

Three-point vs one-point palpation of temporomandibular joint. A clinical trial study

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Abstract

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Background: Palpation is a crucial component of the temporomandibular joint (TMJ) examination in identifying tenderness. One-finger one-point palpation has a high tendency for inappropriate application and misinterpretation.

Objective: To evaluate three-point vs one-point palpation in determination of TMJ tenderness.

Patients and Methods: The study included fourth and fifth-year students in the College of Dentistry/Hawler Medical University. All students were examined using both one-point and three-point techniques. Two essential elements were recorded for each TMJ: tenderness and clicking.

Results: A total of 76 students (152 TMJs); 40 female and 37 male, were included. One-point TMJ tenderness was present in 41 (26.7%) and three-point TMJ tenderness was present in 114 (75%) TMJs ($P=0.0001$), with a sensitivity of 75% and specificity of 73%. Clicking, in three-point, 14 (9.21%), in one-point, 22 (14.47%) TMJs were with ($P=0.2136$) with a sensitivity of 18.42% and specificity of 71%.

Conclusion: Three-point technique can be used for palpation of TMJ, especially for detection of joint tenderness. Better not to be used for clicking evaluation.

Keywords: Temporomandibular joint, orofacial pain, palpation, examination

Introduction

One of the most prevalent health problems affecting the modern human population is temporomandibular joint disorder (TMD), which affects 70% of people [1]. Stress, a sedentary lifestyle, trauma, and the imbalance between the size of teeth compared to the size of alveolar bones and jaws are the causes of this problem's rise. Hence the great attention of most institutes to this problem. The proper history and examination are the first steps in diagnosing TMD, just like with

any other health issue, and are followed by advanced diagnostic techniques like MRI, CT, and CBCT. Diagnosis of TMD largely depends on clinical examination and it is of decisive importance, especially for the evaluation of the joint itself [2].

Palpation of the temporomandibular joint (TMJ) regarded as one of the main parts of the examination. The role of palpation is to determine tenderness, movement of the head of the condyle. Joint sounds can be felt by

means of auscultation, especially for clicking. When a sound is heard, some changes in movements inside the jaw can be felt by palpation.

Pain as the main complaint of a the patient can be determined by both history and palpation.

The tenderness of TMJ reflects the presence of pathology [3]. Feeling tenderness depends largely on the pressure applied. LIMA C.M.F. *et al* (2014) concluded that “The mean pressure applied by examiners who participated in the study was (0.7 kg for joint palpation and 1.4 kg for muscle palpation) [4]. This is regarded to be high if compared with that recommended by the Research Diagnostic Criteria for TMD: 0.5 kg [5], but it is less than what is suggested by some recent studies: 1.0 - 1.5 kg [6]. There are many doubts regarding the accuracy of TMJ examination by both physical and radiological means [7]. Many references recommend the examination of TMJ standing behind the patient [5]. The examiner puts one finger either over the area below the zygomatic arch just anterior to the tragus of the external ear or inside the canal of the external auditory meatus. Such a practice has been in use for more than five decades. The disadvantages of this technique are: inability to trace the head of condyle along the whole path; inability to see patients' expressions during examination; feeling of the lateral portion of condyle only; and from a psychological point of view, some people do not feel comfortable when someone is standing behind them. The aim of this study is to test the efficacy of a new method of TMJ palpation and comparing it with one-point one, in detection of TMJ tenderness.

Patients and Methods

This prospective clinical trial study was carried out in the College of Dentistry/Hawler Medical University, Kurdistan region of Iraq. The study included fourth- and fifth-year students in the College of Dentistry/HMU who agreed to participate. The sample size was not predefined. The exclusion criteria were settled as follows: presence of edentulous area in dental arches; significant occlusal abnormalities; and presence of diagnosed systemic arthritis. All students were examined using both one-point and three-point techniques. The one-point technique was the first to be tested, followed by the other technique. Two essential elements were recorded for each TMJ: tenderness and clicking. One examiner carried out palpation for all included students. The examiner has tested the amount of pressure he usually applies during TMJ palpation, which was approximately 450g.

One-point technique: applying one finger (index finger) over the skin just anterior to the tragus and below the zygomatic arch on both sides Figure (1). The client asked to open and close as much as he/she could. Pain was the main characteristic to be noticed either by patient words or patient facial expressions. Clicking was also evaluated during opening and closing.

We could not find any data related to the three-point palpation technique of TMJ in the literature to use it as a model, so we formulated our own. In the three-point technique (a new method), standing in front of the patient at 7 o'clock, the index, middle, and ring fingers of one hand were placed anterior to the tragus and below the zygomatic arch; ring: on the posterior part of

the condyle, middle: on the superior, and index: on the anterior parts) and the same on the other side Figure (2). While asking the client to open and close their mouth, pain was the main character to be evaluated either by the patient's words or their facial expressions. Clicking was also evaluated during opening and closing.

