



# Impact of routine open-mouth osseous temporomandibular joint tomography on diagnosis and therapeutic options

Asma'a Abdurrahman Al-Ekrish, BDS, MDS, Cert. Diag. Sci. (OMFR),<sup>a</sup>  
 Eman A. AlKofide, BDS, MS, FCMDOP, DSc,<sup>b</sup> Maysara Dawood Al-Shawaf, BDS, MS,<sup>c</sup>  
 Nasser S. Nooh, BDS, MS, DSc, OMFS,<sup>d</sup> Rawan Dammak Daabash, BDS,<sup>e</sup>  
 Munerah Alsanouni, BDS,<sup>f</sup> and Dania Tamimi, BDS, DMSc<sup>g,h</sup>

**Objectives.** The aim of this study was to evaluate the impact of routine open mouth osseous temporomandibular joint (TMJ) tomography on diagnosis and treatment planning of TMJ conditions. Investigating the need for such images is important to justify the additional radiation exposure imparted by such procedures.

**Study Design.** The records of patients who underwent closed- and open-mouth osseous TMJ tomography (planar film tomography up to the beginning of 2006; cone beam computed tomography from 2006 onward) were reviewed. Three examiners formulated a diagnosis and treatment plan based on the history, clinical findings, and tomography interpretation reports of closed-mouth images. Then they reviewed the interpretations of the open-mouth images and recorded whether they would change their original diagnosis and/or treatment plan on the basis of the findings. Descriptive analysis of the results was performed.

**Results.** The impact of routine open-mouth imaging on diagnosis and treatment planning was variable among the examiners. Examiners 1, 2, and 3 had a change in diagnosis in 7%, 5%, and 3% of cases, respectively, and a change in treatment plan in 1%, 1%, and 8%, respectively.

**Conclusions.** Routine open-mouth osseous TMJ tomography had a minimal impact on diagnosis and treatment planning of TMJ conditions, which varied according to the treating clinician. (Oral Surg Oral Med Oral Pathol Oral Radiol 2017;123:508-514)

According to the Temporomandibular Disorders Policy Statement of the American Association for Dental Research,<sup>1</sup> it is recommended that the differential diagnosis of temporomandibular disorders (TMDs) or

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<sup>a</sup>Assistant Professor, Department of Oral Medicine and Diagnostic Sciences, Division of Oral and Maxillofacial Radiology, College of Dentistry, King Saud University, Riyadh, Saudi Arabia.

<sup>b</sup>Professor, Department of Pediatric Dentistry and Orthodontics, College of Dentistry, King Saud University, Riyadh, Saudi Arabia.

<sup>c</sup>Associate Professor, Department of Oral Diagnosis and Oral Medicine, King Saud Bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia.

<sup>d</sup>Professor and Consultant, Maxillofacial Surgery, Department of Maxillofacial Surgery, College of Dentistry, King Saud University, Riyadh, Saudi Arabia.

<sup>e</sup>General Dental Practitioner, College of Dentistry, Princess Nourah bint Abdulrahman University, Riyadh, Saudi Arabia.

<sup>f</sup>Postgraduate Student, Department of Pediatric Dentistry and Orthodontics, College of Dentistry, King Saud University, Riyadh, Saudi Arabia.

<sup>g</sup>Oral and Maxillofacial Radiology Consultant, Private Practice, Orlando, Florida, USA.

<sup>h</sup>Adjunct Assistant Professor, Department of Comprehensive Dentistry, University of Texas Health Science Center, San Antonio, Texas, USA.

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related orofacial pain conditions should be based primarily on information obtained from the patient's history, clinical examination, and, when indicated, temporomandibular joint (TMJ) imaging. However, the policy statement does not specify which radiologic examinations are appropriate and under which circumstances. Studies investigating the diagnostic and therapeutic impact of osseous imaging of the TMJ have been contradictory,<sup>2-5</sup> but evidence-based guidelines on cone beam computed tomography (CBCT) imaging of the TMJ have questioned the therapeutic impact of osseous imaging for the majority of TMDs.<sup>6</sup> Furthermore, some authors have questioned the usefulness of osseous imaging of the TMJ because of its lack of impact on treatment outcome in patients with TMDs.<sup>7,8</sup>

However, some consider that when osseous imaging of the TMJ is indicated, the joint should be imaged in both the closed-mouth and open-mouth positions.<sup>9,10</sup> Routine open-mouth imaging, which refers to open-mouth TMJ images being obtained for all patients referred for TMJ tomography, in addition to the

