BEHAVIORAL AND EMOTIONAL PROBLEMS ASSOCIATED WITH CONVERGENCE INSUFFICIENCY IN CHILDREN

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Acknowledgements

• Study was funded by a grant from COVD.
Purpose

• Investigated behavioral and emotional characteristics in children presenting to eye care clinics with convergence insufficiency (CI) prior to treatment.

• Examine whether successful treatment of CI was associated with a reduction in adverse behaviors and emotional problems.
Background

- CITT trial showed that children’s symptoms improve following successful treatment on the CISS
- Many symptoms related to attention: difficulty concentration, loss of place, reads slowly.
Background

- CITT trial showed that parents report fewer adverse academic behaviors following treatment of CI.
- Adverse academic behaviors related to attention: difficulty completing school work, avoiding reading and studying, and inattentiveness or distraction during reading.
Methods

- Do children with CI have more ADHD like behaviors?
  - 53 school aged children with symptomatic CI
  - 8 children has parent reported ADHD.
  - Parents completed Conners 3 ADHD Index.
    - 10 item scale
    - Behaviors most associated with ADHD
  - Compared results to normative data.
Methods

• Do children with CI have more emotional problems?
  – Administered Child Behavior Checklist (CBCL)
  – 53 school aged children with symptomatic CI.
  – The CBCL is designed to identify children with behavioral, emotional, or social problems.
CBCL Syndrome Scale Scores

• Internalizing problems
  – anxious/depressed
  – withdrawn/depressed
  – somatic complaints

• Externalizing problems
  – rule breaking behavior
  – aggressive behavior
Scoring

• CBCL Responses
  – Not true  Somewhat true  Very true

• Connors ADHD index:
  – Not true at all  Just a little true  Pretty much true  Very much true
Statistical Methods

• Scores compared to published norms for the Conners 3 ADHD index and the CBCL.
• T-scores (mean of 50 and SD of 10) were calculated for the Conners 3 ADHD index.
• Z-scores (mean of 0 and SD of 1) for the CBCL.
• High scores indicate a problem.
Conners 3 ADHD Index was significantly higher than normative values with a mean T-score of 63 (p<0.001).
- 28 of 53 children had a T-score of 60 or higher.
Conners 3 ADHD Index Scores at Baseline
Inattentive Symptoms more Common

- Fidgets in seat
- Restless/overactive
- Fidgeting
- Trouble organizing
- Doesn't listen
- Interrupts
- Doesn't pay attention
- Easily Distracted
- Gives up easily
- Inattentive

Percent Responded Pretty or Very Much
Results-CBCL

• CBCL
  – Internalizing problems were higher and approached significance.
    • Z-score of 0.48
  – Somatic problems were very high.
    • Z-score of 1.36 (p<0.001)
  – Externalizing problems were significantly below average or low.
    • Z-score of -0.36 (p<0.001)
Study-2

- Examine whether successful treatment of CI was associated with a reduction in adverse behaviors and emotional problems.
- Non-randomized single treatment study with unmasked outcome visits.
44 children with 3-sign CI completed 16 weeks of treatment
Mean age = 11.5 years (std = 2.2)
One parent of each child completed the Conners 3 ADHD Index – Parent (2008) and the CBCL at the eligibility examination and at 24 weeks after the eligibility exam.
Treatment

• 16 weeks of Office Based Vergence Accommodative Therapy (OBVAT) according to CITT protocol.
• 8 weeks of maintenance therapy following the 16 weeks of OBVAT.
• Outcome assessment 24 weeks after enrollment.
## CI Measures

<table>
<thead>
<tr>
<th></th>
<th>Eligibility</th>
<th>Week 24</th>
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</thead>
<tbody>
<tr>
<td>CISS</td>
<td>30.20 (9.07)</td>
<td>12.94 (10.60)</td>
</tr>
<tr>
<td>NPC</td>
<td>14.54 (8.56)</td>
<td>3.40 (2.87)</td>
</tr>
<tr>
<td>PFV</td>
<td>12.02 (4.59)</td>
<td>33.03 (10.80)</td>
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</tbody>
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Statistical Methods

• Pre and post therapy scores compared using paired t-tests
Results-Conners 3 ADHD Index

• Conners 3 ADHD Index scores showed a significant improvement in behaviors following treatment ($p < 0.0001$).

• Those with higher scores at baseline (T score $\geq 60$) showed the largest improvement.
Conners 3 ADHD Index

Conner's ADHD Index T-score

- Baseline: 62.6
- Week 24: 52.8
- Change: 9.9
Results - CBCL

- CBCL scores significantly improved for internalizing problems following treatment.
  - Effect size of 0.67 (p<0.001)
- The biggest improvement was seen for somatic symptoms.
  - Effect size of 1.15 (p<0.001)
- Externalizing problems showed no change.
Limitations

• Single treatment arm with no comparison group.
• No masking
• May overestimate the true impact of successful treatment of CI on measures of attention and emotional problems.
Conclusions

• The parents of symptomatic CI children reported significant improvements in measures of attention as measured by the Conners 3 ADHD Index.

• The parents of symptomatic CI children reported significant decreases in internalizing problems as measured by the CBCL.
Conclusions

• Need for randomized clinical trial investigating the impact of successful treatment of symptomatic CI on measures of attention and relationship to academic performance.
• Children with ADHD should be screened for CI.
• Children with inattentive ADHD and somatic complaints maybe at higher risk.