Statistical Analysis

The data input made through an Excel form specifically designed for this reason, that includes both biographical and medical fields. Data analysis done by SPSS program using chi-square, sensitivity and specificity tests.

Results

A total of 76 students (152 TMJs), 40 female and 37 male, were included. The mean \pm SD of age was 22.03 ± 3.21 . Out of total, 55 (72.36%) cases were with no complaints and the rest had complaints like headaches, clicking, and preauricular pain. In the Three-point technique, a total of 14 TMJs (9.21%) had clicking, while the other 138 TMJs (90.79%) did not. As opposed to the one-point technique, which had 130 TMJs (85.53%) without clicking and 22 TMJs (14.47%) with clicking. ($P= 0.2136$, with a sensitivity of 18.42% and a specificity of 71%) Figure (3).



Figure (1): One point palpation technique of TMJ [8]



Figure (2): Three-point technique of palpation (new method)

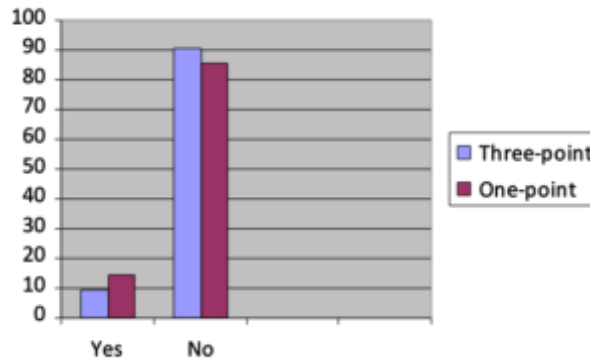


Figure (3): Clicking by both methods

In one-point technique, we found that just 41 (26.97%) TMJs had tenderness on palpation while those not complaining were 111 (73.03%). Whereas in three-point technique,

114 (75%) TMJs were with, and 38 (25%) TMJs were without tenderness. (P=0.0001, with a sensitivity was 75% and specificity was 73% Figure(4).

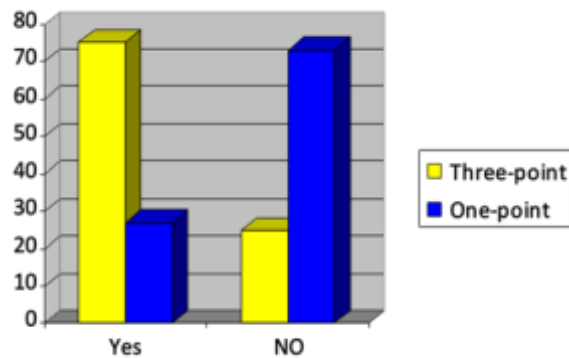


Figure (4): Tenderness by both methods

In comparing the presence of tenderness of right and left TMJs in three-point technique, on the right side it comprised 39 (51.32%), while on the left side it reached 75 (98.68%).

Where, as in the one-point technique, there were only 23 (30.26%) of right side and 18 (23.68%) of left side with tenderness Figure (5 &6).

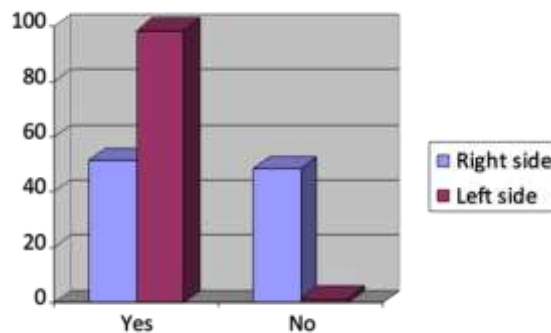


Figure (5): Comparing of Right and Left sides for tenderness by three-point technique

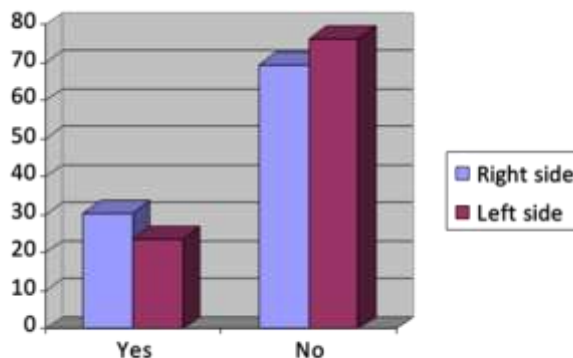


Figure (6): Comparing of Right and Left sides for tenderness by one-point technique

Discussion

Palpation is the second of four parts of a physical examination. In TMJ examination, it has a crucial role, especially for determination of tenderness, which is, as confirmed by Meyer RA (3), regarded to be one of the best indicators of intraarticular pathology. The variability of findings during examination may be considered as one of the reasons for unsatisfied treatment for TMD cases, because incorrect findings mean incorrect diagnosis and, subsequently, treatment. In this regard, very little has been done for the evaluation of the validity of current methods of examination of TMJ.

