmoscopy procedure, statistically significant variance still existed.

Conclusion: Our statistically significant data revealed that the training an optometrist obtains while in school seems to influence the way he practices optometry. The confidence in the use of a particular instrument a doctor acquires through his formal education does not appear to be exceeded by the confidence he receives through continuing education. In this light, it is essential that formal optometric education include training in techniques and procedures that are foreseen to become standard of care.

Degree Type
Thesis

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A COMPARATIVE SURVEY OF OPTOMETRISTS' UTILIZATION OF THE BINOCULAR INDIRECT OPHTHALMOSCOPY PROCEDURE

By

TROY M. HUMPHREYS
BRADLEY J. LIGHTFOOT

A thesis submitted to the faculty of the College of Optometry Pacific University Forest Grove, Oregon For the degree of Doctor of Optometry May, 2000

Advisors:
Dr. Suzanne D. Scott
Dr. Darin L. Paulson
A COMPARATIVE SURVEY OF OPTOMETRISTS’ UTILIZATION OF THE BINOCULAR INDIRECT OPHTHALMOSCOPY PROCEDURE

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May, 2000
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- All of the survey participants who made this endeavor possible.

- The Pacific University Continuing Education department for the use of their database.

- All our friends and family that offered their continual support.
Abstract

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The American Optometric Association Optometric Clinical Practice Guidelines encourages a dilated fundus examination as part of a routine comprehensive vision examination. Binocular indirect ophthalmoscopy is a method of evaluating the posterior and peripheral fundus that has been introduced in recent years as optometric standard of care. The purpose of this survey was to compare the utilization of binocular indirect ophthalmoscopy between two cohorts of optometrists, one who received formal education on the technique and one who did not.

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Results

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Our statistically significant data revealed that the training an optometrist obtains while in school seems to influence the way he practices optometry. The confidence in the use of a particular instrument a doctor acquires through his formal education does not appear to be exceeded by the confidence he receives through continuing education. In this light, it is essential that formal optometric education include training in techniques and procedures that are foreseen to become standard of care.
Troy M. Humphreys

Troy completed his undergraduate studies at the University of California at Berkeley with a Bachelor of Arts in Integrative Biology in 1996. During his optometric studies at Pacific University College of Optometry, Troy served as both president and vice-president of his class, Research and Awards Committee student liaison, Student Optometric Association class representative, and member of the Beta Sigma Kappa Optometric Honor Society. Troy was also a team member on an Amigos Eyecare mission to San Jose, Costa Rica in 1998 where over 2,000 people received very necessary eyecare. During his fourth year of Optometry school, Troy completed externships at Fort Wainwright Army Hospital in Fairbanks, Alaska, and the Pacific Cataract and Laser Institute in Bellevue, Washington. Upon graduation, Troy intends to join his father in private primary eyecare practice in Sparks, Nevada.

Bradley J. Lightfoot

In 1996 B.J. completed his undergraduate education at Linfield College in McMinnville, Oregon. He is currently pursuing his doctorate of optometry at Pacific University and will graduate in May, 2000. During his studies he was active in various student organizations and extracurricular activities. B.J. was involved with the Student Optometric Association serving as both class representative and vice-president. He was also a member of Amigos Eyecare and Beta Sigma Kappa. During his fourth year of optometric studies, B.J. completed externships at the Eye Institute of Utah in Salt Lake City, Utah and at Snowy Range Vision clinic in Laramie, Wyoming. Upon graduation B.J. plans to join a private optometric practice in the western United States focusing on ocular pathology and contact lenses.
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Introduction

Throughout the history of primary eyecare practice within the United States, ophthalmology has adopted the 'comprehensive' examination, including peripheral fundus evaluation, as a normal clinical encounter of asymptomatic patients. In the past, the optometric standard of care had utilized a more limited range of services with dilation rarely occurring. However, in the last 16 years, optometry has included dilation and peripheral fundus evaluation as a standard of care. Today, optometrists in all 50 states can use diagnostic pharmaceutical agents (DPAs) for performing dilated fundus examinations. The AOA Clinical Practice guidelines encourages DFEs as part of a routine comprehensive vision examination (CVE).

As suggested in the literature, many ocular abnormalities can be overlooked by using a direct ophthalmoscope alone. One-tenth of significant fundus lesions in asymptomatic patients are beyond the view of the direct ophthalmoscope. Indirect ophthalmoscopy procedures and methodology have improved since Nagel's introduction of the technique in 1864, allowing the primary eyecare practitioner increased field of view, excellent image resolution, and stereopsis to better evaluate the posterior ocular structures.

