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Review

Sagittal joint spaces of the temporomandibular joint: Systematic review and meta-analysis

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ABSTRACT

The aim of this study was to perform a systematic review and meta-analysis on the sagittal joint spaces measurements of the temporomandibular joint. An electronic database search was performed with the terms "condylar position"; "joint space" AND "TMJ". The risk of bias of each study was assessed with "*Cochrane risk of bias tool*". The values used in the meta-analysis were the joint space measurements and their differences between the right and left joint.

From the initial search 2706 articles were retrieved. Eighteen articles classified for final review. Only one study was classified as having high level of evidence. Seventeen of the reviewed studies were included in the meta-analysis concluding that the mean sagittal joint space values were: anterior joint space 1.86 mm, superior 2.36 mm and posterior 2.22 mm. However, the analysis also showed high levels of heterogeneity. Right and left comparison has shown statistically significant differences.

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Espaços articulares sagitais da articulação temporomandibular: revisão sistemática e meta-análise

Palavras chave:
Articulação temporomandibular
Revisão
Meta-análise

RESUMO

O objetivo deste estudo foi realizar uma revisão sistemática e meta-análise sobre os espaços articulares sagitais da articulação temporomandibular. Foi realizada uma pesquisa eletrónica com os termos "condylar position", "joint space"AND"TMJ". O nível de evidência de cada estudo foi avaliado com "Cochrane risk of bias tool". Os valores sumariados na meta-análise foram os espaços articulares e a diferença entre a articulação direita e esquerda.

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Da pesquisa inicial resultaram 2076 artigos dos quais 18 foram selecionados para a revisão. Apenas um estudo foi considerado de elevado nível de evidência. Foram incluídos na meta-análise 17 dos artigos da revisão concluindo-se que, os valores médios para os espaços articulares sagitais foram: 1.86 mm para o anterior, 2.36 mm para o superior e 2.22 mm para o posterior. No entanto, a análise revelou ainda grande heterogeneidade nos resultados dos estudos avaliados. Verificaram-se diferenças estatisticamente significativas entre as articulações esquerda e direita.

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Introduction

The mandibular condyle position has been at the centre of a long lasting controversy among gnathologists and orthodontists. The ideal concept of the mandibular condyle position has changed from the most retruded position of the condyle in the glenoid fossa to the most superior position of the condyle. Nowadays it is accepted as the most anterosuperior position of the mandibular condyle in the glenoid fossa with the articular disk placed in between.[1–4] The literature also shows a great confusion concerning the relationship between dental occlusion and the temporomandibular joints. It is possible to find articles proving the relationship between these two variables, while others achieved contrary results with no relationship being suggested.[5–8] The major focus of the discussion usually is the ideal mandibular condyle position and the effects of its variation.[4,9,10] With the evolution of radiographic exams like computerized tomographies (CT), including the new 3D cone-beam computed tomography (CBCT) and magnetic resonance imaging (MRI) it is now possible to radiographically examine the position of the condyle.[11–13] The most common method found in the literature to determine this position is the assessment of the joint space measurements, which are the radiographic space found between the condyle and the glenoid fossa where the articular disk is placed.[14] A variation on the values of these measurements suggest a displacement of the condyle and so, the determination of the "gold standard" for these values would be a very important tool to determine any variation to the condyle position. The aim of this study is to perform a systematic review and meta-analysis on the sagittal joint space measurements of the temporomandibular joint to assess the mean values for these measurements.

Methods

Search strategy

A comprehensive electronic database search to identify relevant publications was conducted, and the reference lists in relevant articles were searched manually for additional literature. No language restrictions were set, although no attempt was made to explore the informally published literature, like conference proceedings and abstracts of researches presented at conferences and dissertations. The research extended to the following databases: Medline (Pubmed), Lilacs, Scopus, Ebsco (Host by University of Porto) and Cochrane Central Register of Controlled Clinical Trials.

The search terms were "condylar position" and "joint space" AND "TMJ" with no year of publication restriction in order to include the highest number of articles (to 22 April 2014). No restriction to study design was applied.

Faculty of Dental Medicine of University of Porto and Portuguese Society of Dentofacial Orthopedics' libraries were also consulted for printed articles not available online.

Critical evaluation

At the first stage, two reviewers screened independently the titles of the retrieved records, and only the titles related to TMJ joint space assessment were included. Joint space was defined as the radiographic image between the mandibular condyle and the glenoid fossa where the disk is interposed. Next, the abstracts of the retrieved publications were read by the two reviewers and categorized according to the radiographic procedure used to assess the joint space. An article had only to be justified by one reviewer to be included in the second selection phase. Eligibility of the retrieved articles was determined by applying the following inclusion criteria: (1) tomographic examination of the TMJ (2) determination of sagittal joint space measurements at least on two different points (anterior and posterior). The main reasons for exclusion were: mandible fractures, studies not performed in living humans, surgical interventions, studies with patients with syndromes or chronic diseases (including degenerative pathology of the TMJ), samples containing patients only in the primary or mixed/early permanent dentition, clinical only evaluation of the mandibular condyle position, 2D radiograph or magnetic resonance imaging, previous orthodontic or splint therapy, case reports, discussion or debate articles. All not published studies were also excluded.

The analysis was based on primary materials. When an abstract was considered by at least one author to be relevant, it was read in full text. At the second stage, the full texts were retrieved and critically examined. Reference lists from the articles selected on the second stage were screened and articles related to joint space measurements were hand-searched.

Data gathering

The following data were extracted from the selected articles: year of publication, study type, study method, sample description, joint space measurements on the sagittal plane,

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