Accuracy of Mallampati Scoring by Occupational Medicine Practitioners: Outcomes of an Educational Intervention

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Introduction

- Mallampati scoring is an objective predictor of obstructive sleep apnea (OSA) and used as one criterion for deciding polysomnography referral
- Many OSA predictors subjective & prone to recall bias
- Important for Occupational Medicine Providers (OMP’s) to be proficient in Mallampati scoring
- Literature exploring Mallampati scoring by OMP’s lacking

Specific Aims

- To evaluate consistency of OMP’s in Mallampati scoring
- To compare OMP scorings to that of otolaryngology experts (ENT’s)
- ENTs defined as the gold standard
- To determine causes of discrepancies, if any
- Design teaching tool on Mallampati scoring with goals of:
  - Improving scoring consistency among OMP’s
  - Increasing OMP agreement with ENT’s

Methods

- Study Design
  - Pre/Post Intervention Study
- Participants:
  - OM Providers from a variety of hospital-based, on-site, & university practices
  - ENT professors specializing in corrective OSA procedures from 3 teaching hospitals
- Procedures: Modified Mallampati Scoring (I-IV)
  - 30 throat photos scored by OM providers compared to ENT (pre-test)
  - Differences analyzed & causes theorized/discussed
  - Course taught on Evidence-based scoring methodology & relevance to OM
  - Identical photos scored post-presentation & compared to pre-test

Statistical/Data Analysis

- Each OMP determination compared to that of experts pre/post comparison
- Crude agreement & weighted Kappa scores used
- Paired t-tests on Pre/Post kappa scores and crude agreement to assess improvement in accuracy

Results

- 43 OM providers and 3 ENT professors participated
- For the 3 ENT professors of the 30 photos:
  - 3 of 3 agreed on 16 photos (53%)
  - 2 of 3 agreed on 12 photos (40%)
  - None agreed on 2 photos which were discarded

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<th>I</th>
<th>II</th>
<th>III</th>
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<thead>
<tr>
<th>Class</th>
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<th>Post</th>
<th>Difference</th>
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<tr>
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<td>64.6%</td>
<td>89.3%</td>
<td>24.6%</td>
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<td>II</td>
<td>54.4%</td>
<td>62.5%</td>
<td>8.1%</td>
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<tr>
<td>IV</td>
<td>69.6%</td>
<td>86.5%</td>
<td>16.9%</td>
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Weighted Kappa Agreement between OM Provider and Expert

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<tr>
<td>0.683</td>
<td>0.853</td>
<td>0.160</td>
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<tr>
<td>Range</td>
<td>-0.242 - 0.920</td>
<td>0.639 - 1.000</td>
<td>-0.124 - 0.735</td>
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- Prior to intervention, only 11 (27%) OM providers had weighted kappa scores > 0.80
- After intervention, 27 (68%) OM providers had weighted kappas >0.80 with no kappa below 0.60
- Overall, 23% increase in weighted kappa agreement with sleep specialists, (p<.0001)
- Greater consistency of provider response, evidenced by tighter range & elimination of outliers

Limitations

- Confounding by 2 dimensional photography & lighting
  - Minimal effect on results (experts scored same photos)
  - Some photos discarded during analysis (expert disagreement)
  - Left only 4 Class III photos and 4 usable Class II photos
  - Possible confounding due to differences in OMP training

Significance of Study

- Accurately assessed objective predictors, like Mallampati scores, may improve cost-effective sleep study referral of safety-sensitive workers, where subjective predictors are less reliable, thus improving public safety

Conclusion

- Within this sample of providers, the identified patterns of error and subsequent discussions revealed several correctable specialty-oriented differences in scoring methodology that improved agreement with ENT Sleep Specialists

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