**False Positive Amblyopia Prediction (“Pseudoamblyopia”) During Fixation Preference Testing of Strabismic Patients Correlates with Ocular Dominance**

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**Purpose:** Binocular fixation preference testing (BFPT) is a commonly used clinical method to predict strabismic amblyopia in probands. However, false positive cases can lead to inappropriate patching treatment. We explore potential correlates for this phenomenon.

**Methods:** Prospective cohort study (2013-2014) of consecutive verbal comitant strabismic patients without decreased vision other than strabismic amblyopia. BFPT was graded from 1 (strong preference) to 4 (true alternate). With grade 1 or 2 considered positives of amblyopia; this was later compared to the presence/absence of true strabismic amblyopia. Ocular dominance and hand dominance were assessed and previous patching history was documented.

**Results:** Of 114 enrolled subjects (mean 7.9 years old, range 3.4 to 22.4 years, 38 males) 91 (80.3%) had right esotropia and 77 (67.6%) had accommodative esotropia. The mean angle of primary position horizontal strabismus was 27.9 PD ±13.8 SD (range 8 to 70 PD), with only one patient having (10 PD). Six patients also had vertical deviation in primary position with a mean of 0.3 PD ± 1.3 SD (range 0 to 2 PD). Thirty-nine subjects of the 114 (34.2%) had false positive results or “pseudoamblyopia” (best-corrected visual acuity difference between eyes >3 logMAR or fixation grade ≤2). As for these “pseudoamblyopia” subjects, there was a strong correlation between eye fixation preference and ipsilateral ocular dominance (31/39, 79.5%, chi square p value <0.0001) but no correlation between hand preference and ipsilateral ocular dominance (grade 1 & 2 vs. 3 & 4, (42.6% vs. 57.4%, chi square p value 0.344). The positive predictive value was 68.9% (95% confidence interval [CI], 54.0-84.0%) but negative predictive value was only 97.6%, 95% CI (93.8-99.6%). No subgroup (type or degree of strabismus) difference was noted.

**Ocular dominance was tested by asking the subject/family to criss-crossing fingers of his/her hands that were then brought close to the his/her face** ("hole in the hand" test). Hand dominance was assessed by asking the subject/family if they preferred writing/drawing with which hand was used for writing/drawing. History for recent prescribed patching was documented. After the exam, the patient had his/her full ophthalmic examination and thereafter the chart was reviewed for pertinent clinical details.

Data were analyzed using SPSS version 19.0.

### Table: Sensitivity, specificity, and predictive values for amblyopia detection

<table>
<thead>
<tr>
<th>Fixation grade</th>
<th>True amblyopia?</th>
<th>Totals</th>
<th>Sensitivity (95% CI)</th>
<th>Specificity (95% CI)</th>
<th>PPV (95% CI)</th>
<th>NPV (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET only</td>
<td>≥ 10 PD</td>
<td>78</td>
<td>100% (93.9-100)</td>
<td>97.1% (92.7-99.7)</td>
<td>100% (100)</td>
<td>97.1% (92.7-99.7)</td>
</tr>
<tr>
<td>ET only</td>
<td>&lt; 10 PD</td>
<td>36</td>
<td>97.2% (90.9-99.7)</td>
<td>92.6% (85.5-97.5)</td>
<td>88.9% (76.3-99.5)</td>
<td>98.2% (93.2-99.9)</td>
</tr>
<tr>
<td>ET &amp; XT</td>
<td>≥ 10 PD</td>
<td>74</td>
<td>97.4% (95.0-99.3)</td>
<td>97.1% (92.7-99.7)</td>
<td>97.4% (93.7-99.6)</td>
<td>97.4% (93.7-99.6)</td>
</tr>
<tr>
<td>ET &amp; XT</td>
<td>&lt; 10 PD</td>
<td>36</td>
<td>94.4% (87.6-98.6)</td>
<td>92.6% (85.5-97.5)</td>
<td>88.9% (76.3-99.5)</td>
<td>98.2% (93.2-99.9)</td>
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**Discussion**

In this cohort of 114 subjects referred for strabismus 39/114 (34.2%) had false positive results during BFPT. No difference was detected for esotropia versus exotropia or different subgroup angles of strabismus in our cohort. For these “pseudoamblyopia” cases the fixing eye correlated with ipsilateral ocular dominance, evidence that ocular dominance is a factor underlying “pseudoamblyopia” in BFPT. BFPT was a poor screening test for strabismic amblyopia as those with a positive test were almost as likely to not have true amblyopia as they were to have true amblyopia. Thus the results of such testing should not be used in isolation when making a decision for amblyopia treatment.

On the other hand, negative predictive value was high - subjects without a fixation preference were very unlikely to have true amblyopia. Thus BFPT does predict the absence of strabismic amblyopia well.

### References