

CLINICAL INVESTIGATIONS

Temporomandibular Joint Disorders' Impact on Pain, Function, and Disability

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Appendix

Data Analysis

Tested Hypotheses

1. Multivariate multiple regression investigated simultaneously the association between ordered temporomandibular joint (TMJ) intra-articular status and each patient-reported outcome (PRO). Specifically, we tested the null hypothesis that there is no linear trend associating a 4-level TMJ intra-articular status with each PRO.
2. Multivariate multiple regression investigated simultaneously the association between unordered TMJ intra-articular status and each PRO. Specifically, we tested the null hypotheses of no association between any of the TMJ intra-articular status levels and the 3 PROs.
3. Multiple regression investigated the association between ordered TMJ intra-articular status and Jaw Functional Limitation Scale (JFLS) subscales in 3 separate analyses. Specifically, we tested the null hypotheses that there is no linear trend associating a 4-level TMJ intra-articular status with any of the JFLS 3 subscales.
4. SEM analysis investigated the association between ordered

TMJ intra-articular status and temporomandibular disorder (TMD) impact. Specifically, we tested the null hypothesis that there is no linear trend associating a 4-level TMJ intra-articular status with the latent variable TMD impact.

Investigated Samples

We investigated 2 groups of TMD cases:

1. TMD cases with any diagnosis and
 2. TMD cases with a painful diagnosis (this latter group is a subset of the former)
- The 2 groups of TMD cases represent relevant patient populations found in TMD treatment centers:
1. Cases with any TMD diagnosis represent a TMD population with a range of painful and nonpainful signs and symptoms. Most TMD patient populations in treatment centers consist of cases with and without pain.
 2. Cases with only pain-related TMD diagnoses represent a TMD population with the most important symptom, masticatory muscle and TMJ pain. Most TMD patient populations in treatment centers consist mainly of cases suffering from pain.

Study Limitations

TMJ structural status and TMD impact are 2 complex concepts, and simplifying them leads to limitations. The TMJ structural status model we investigated represents core aspects of beliefs held by many TMD practitioners or represents components of TMJ structural etiopathogenesis provided in textbooks (Okeson 2005), that is, that disc displacement (DD) commonly precedes degenerative osseous changes or that DDwR usually occurs before DDwoR. While this may represent a common situation, it is known that transition from structurally normal joints to DDwoR or even DJD can happen. Data supporting our model of TMJ intra-articular status are as limited as data supporting any other model; our analysis tests the most commonly cited model and represents diagnoses a clinician typically receives from radiologists interpreting their patients' results from magnetic resonance imaging or computed tomography.

While we detected some differences in patient-reported outcomes between cases with normal joints and cases with disc displacements or degenerative changes in our secondary analyses, these differences were difficult to interpret. The magnitude of the effects was not clear, and the pattern of findings was not consistent—that is, effects were not always in the

expected direction, and statistically significant findings in cases with any TMD diagnosis were not significant any more than in the smaller group of cases with a painful TMD diagnosis. While more heterogeneous samples such as the participants of the RDC/TMD Validation Project have a substantial potential to generalize findings to other populations of interest, more homogeneous groups of subjects such as our cases with an intra-articular disorder may have advantages for detecting associations. In these cases with intra-articular diagnoses, TMJ structure was associated with Characteristic Pain

Intensity (CPI). Likely, this association was present because some patients with disc displacement with reduction (DDwR) had a disorder without substantial pain, lowering their CPI scores compared with disc displacement without reduction (DDwoR) and degenerative joint disease (DJD). In another subset of our subjects, in painful TMD cases, the association between TMJ structure and CPI was less pronounced and not statistically significant. All these secondary analyses provide interesting insight into the patient-perceived impact from structural TMJ status; however, because we tested

multiple variables in several subsets of TMD cases, these findings require validation in future studies.

In summary, the present study's results cannot characterize change of soft and hard TMJ tissues longitudinally and cannot exclude the possibility that certain components of TMJ structure may have an influence on certain aspects of what is important for patients.

Appendix Reference

Okeson JP. 2005. Bell's orofacial pains: the clinical management of orofacial pain. 6th ed. Carol Stream, IL: Quintessence. p. 343.