As the primary eyecare profession, optometrists today must be able to detect, diagnose, and manage ocular disease, regardless of how small of a percentage of the population it affects. Choroidal nevi, for instance, due to their size and color blending effect, can be overlooked with the direct ophthalmoscope and are more easily revealed with the larger field of view of the indirect ophthalmoscope. The instrument of choice for differentiating choroidal nevi and choroidal melanomas and for evaluating the depth of overlying serous detachment is the binocular indirect ophthalmoscope. Binocular instrumentation has added to the armamentarium that the optometrist can use as a first line of defense against posterior ocular pathology.

Because optometry is increasing the scope of practice it is necessary to train new optometrists in all of the procedures required to complete a comprehensive visual examination and maintain our standard quality of care as a unified profession. Binocular indirect ophthalmoscopy is just one examination method that has increased our ability to detect and diagnose ocular pathology. Dr. William Stacy, in a guest editorial entitled "The Case for Indirect Ophthalmoscopy" suggests that monocular indirect ophthalmoscopy is like looking through an open window with one eye closed. And binocular indirect ophthalmoscopy is like opening the door, stepping in and looking around with both eyes open.

Many optometrists practicing today did not learn binocular fundus viewing techniques during their formal optometric education. Some optometrists have not learned the binocular indirect ophthalmoscopy procedure and still use the direct or monocular indirect ophthalmoscope for dilated fundus examinations. On the other hand, many of the practicing optometrists that did not learn the procedures in school have taken continuing education courses to become skilled in the procedure. These differences in binocular indirect ophthalmoscopy training and utilization can be useful in evaluating...
how optometry has embraced binocular indirect ophthalmoscopy as a standard of vision care.

To our knowledge, no formal survey has been done that has examined differences in binocular indirect ophthalmoscopy training and utilization. The purpose of this study is to compare two cohorts of optometrists, one that received binocular indirect ophthalmoscopy training in their formal education and one that did not, in order to determine how formal teaching of this primary eyecare procedure has affected practitioner attitude toward the ease, efficacy and usage of binocular indirect ophthalmoscopy.
Methods

A survey was administered to six graduating classes from Pacific University College of Optometry. Three hundred fifty-one surveys were mailed to the members of the graduating classes of 1973, 1974, 1975, 1993, 1994, and 1995. Individuals from the same educational institution were selected to factor out any educational or curricular variation. Formal training in the use of binocular indirect ophthalmoscope was introduced into the Pacific University College of Optometry curriculum in the spring of 1979 in the second year procedures course. The surveyed population was divided into two cohorts based on this fact. The first cohort, consisting of the classes of 1973, 1974, and 1975, formed the group who did not receive formal BIO training. The second cohort was derived from the classes of 1993, 1994, and 1995, those classes who received formal binocular indirect ophthalmoscope training during their optometric education at Pacific University College of Optometry.

The survey requests information about the doctor's formal education, any training received in the use of the BIO, the doctor's practice setting, the number of comprehensive vision exams performed daily, and the total number of BIO examinations performed in a career. The remaining questions asked the doctors to rate their confidence in using the BIO, to indicate what conditions they use the BIO, and to compare it to other instruments used to evaluate the posterior ocular structures. Rating scales with 1 representing "not confident or insufficient" and 5 representing "extremely confident or extremely sufficient" were used. For a complete listing of questions and an example survey please refer to Appendix A.

The returned surveys were divided into their respective cohorts based on graduation date, and further divided based on practice setting. The confidence level of the two cohorts was compared using the Chi-square test for non-parametric data. The utilization tendencies and the instrument comparisons were also analyzed using the Chi-square statistic.
Results

Respondents

Of the 345 surveys sent to 1970's and 1990's Pacific University College of Optometry graduates, 171 (50.0%) responded from various practice settings. Refer to Table 1.

Table 1. Respondent Practice Settings

Question 2: In what practice setting do you work?

<table>
<thead>
<tr>
<th></th>
<th>Private</th>
<th>Commercial</th>
<th>Other</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990's</td>
<td>53 (53.0%)</td>
<td>27 (27.0%)</td>
<td>20 (20.0%)</td>
<td>100</td>
</tr>
<tr>
<td>1970's</td>
<td>59 (83.0%)</td>
<td>3 (4.2%)</td>
<td>9 (12.7%)</td>
<td>71</td>
</tr>
</tbody>
</table>

Refer to Chart 1 for relative percentages of each practice modality.

