Near Point Convergence Predicting Return to Learn

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PURPOSE
Identify whether abnormal near point convergence (NPC) can be used as a clinical predictor of a student’s ability to return to learning (RTL)

NEAR POINT CONVERGENCE (NPC)
NPC: the distance from the nose to where the eyes stop crossing as an object moves towards the nose
Testing: US device with microprocessor

CONVERGENCE INSUFFICIENCY
Convergence insufficiency (CI): post-concussion binocular vision deficit.
Normal= 6 cm or less
Borderline= 6-9 cm
Abnormal= ≥10 cm

Approximately 5% of people have CI as baseline data.
CI is the most common visual dysfunction after concussion.
56%-70% of concussed patients exhibit CI.
Possible effects of CI:
Visual discomfort, HA, and vision-mediated functional difficulties
Lack of concentration leading to impaired academic, work, and sport performance

METHODS
RETROSPECTIVE CHART REVIEW PILOT STUDY
PARAMETERS:
• Patients visited between 11/22/17-11/27/18 within 7 months of injury
• Students ages 12-25
• NPC checked every visit using US device and clinical evaluation by concussion specialist
• Academic tolerance assessed at each clinical evaluation

*Excluded patients with function oculomotor disfunctions, learning disorders, seizure disorders, brain bleeds, 3+ head injuries

RETURN TO LEARN (RTL)

ACADEMIC ZONES:
Red: no school / complete cognitive rest
Orange: part-time school attendance with many accommodations
Yellow: half to full-day of school attendance with some accommodations
Green: full days with no accommodations
Blue: full days with full workload and return to sport

SIGNSIFICANCE
• Little research completed on clinical predictors of RTL
• The data supports the use of oculomotor testing (NPC) for concussion assessment and recovery (ref VOMS paper)
• NPC testing can be easily done in office visits in a timely manner
• Proper RTL placement will help concussion patients better recover and succeed in academic, work, and extracurriculars
• 95% of those with NPC>18cm need accommodation

RESULTS

Zone NPC values and percentages

<table>
<thead>
<tr>
<th>ZONE</th>
<th>Ave. NPC (cm)</th>
<th>Percent of patients with NPC≤9cm</th>
<th>Percent of patients with NPC&gt;18cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange</td>
<td>15.97</td>
<td>21.05%</td>
<td>35.14%</td>
</tr>
<tr>
<td>Yellow</td>
<td>12.00</td>
<td>31.09%</td>
<td>13.45%</td>
</tr>
<tr>
<td>Green</td>
<td>7.98</td>
<td>81.18%</td>
<td>4.55%</td>
</tr>
<tr>
<td>Blue</td>
<td>7.31</td>
<td>86.67%</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

Table 1 significance: Average NPC was 4-8 cm worse in RTL orange and yellow than green and blue.

CONCLUSION
NPC can be a critical clinical predictor of RTL zones and level of school modification.

There is a positive correlation between NPC and academic accommodations.

REFERENCES