The Oral Trail Making Test as a Predictor of Dementia & IADLs

INTRODUCTION

**Background:**
The written TMT is widely used as a set-shifting test and as a measure of executive functions. However, for older adults with visual and/or motor impairments, the written TMT is ineffective as a measurement instrument.

An oral paradigm (OTMT) for set-shifting can help compensate for these problems. The OTMT also has the advantage of being rapidly administered.

Few predictive validity studies exist for either TMT or OTMT, especially for predicting dementia and IADLs. Having a tool that can help predict dementia and identify those persons at risk for functional impairment would be useful for disease and safety management.

**Purpose:**
The purposes of this study were to:
1. determine if an oral TMT predicts the diagnosis of dementia; and
2. determine if an oral TMT predicts functional status as defined by a measure of IADL.

**Methods:**
111 older adults were prospectively recruited from Baltimore-based Memory Centers where they received neuropsychological evaluations for self- or informant-reported cognitive dysfunction. Licensed psychologists with expertise in the evaluation of cognitive disorders were responsible for the flexible battery and making diagnoses. The OTMT is also an item in the BCAT cognitive screening measure.

**Sample Demographics:**
- Mean age – 83.6
- 71% female
- 87% Caucasian
- 67% widowed
- 83% ≥ HS education

**OTMT-B:**

“Now I would like you to say some numbers and letters. I will ask you to switch between numbers and letters, but keeping them in order. You would say 1-A-2-B-3-C, and so forth. Okay start with 1-A and keep going until I tell you to stop, Begin.”

**RESULTS**

**Predictive utility of several OTMT cut scores for dementia**

<table>
<thead>
<tr>
<th>Cut Score</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/5</td>
<td>.51 (.38-.63)</td>
<td>.79 (.62-.91)</td>
<td>.83 (.67-.92)</td>
<td>.45 (.32-.58)</td>
</tr>
<tr>
<td>5/6</td>
<td>.60 (.47-.71)</td>
<td>.76 (.58-.89)</td>
<td>.83 (.69-.92)</td>
<td>.49 (.35-.63)</td>
</tr>
<tr>
<td>6/7</td>
<td>.72 (.59-.82)</td>
<td>.68 (.49-.82)</td>
<td>.81 (.69-.90)</td>
<td>.55 (.39-.70)</td>
</tr>
<tr>
<td>7/8</td>
<td>.72 (.59-.82)</td>
<td>.59 (.41-.75)</td>
<td>.77 (.65-.87)</td>
<td>.51 (.35-.67)</td>
</tr>
</tbody>
</table>

*OTMT cut-scores to classify participants into dementia/non-dementia diagnostic categories

95% confidence interval in parentheses

**OTMT scores by diagnostic category**

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>No Dementia (MCI)</th>
<th>Dementia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>n = 34</td>
<td>N = 67</td>
</tr>
<tr>
<td>OTMT Mean Score</td>
<td>7.32</td>
<td>5.06</td>
</tr>
<tr>
<td>OTMT Standard Deviation</td>
<td>2.74</td>
<td>3.15</td>
</tr>
<tr>
<td>95% Confidence Interval for OTMT Mean</td>
<td>6.37 – 8.28</td>
<td>4.29 – 5.83</td>
</tr>
</tbody>
</table>

**Conclusions**

Our findings suggest that:
- OTMT predicts dementia
- Cutting score of 6/7 for dementia versus non-dementia (MCI)
- OTMT predicts functional status (IADLs)
- Data based on a clinical population requiring cautious generalization
- Positive screening results can be more useful than negative ones