Performing a chi-square test for significance between the 1970's and 1990's doctors revealed significant variance between the two groups ($x^2=30.3$, $p<0.005$). This variance must be taken into consideration when analyzing the data.

Respondent totals vary for each question as not all doctors answered every question. The questions that were not answered on these surveys were thus omitted.
Confidence Levels

Drawing a comparison between the 1970's and 1990's doctors' confidence level in the BIO procedure revealed significant variance between the two groups ($x^2=38.7, p<0.005$). The 1990's respondents had significantly greater confidence in their proficiency compared to the 1970's doctors. Refer to Table 2.

Table 2. Respondent Confidence Levels (1 Low - 5 High)

<table>
<thead>
<tr>
<th>Question 6: How would you rate your confidence level in proficiency with the BIO?</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;or=2</td>
</tr>
<tr>
<td>1990's</td>
</tr>
<tr>
<td>1970's</td>
</tr>
</tbody>
</table>

Chart 2 represents percentages of doctors within each cohort and their relative confidence level (1 = not confident - 5 = confident).

Continuing Education

In terms of the continuing education for binocular indirect ophthalmoscopy that the two cohorts of optometrists received, the chi-square test revealed no significant variance between the two groups ($x^2=0.60, p>0.05$). Refer to Table 3 and Chart 3.
Table 3. Respondent Continuing Education

**Question 4:** Have you received BIO training through Continuing Education or optometric seminars?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990's</td>
<td>92 (92.9%)</td>
<td>7 (7.1%)</td>
<td>99</td>
</tr>
<tr>
<td>1970's</td>
<td>68 (95.8%)</td>
<td>3 (4.2%)</td>
<td>71</td>
</tr>
</tbody>
</table>

**chart 3. Respondent Continuing Education**

**Comprehensive Examinations/BIO Totals**

The two cohorts had no significant variance in terms of the number of comprehensive vision examinations (CVE) they performed each day ($x^2=2.44$, $p>0.05$). Refer to Table 4 and Chart 4.

Table 4. Respondent Comprehensive Vision Exams (CVEs) per day

**Question 7a:** On average, how many comprehensive vision exams do you perform on asymptomatic patients age 18-45 each day?
Despite the similarities between the two groups in terms of CVE's performed each day, the 1990's doctors significantly performed more BIO examinations throughout their careers ($\chi^2=10.12, p<0.05$) even though the 1970's doctors have practiced 20 more years on average compared to the 1990's doctors. Refer to Table 5 and Chart 5.

Table 5. Respondent BIO Totals (Career)

*Question 8:* Approximately how many times have you performed BIO in your entire career?

<table>
<thead>
<tr>
<th></th>
<th>0-1K</th>
<th>1K-5K</th>
<th>5K-10K</th>
<th>10K+</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990's</td>
<td>21(21.9%)</td>
<td>35(36.5%)</td>
<td>27(28.1%)</td>
<td>13(13.5%)</td>
<td>96</td>
</tr>
<tr>
<td>1970's</td>
<td>27(38.0%)</td>
<td>21(29.6%)</td>
<td>14(19.7%)</td>
<td>9(12.7%)</td>
<td>71</td>
</tr>
</tbody>
</table>
Private Practice Doctors

When only the private practicing optometrists were evaluated as a separate group, the confidence level still showed significant variance ($x^2=20.28$, $P<0.005$). Refer to Table 6 and Chart 6.

Table 6. Private Practice Doctor's Confidence Levels

**Question 6:** How would you rate your confidence level in proficiency with the BIO?

<table>
<thead>
<tr>
<th></th>
<th>&lt;or = 2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990's</td>
<td>0(0%)</td>
<td>6(11.3%)</td>
<td>30(56.6%)</td>
<td>17(32.1%)</td>
<td>53</td>
</tr>
<tr>
<td>1970's</td>
<td>9(18.0%)</td>
<td>18(32.0%)</td>
<td>26(54.0%)</td>
<td>6(12.0%)</td>
<td>50</td>
</tr>
</tbody>
</table>
Furthermore, the private practicing optometrists had no significant variance in terms of BIO totals performed in their careers. Refer to Table 7 and Chart 7.

