Ultrasonography has an acceptable diagnostic efficacy for temporomandibular disc displacement

Abstracted from

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Question: How effective is ultrasonography in detecting disc displacement of the temporomandibular joint?

Data sources Medline, Embase and the Chinese Biomedical Literature databases were searched with no language restrictions.

Study selection Studies evaluating the diagnostic efficacy of ultrasonography in detecting TMJ disc displacement in participants with any symptoms or clinical signs related to temporomandibular disorders (TMD), with use of MRI as the gold standard, were included.

Data extraction and synthesis Study selection, data abstraction and risk of bias assessment were carried out independently by two reviewers. A meta-analysis was conducted.

Results Fifteen studies (14 cohort studies and one case control) were included in this review; six studies had a low risk of bias, six studies an unclear risk and three studies a high risk. Meta-regression indicated that the detected results were not influenced by the types of ultrasonography, image dimensions, types of transducer and ultrasonic image of the disc (P= .05). The Q* values (the point where sensitivity equals specificity on the summary reviewer operator characteristics curve) of ultrasonography for the closed- and open-mouth positions were 0.79 and 0.91, respectively. The diagnostic efficacy of disc displacement with reduction had a sensitivity of 0.76, a specificity of 0.82, a positive likelihood ratio of 3.80, a negative likelihood ratio of 0.36, a diagnostic odds ratio of 10.95, an area under the curve of 0.83 and a Q* of 0.76. The diagnostic efficacy of disc displacement without reduction had a sensitivity of 0.79, a specificity of 0.91, a positive likelihood ratio of 80.5, a negative likelihood ratio of 0.25, diagnostic odds ratio of 36.80, an area under the curve of 0.97 and a Q* of 0.92.

Conclusions The diagnostic efficacy of ultrasonography is acceptable and can be used as a rapid preliminary diagnostic method to exclude some clinical suspicions. However, positive ultrasonographic findings should be confirmed by magnetic resonance imaging. Also, the ability of ultrasonography to detect lateral and posterior displacements is still unclear.

Commentary

Ultrasonography (US) of the temporomandibular joint (TMJ) has been the focus of an increasing number of researches over the last decade or so, and this review represents the first attempt to perform a meta-analysis of the available data on the diagnostic accuracy of US for TMJ disc displacement in comparison to magnetic resonance (MR). The intention of the authors is very laudable and the resulting paper is a useful statistical guide for readers willing to get deeper into the issue. The aim was clearly stated, the literature search of three databases comprehensive and the data selection and extraction were performed meticulously.

A flow diagram of the articles identified, screened after removal of duplicate studies, assessed for eligibility, included in qualitative synthesis and included in the meta-analysis was provided. With respect to the most comprehensive systematic review on ultrasonography of the TMJ conducted so far,[1] it seems that only one paper was missing from the reference list, based on the authors' inclusion criteria. Also, two additional papers were published after this review and were not included in the meta-analysis.[2,3] Findings from the meta-analysis suggested that the diagnostic accuracy of US for TMJ disc displacement is good to excellent both in closed- and open-mouth positions. Whilst these conclusions are statistically sound and the authors should be complimented for their methodological approach, it must be pointed out that they did not seem to take into account for the external validity of their findings.[4]

Six out of the eight studies included in the meta-analysis came from the same research group, and the other two studies, which described lower levels of diagnostic accuracy, came from another group. Thus, redundancy problems cannot be excluded and cautionary statements on the need to perform additional investigations involving other research groups should be recommended. This suggestion is supported by the newer findings not included in this review, describing accuracy values lower than the mean values reported in the meta-analysis. Besides, as a general remark, it must be borne in mind that the management of statistical data by examiners without specific clinical expertise in the field of application of the meta-analysis may lead to potential statistically-but-not-clinically sound conclusions. Having made these premises, there is no doubt that the usefulness of ultrasonography for the study of the TMJ is worthy of being explored, especially in the light of the diminishing indications for prescribing more expensive imaging techniques.

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3. Bas B, Yilmaz N, Gökce E, Akan H. Diagnostic value of ultrasonography in temporomandibular disorders. *J Oral Maxillofac Surg* 2011; **69:** 1304–1310.
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Practice points

- Ultrasonography may have promising applications to study TMJ disorders
- US may be useful to replace MR in assessing the disc position for routine cases
- Some other studies suggested that effusion may be also a target for US examinations
- Validation studies from more research groups are needed.