Palpation is technique-sensitive. Understanding of anatomy; tactile sensation; pressure applied and point of application are points of concern during this procedure. In our practice, with the one-point method, we noticed the above factors leading to misdiagnosis of TMD cases. So in the studied method, all the above points have been considered. Better stabilization of finger tips over the joint, including all possible positions of the condylar head during movement; three important zones of the lateral part of the TMJ to be checked simultaneously: posterior,

superior, and anterior; equal pressure applying; and, face control of the patient.

The study showed that our technique is effective, just like the one-point method in the identification of clicking, but this can't be an important aspect, since this finding should be evaluated by auscultation more than palpation. The importance of the results of the current study comes from the outcomes of tenderness detection, sensitivity, and specificity of both techniques. The tenderness of the TMJ area as the main part of the examination showed a significant difference between both techniques. The three-point technique shows more positive results for tenderness compared to the one-point one. This may be explained by the possibility of a larger area of involvement by three fingers, which in turn may include more possible tender zones. The next one may be the fact that in a new technique we directed pressure over post-disk tissues, which is the most innervated part of the TMJ [9]. In the one-point technique, we found that only 26.97% of TMJs had tenderness on palpation, where, as in the three-point technique, the percentage was 75%, with a strongly significant ($P < 0.0001$).

The sensitivity test was very low, while the specificity was very high (sensitivity of 01.31% and specificity of 97.37%). The high score of the specificity test indicates that the chances of false negative results are very low by these two techniques, while the chances of false positive results are too high.

In the three-point technique, we noticed a difference in the number of cases with tenderness between the right and left sides, with the left side having more cases with such a finding. The left side of the patient is the part that has been examined by the right hand of the examiner. The right side had more cases of tenderness in one-point technique. This may be explained by the fact that the examiner was right-handed and the amount of pressure applied was greater.

Pressure application is critical in TMJ examination. Less pressure decreases the chances of inflamed tissue identification; more pressure may again cause false positive results. In the three-point technique, there were fewer cases of clicking on examination compared to one-point. Such phenomena may be explained by the effect of three fingers on different areas of the TMJ that may stabilize the disk by restricting the movement of the disk into anterior, posterior and lateral directions.

Hence, we can say that the three-point technique may serve as a good alternative to the one-point one, especially for the detection of tenderness. It is not dependable and better not to be recommended for click detection. But the whole process needs further evaluation and validation.

Conclusions

A three-point technique can be used for palpation of the TMJ, especially for detection

of joint tenderness. It is better not to be used for click evaluation.

Recommendations

The mentioned technique of palpation can be used for determination of location of head of condyle, feeling movement of the disk and presence of tenderness. It is not recommended to evaluate the clicking of joints.

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Conflict of interest: Nil

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فحص ثلاث نقاط للمفصل الفكي الصدغي عن طريق الجس مقابل فحص نقطة واحدة دراسة تجريبية سريرية

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الملخص

خلفية الدراسة: في فحص المفصل الصدغي الفكي ، يلعب الجس دورًا رئيسيًا في تحديد الألم. يميل ملامسة نقطة واحدة بإصبع واحد إلى التطبيق غير المناسب وسوء التفسير.

اهداف الدراسة: لتقييم الجس بثلاث نقاط مقابل الجس بنقطة واحدة في تحديد الم المفصل الفكي الصدغي.

المرضى والطرائق: اشتملت الدراسة على طلاب السنة الرابعة والخامسة في كلية طب الأسنان / جامعة اربيل الطبية. تم فحص جميع الطلاب من خلال تقنيات النقاط الواحدة والثلاثية. تم تسجيل عنصرين أساسيين لكل من المفصل الفكي الصدغي: الألم عند الجس والنقر.

النتائج: تم تضمين ٧٦ طالبًا (١٥٢ المفاصل الفكية الصدغية) ، ٤٠ إناث و ٣٧ ذكرًا. الألم عند الجس ، في نقطة واحدة ٤١ (٢٦,٩٧٪) ، بنقطة النقاط الثلاث ١١٤ (٧٥٪) كانت المفاصل الفكية الصدغية موجودة (كانت قيمة $P < 0.0001$: ذات دلالة قوية) كانت الحساسية ٧٥٪ والنوعية ٧٣٪. كان النقر ، في ثلاث نقاط ، ١٤ (٩,٢١٪) ، في نقطة واحدة ٢٢ (١٤,٤٧٪) المفاصل الفكية الصدغية (كانت قيمة $P = 0.2136$: ليست كبيرة). كانت الحساسية ١٨,٤٢٪ والنوعية ٧١٪.

الاستنتاجات: يمكن استخدام تقنية النقاط الثلاث في جس المفصل الفكي الصدغي ، خاصة للكشف عن إلام المفصل. لكن من الأفضل عدم استخدامه لتقييم النقر.

الكلمات المفتاحية: المفصل الفكي الصدغي ، ألم الفم ، فحص المفصل الفكي الصدغي ، فحص المفصل الفكي الصدغي

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