**Table 7. Private Practice Doctors' BIO Totals**

*Question 7a: On average, how many comprehensive vision exams do you perform on asymptomatic patients age 18-45 each day?*

<table>
<thead>
<tr>
<th></th>
<th>0-1K</th>
<th>1K-5K</th>
<th>5K-10K</th>
<th>10K</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990's</td>
<td>11(21.2%)</td>
<td>25(48.1%)</td>
<td>11(21.2%)</td>
<td>5(9.6%)</td>
<td>52</td>
</tr>
<tr>
<td>1970's</td>
<td>22(37.3%)</td>
<td>19(32.2%)</td>
<td>12(20.3%)</td>
<td>6(10.2%)</td>
<td>59</td>
</tr>
</tbody>
</table>
**Fundus Examination Efficacy**

The doctors ranked different fundus examination procedures based upon their efficacy in completely evaluating the posterior ocular structures in an asymptomatic patient. Comparing the cohorts with a chi-square significance test, there was no significance in efficiency rating ($p>0.05$) between the BIO, direct ophthalmoscopy, Monocular Indirect Ophthalmoscope (MIO), and high plus (HP) procedures. Refer to Table 8 and Chart 8.

Direct ophthalmoscopy was excluded from statistical analysis due its minimal usage amongst surveyed optometrists.

**Table 8. Respondent Median Efficacy Ratings (1 Most Efficacious - 4 Least Efficacious)**

*Question 9:* Please rank the following fundus examination techniques based upon their efficacy in completely evaluating the posterior ocular structures of asymptomatic patients age 18-45.

<table>
<thead>
<tr>
<th></th>
<th>BIO</th>
<th>MIO</th>
<th>HP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990's</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>1970's</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>
Instrument Utilization

As an addition to the study, doctors were asked which instrumentation they would use to evaluate the fundus in patients with diabetic history, glaucomatous history, hypertensive history, myopic history (>-.4.00D), and symptomology of flashes and floaters. Interestingly enough, each condition produced a significant variance of instrumentation utilized. For patients with a history of diabetes mellitus there was a statistically significant variance in instrumentation utilized ($x^2=8.80$, $p<0.01$). For patients with a history of glaucoma statistically significant variance also existed ($x^2=9.84$, $p<0.01$). For patients with a history of hypertension, there was a statistically significant variance in instrumentation utilized ($x^2=26.99$, $p<0.005$). For patients with a history of myopia >-4.00D a statistically significant variance was also noted ($x^2=16.87$, $p<0.005$). For patients with a history of flashes and floaters, no statistically significant variance was noted ($p>0.05$) as the vast majority of practitioners utilized the BIO procedure. Refer to Table 9-13 and Chart 9-13.
Table 9. Respondent Instrument Utilization in DM Patients

**Question 10:** What instrumentation do you consider most valuable in evaluating the fundus of the following patient types? (check one instrument per condition).
- History of Diabetes
- History of Glaucoma
- History of Hypertension
- Myopia > -4.00D
- Symptomology of flashes and floaters

<table>
<thead>
<tr>
<th>Instrument</th>
<th>1990's</th>
<th>1970's</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO</td>
<td>44(44.4%)</td>
<td>28(41.2%)</td>
</tr>
<tr>
<td>MIO</td>
<td>4(4.1%)</td>
<td>12(17.6%)</td>
</tr>
<tr>
<td>HP</td>
<td>51(51.5%)</td>
<td>28(41.2%)</td>
</tr>
<tr>
<td>Totals</td>
<td>99</td>
<td>68</td>
</tr>
</tbody>
</table>

Chart 9. Respondent Instrument Utilization in DM Patients

![Chart 9](image_url)
Table 10. Respondent Instrument Utilization in Glaucoma Patients

Question 10: What instrumentation do you consider most valuable in evaluating the fundus of the following patient types? (check one instrument per condition).
- History of Diabetes
- History of Glaucoma
- History of Hypertension
- Myopia > -4.00D
- Symptomology of flashes and floaters

<table>
<thead>
<tr>
<th></th>
<th>BIO</th>
<th>MIO</th>
<th>HP</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990's</td>
<td>3(3.1%)</td>
<td>2(1.0%)</td>
<td>93(94.9%)</td>
<td>98</td>
</tr>
<tr>
<td>1970's</td>
<td>4(5.6%)</td>
<td>10(13.9%)</td>
<td>58(80.5%)</td>
<td>72</td>
</tr>
</tbody>
</table>

Chart 10. Respondent Instrument Utilization in Glaucoma Patients
Table 11. Respondent Instrument Utilization in HTN Patients

Question 10: What instrumentation do you consider most valuable in evaluating the fundus of the following patient types? (check one instrument per condition).