## Statement of Clinical Relevance

Routine open mouth osseous TMJ tomography has a minimal impact on diagnosis and treatment planning of TMJ conditions, therefore its use needs to be reassessed based upon clinical needs of TMD patients.

standard closed-mouth images, increases the radiation dose to patients; therefore, the additional dose must be justified by demonstration of a diagnostic and therapeutic impact of imaging in the open-mouth position. A previous study investigated the association between clinical diagnoses and radiographic findings in TMJ tomograms and found an association between the clinical range of jaw opening and the radiographic condyle-to-articular eminence position in the open-mouth position,<sup>11</sup> which led the authors to conclude that radiographs in the open-mouth position will not provide significant additional information compared with clinical evaluation of the range of maximal jaw opening. However, to our knowledge, at the time of this writing, no studies have been published on the diagnostic and therapeutic impact of routine open-mouth osseous imaging of the TMJ. Therefore, the aim of this study was to evaluate the impact of routine open-mouth osseous TMJ tomography on the diagnosis and treatment planning of TMJ conditions.

**MATERIALS AND METHODS**

The TMJ tomography interpretation reports that were retrievable from the electronic archives of the College of Dentistry Radiology Department, King Saud University (Riyadh, Saudi Arabia), were accessed to obtain the study samples. Ethical approval for accessing the patients’ records was obtained from the Ethics Committee of the College of Dentistry Research Center, and the study protocol was in compliance with the Declaration of Helsinki. Before 2010, TMJ imaging at this institution routinely included both open-mouth and closed-mouth imaging. The inclusion criteria were reports written for tomograms of the osseous components of the TMJ, which included interpretation of the TMJs in the closed-mouth and open-mouth positions. The search began with the most recent reports (from 2010) and then went to progressively older reports until 105 reports were obtained. The tomograms had been obtained with conventional hypocycloidal tomography at the beginning of and before 2006 and with CBCT from 2006 onward.

As a standard procedure for TMJ imaging within our institution, the radiologist takes a history of the patient’s complaint and performs basic extraoral and intraoral clinical examinations for TMD before imaging; the findings are included in the interpretation report under sections entitled “History” and “Clinical Exam.” The extraoral examination includes evaluation of facial symmetry; palpation of the TMJs, muscles of mastication, and the sternocleidomastoid and trapezius muscles; evaluation of the path of mandibular opening and closing and excursions; and auscultation of the TMJs during opening and closing. The intraoral examination includes palpation of the pterygoid muscles (when possible); evaluation of the occlusion (including overjet

**Table I.** Age and gender distribution of the study sample

Age range (years)	Sex	No. of patients
0-10	Female	0
	Male	1
11-20	Female	16
	Male	9
21-30	Female	35
	Male	12
31-40	Female	13
	Male	5
41-50	Female	7
	Male	2
51-60	Female	1
	Male	2
Unknown	Female	2
	Male	2
<b>Total</b>		<b>105</b>

and overbite); and maximal interincisal distance upon mouth opening. A complete interpretation report thus contained the patient demographic data and clinical notes of the referring clinician, as well as the history, clinical examination findings, and radiographic interpretation, which were all obtained by the radiologist.

Information from the demographic data, clinical notes, history, clinical examination results, and radiographic descriptions from the interpretation reports was consolidated in a table format and presented to 3 examiners. **Table I** presents the age and sex distribution of the patients included in the study. The examiners were TMJ clinicians whose main specialties were Orthodontics, Oral and Maxillofacial Surgery, and Oral Medicine, and they had 22, 16, and 45 years of experience, respectively, in management of TMJ disease. The examiners were not necessarily the requesting clinicians for the cases included in the study. The data from radiographic interpretation reports for open-mouth and closed-mouth images were arranged in separate columns. The examiners were asked to formulate a diagnosis and treatment plan based on the history and clinical findings and interpretations of the closed-mouth images. They then reviewed the interpretations of the open-mouth images and recorded whether they would change their original diagnosis and/or treatment plan. If there were any changes, they also recorded the new diagnosis and/or treatment plan.

The diagnosis and treatment plan entries of the examiners were open-ended. Therefore, to facilitate analysis, they were grouped under the main headings listed in **Table II**. Descriptive analysis of the results was then performed.

**RESULTS**

The study included a total of 105 patients. Examiner 1 excluded 2 patients because of insufficient information.

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