Assessment of a New Diagnostic Tool in the Diagnosis of Temporomandibular Disorders

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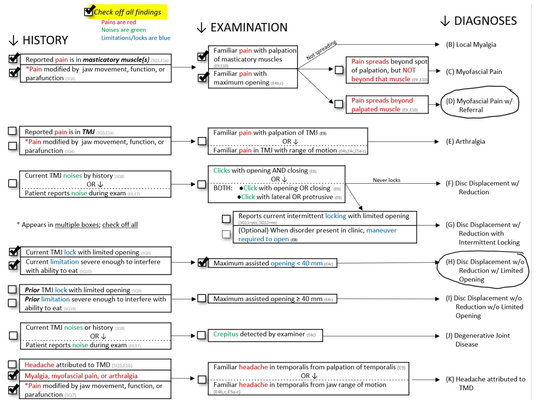
Introduction

Temporomandibular disorders (TMD) are a group of musculoskeletal and neuromuscular conditions that involve the temporomandibular joint (TMJ), the muscles of mastication, and associated tissues with an estimated prevalence of 5-12%.[1] The diagnosis and treatment of TMD is primarily the responsibility of dentists; however, many dentists receive minimal training on TMD.[2] Many rely on the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD)[3], which currently offers a decision tree-style diagnostic tool to assist in clinical application.[4] We developed a new diagnostic tool with input from 300 participants through seminars and clinical consultations. Our tool uses the same verbiage as the DC/TMD, but it is formatted as a checklist and has multiple proposed benefits. For example, our tool does not require clinicians to categorize a patient's condition as muscular or joint-related in origin, nor does it require users to know ahead of time which signs and symptoms are associated with each condition.



Methods

Randomized crossover-controlled double-blinded study at the Arthur A. Dugoni School of Dentistry in San Francisco, and the Nihon University School of Dentistry in Tokyo. The control tool is made up of two decision trees: one for pain conditions and one for intra-articular disc disorders. The experimental tool is a new, checklist-style tool that does not require users to be familiar with the symptoms of TMD conditions or how to categorize TMD conditions. Both tools rely on the DC/TMD and guide clinicians through a patient interview and physical exam. 155 dental students, interns, and residents evaluated two different hypothetical patient scenarios using the control tool for one and using the experimental tool for the other. Their checklists were graded and scored based on the number of correct diagnoses achieved, the number of missed diagnoses, and the number of incorrect diagnoses added onto the checklist but were not actually present in the patient. Participants were timed, and the time required to complete each case was recorded.

Objective

To test the speed and accuracy of a new, checklist-style diagnostic tool in the diagnoses of various TMD conditions compared to the decision-tree diagnostic tool currently being used.

Results

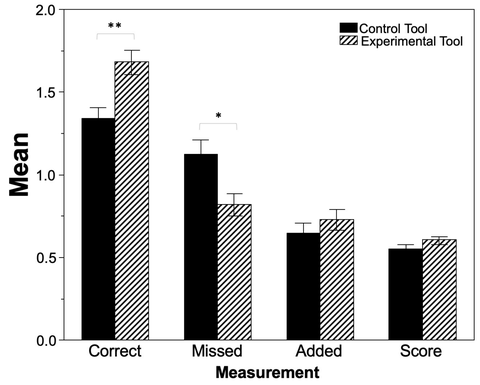


Figure 1. Comparison of the new (experimental) and the existing (control) diagnostic tools for the DC/TMD. Overall, participants using the experimental tool identified significantly more correct diagnoses and missed significantly fewer diagnoses compared to the control tool. The average number of incorrectly added diagnoses and the overall score did not differ between the two tools. *p-value < 0.05, **<0.01.

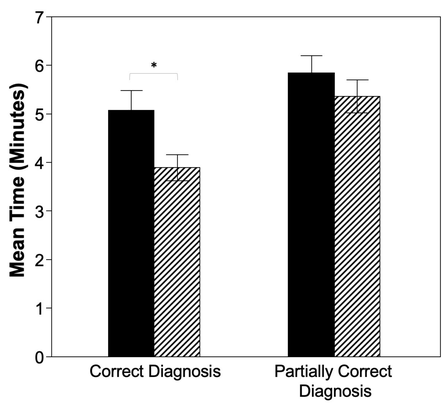
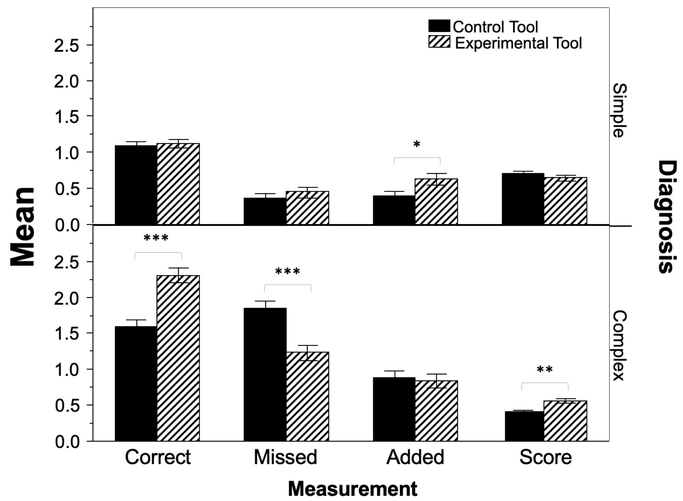


Figure 2. Average time to identify correct or partially correct diagnosis using experimental and control diagnostic tools for DC/TMD. Overall, participants using experimental tool identified correct diagnosis significantly faster compared to those who used the control tool. There was no significant difference in the time it took to identify partially correct diagnosis (at one of the multiple conditions present was correctly identified) between the two tools. *p-value <0.05.

Figure 3. Comparison of the new (experimental) and the existing (control) diagnostic tools for the DC/TMD by case complexity. For simple cases (1-2 TMD conditions present), the experimental and the control tool performed comparably in terms of the number of correctly identified diagnoses, number of missed diagnoses and the overall score. For complex cases (3-4 TMD conditions present), participants using the experimental tool identified significantly more correct diagnoses, missed fewer diagnoses, and attained higher scores. *p-value <0.05, **p-value < 0.001, ***p-value<0.0001.



Conclusions

- Participants identified significantly *more correct diagnoses* (30% increase) and *missed significantly fewer correct diagnoses* (27% decrease) when using the ***experimental tool*** compared to the control tool.
- When using the experimental tool, it took participants ***significantly less time*** to reach the correct diagnoses.
- In complex cases (3-4 TMD conditions present), participants using the experimental tool achieved ***44% more*** correct diagnoses and ***missed 33% fewer*** correct diagnoses.
- In simple cases (1-2 TMD conditions present), the control and experimental tools **performed similarly** with regard to correct diagnoses, missed diagnoses, added diagnoses, and time required to complete the case.

Acknowledgments

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