- History of Diabetes
- History of Glaucoma
- History of Hypertension
- Myopia > -4.00D
- Symptomology of flashes and floaters

<table>
<thead>
<tr>
<th>Instrument</th>
<th>1990's</th>
<th>1970's</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO</td>
<td>36(36.4%)</td>
<td>25(35.7%)</td>
<td>99</td>
</tr>
<tr>
<td>MIO</td>
<td>7(7.1%)</td>
<td>26(37.1%)</td>
<td></td>
</tr>
<tr>
<td>HP</td>
<td>56(56.5%)</td>
<td>19(27.1%)</td>
<td>70</td>
</tr>
</tbody>
</table>

Chart 11. Respondent Instrument Utilization in HTN Patients
Table 12. Respondent Instrument Utilization in Myopic (> -4.00D) Patients

*Question 10:* What instrumentation do you consider most valuable in evaluating the fundus of the following patient types? (check one instrument per condition).
- History of Diabetes
- History of Glaucoma
- History of Hypertension
- **Myopia > -4.00D**
- Symptomology of flashes and floaters

<table>
<thead>
<tr>
<th></th>
<th>BIO (%)</th>
<th>MIO (%)</th>
<th>HP (%)</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1990's</strong></td>
<td>91(96.8%)</td>
<td>1(1.1%)</td>
<td>2(2.1%)</td>
<td>94</td>
</tr>
<tr>
<td><strong>1970's</strong></td>
<td>52(76.5%)</td>
<td>12(17.6%)</td>
<td>4(5.9%)</td>
<td>68</td>
</tr>
</tbody>
</table>

**Chart 12. Respondent Instrument Utilization in Myopic (>4D) Patients**

- **1990s**
- **1970s**

Instrument
Table 13. Respondent Instrument Utilization in Patients with Flashes and Floaters (F/F)

Question 10: What instrumentation do you consider most valuable in evaluating the fundus of the following patient types? (check one instrument per condition).
- History of Diabetes
- History of Glaucoma
- History of Hypertension
- Myopia > -4.00D
- Symptomology of flashes and floaters

<table>
<thead>
<tr>
<th></th>
<th>BIO</th>
<th>MIO</th>
<th>HP</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990's</td>
<td>97(97%)</td>
<td>1(1%)</td>
<td>2(2%)</td>
<td>100</td>
</tr>
<tr>
<td>1970's</td>
<td>63(87.5%)</td>
<td>3(4.2%)</td>
<td>6(8.3%)</td>
<td>72</td>
</tr>
</tbody>
</table>

![Chart 13. Respondent Instrument Utilization in Patients with F/F](image)
Discussion

Confidence

The 1990's doctors seem to be more confident in the use of the BIO than the 1970's doctors. The confidence differences could be due to formal education in the procedure or hands-on practice of the procedure. Our comparisons help us define the reasons. When doctors in the same practice setting (private practice) were compared it was discovered that no significant differences in the amount of continuing education or the total number of BIO exams existed. These facts considered leaves formal education in the use of the BIO as the most likely cause for the increased level of confidence noted in the 1990's doctors.

Utilization

Five separate conditions that suggest the need for a posterior fundus examination were presented to the doctors. The doctors indicated the instrument they preferred most to complete the evaluation and ranked the other choices in efficacy as well. The instruments presented to the doctors were the BIO, the monocular indirect ophthalmoscope (MIO), and the high plus lens used in conjunction with the biomicroscope. The five conditions that were studied were patient history of any of the following; diabetes mellitus (DM), myopia >4.00D, glaucoma, hypertension, or flashes and floaters. The analyzed data revealed that the two cohorts utilize the BIO differently.

Diabetes

When a patient presents with a history of DM the two cohorts exhibit somewhat similar trends in instrumentation choice. The majority of both the 1970s and the 1990s doctors elected to use the BIO or the high plus lens to evaluate the posterior ocular structures in this case. The largest discrepancy discovered between the groups was found in the prevalence of the 1970s doctors to use the MIO for evaluation of a patient presenting with a positive history of DM. 17.6% of the 1970s doctors elected to use the MIO while only 4.0% of the 1990s doctors used the MIO. Training in the use of the MIO was minimal in the curriculum of the 1990s doctors. This illustrates the tendency of doctors to use instrumentation for which they received training in their formal education.

High Myopia

A resounding trend was noted among both cohorts when a patient presents with a history of myopia greater than 4.00D. Both groups overwhelmingly chose to use the BIO to evaluate the patient in this case. However, a notable percentage of 1970s doctors again relied on the MIO for examining the myopic patient's fundus (17.6%).
Glaucoma

When a patient presents with a history of glaucoma the majority of both groups were in agreement that the high plus lens in conjunction with the biomicroscope was the most effective method for evaluating the patient's fundus. Once again there was a portion of the 1970s doctors who still chose to use the MIO to evaluate the glaucomatous patient (13.9%).

Hypertension

The patient presenting with a history of hypertension produced a notable division between the two cohorts in their instrumentation choice. An equivalent amount of each group chose to use the BIO to evaluate the hypertensive patient, but 29.5% more of the 1990s doctors favored the high plus lens for assessment in this instance. Again there was a significantly higher percentage of 1970s doctors using the MIO for posterior ocular structure examination than 1990s doctors (30.0%).

Flashes and Floaters

The BIO was selected for fundus evaluation of the patient who presents with symptoms of flashes and floaters by the vast majority of both cohorts.

The differences in the preceding four sub-groups indicate a higher prevalence of MIO utilization among 1970s doctors and a higher BIO utilization among 1990s doctors. This trend illustrates that doctors utilize instrumentation in which they received formal education.

Efficacy

The doctors were surveyed on their opinions of the efficacy of the three instruments. Both cohorts ranked the BIO as most efficacious, but as indicated earlier, the 1990s doctors use the instrument in practice significantly more. Both groups ranked the high plus lens as moderately efficacious. Both cohorts ranked the MIO as least efficacious. However, a notable percentage of 1970s doctors reported using the MIO in evaluating patients in all of the surveyed conditions except symptoms of flashes and floaters. While both cohorts recognize the efficacy of the instruments, the 1990s doctors exhibit higher confidence in the use of the BIO and use the instrument more in practice. The 1970s rank the MIO as least efficacious, but continue to use the instrument in practice at a greater rate than the 1990s doctors.
Conclusion

The training a doctor obtains while in school seems to influence the way he practices optometry. The confidence in the use of a particular instrument a doctor acquires through his formal education does not appear to be exceeded by the confidence he receives through continuing education.
References


Appendix A

Binocular Indirect Ophthalmoscopy Use Survey

Please circle answers to questions below:

2. In what practice setting do you work? -Private Practice- -Commercial- -Hospital-Based-
   -Co-Management/Referral Center- -HMO-
   -Other, please specify________________
3. Was binocular indirect ophthalmoscopy (BIO) training offered through your formal education at Pacific University College of Optometry? If Yes, skip to question #6.
   Yes    No
4. Have you received BIO training through Continuing Education or optometric seminars? Yes    No
5. Has CE training in the BIO procedure been sufficient to train you to use the instrument? (1=insufficient, 5=extremely sufficient)
   1   2   3   4   5
6. How would you rate your confidence level in proficiency with the BIO? (1=not confident, 5=extremely confident)
   1   2   3   4   5

7. a) On average, how many comprehensive vision exams do you perform on asymptomatic patients age 18-45 each day? 0-6 7-12 13-18 19-24 25-30 30+ b) For approximately what percentage of asymptomatic patients age 18-45 do you perform BIO on during a routine comprehensive vision exam? ___%  
8. Approximately how many times have you performed BIO in your entire career? 0-100 100-999 1,000-4,999 5,000-9,999 10,000-19,999 20,000+
9. Please rank the following fundus examination techniques based upon their efficacy in completely evaluating the posterior ocular structures of asymptomatic patients age 18-45. (1=most efficacious, 4=least efficacious) Binocular Indirect Ophthalmoscopy  Direct Ophthalmoscopy  Monocular Indirect Ophthalmoscopy  High Plus Lens (90 D, Superfield, etc.)

10. What instrumentation do you consider most valuable in evaluating the fundus of the following patient types? (check one instrument per condition)

   BIO    MIO    Direct    High Plus
- History of Diabetes
- History of Glaucoma
- History of Hypertension
- Myopia > - 4.00D
- Symptomology of flashes and floaters

Thank you for your time and consideration in completing our survey.