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**DESCRIPTIONS OF CONDYLE HEAD POSITION IN DIGITAL PANORAMIC
RADIOGRAPH OF CLICKING AND NONCLICKING PATIENTS AT
RSGM UNPAD DENTAL RADIOLOGY INSTALLATION**

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ABSTRACT

Background: Clicking is associated with the movement of condyle head and other predisposing factors. Digital panoramic radiograph may identify such condition by describing the position of head of condyle.

Objective: To identify the description of condyle head position in digital panoramic radiograph of clicking and non-clicking patients at RSGM Unpad Dental Radiology Installation. **Method:** This was a descriptive research employing purposive sampling method to collect 31 samples of digital panoramic radiographs from 11 clicking patients and 20 non-clicking patients. The measurement method in this research is referring to Ikeda's (2011). **Result:** The average position of clicking TMJ was 1.45 mm from posterior aspect and the average position of non-clicking TMJ was 1.64 mm from superior aspect. **Conclusion:** It can be inferred that head of condyle's position in digital panoramic radiographs of clicking and non-clicking patients at RSGM Unpad may change from normal position to the majority of head of condyle displacement approaching the glenoid fossa. Clicking TMJ is presented with posterior displacement while non-clicking TMJ demonstrates superior displacement.

Keywords: condyle position, clicking patient, non-clicking patient, digital panoramic radiograph

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INTRODUCTION

Temporomandibular joint (TMJ) is one of the joints that has an important role in the opening and the closing movement of the mouth presented in mastication, deglutination and speech process. Excessive pressure or trauma on TMJ will result in the damage of joint structure or commonly referred as temporomandibular disorder (TMD), involving the discus, condyle, glenoidal fossa and articular eminence.

The clicking symptoms are usually accompanied by referred pain to the ear which is sometimes assumed by the patient as an earache or a loss in hearing. Based on the results of Luciana D's study (2012), as many as 70% -80% TMD patients at RSGM Unpad were reported with clicking symptoms while other studies conducted at the Federal University of Sa

Universityo Carlos, Sa~o Paulo, Brazil, also found that as many as 60% -75% of TMD patients were presented with clicking. This shows that the prevalence of patients who experience clicking as a symptom of TMD is fairly high. The most influential to cause clicking of TMJ are changes in position and shape of condylar head yet the presence of excessive pressure on TMJ may also alter condyle head position at the beginning and later will affect the shape of condylar head.⁴

Changes in TMJ position are evaluated through radiographic examination when a suspicion of joint disorders is identified at clinical examination. Panoramic radiography technique is frequently used for TMJ examination, considering the low cost and the low amount of radiation compared to other techniques.⁵ Panoramic radiography is advantageous at displaying the anatomy of TMJ. Both sides of the condyle can be

observed in one image so does the symmetrical position between the two condyles. All elements in panoramic radiography can aid the diagnosis of abnormalities in TMJ. Early diagnosis is required to prevent the progress of the disease. This study aims to determine condyle head position in clicking and non-clicking patients with edge to edge bite position.

MATERIALS AND METHODS

This research was a descriptive study based on a method by Ikkedda & Kawamura's study in 2009. This research was conducted in October to November 2018. The population of this study was a secondary data on digital panoramic radiographs at Dental Radiology Installation of RSGM Unpad in 2014 which satisfied the inclusion criteria of digital panoramic radiographs of patients (aged 16-60 years who had of clicking and non clicking symptom assisted with a clear visibility of condyle anatomy).

The sample of this research was a secondary data from digital panoramic radiographs at the Dental Radiology Installation of Unpad Dentistry Hospital. The sampling was selected using purposive sampling method.

The tools and materials required in this study were digital panoramic radiographic data of clicking and non clicking patients, computers to examine digital radiographs, stationery to record measurement results, and EasyDent software as a program used for TMJ position measurement.

Condylar position is condyle location upon the discus and glenoidal fossa which is illustrated by the distance between condyle and glenoidal fossa anteriorly, superiorly, and posteriorly. Measurement was performed by determining the highest point of the condylar head (SC point) closest to glenoid fossa. The SC point was drawn vertically straight to the deepest point in the glenoid fossa (SF point), then the superior distance between the condyle and the glenoid fossa (SS) was found. The next phase was drawing a line from the SF point to the most anterior (AC) and the most posterior point on the head of the condyle (PC). The anterior (AS) and posterior (PS) distances were obtained by drawing a line vertical to the line from the glenoid fossa to the condyle which is the superior distance.⁷ The normal distance between the condyle and the glenoid fossa while in an edge to edge position on

a panoramic radiograph is 2.5mm (superior), 1.3mm (anterior), and 2.1mm (posterior).⁸ After obtaining the distance of the condyle to glenoidal fossa, a displacement toward the anterior, superior, and posterior could be noticed when it was less than the normal range.

Transmigration of condylar head position to anterior, superior, and posterior may exist if the distance of the condyle to the glenoid fossa is less than the normal range, which is 1.3 mm, 2.5 mm and 2.1 mm. Condylar position shifts away from anterior, superior, and posterior if the distance of the condyle to the glenoid fossa is larger than the normal length.

This research was approved by Commission of Ethics in Research, Faculty of Medicine, Padjadjaran University, no: 1216/UN6.KEP/EC/2018 and RSGM Unpad no: 418/UN6.8.17/PL/2018.

RESULTS

The results for the characteristics of clicking and non-clicking patients based on age are presented in Table 1.

Table 1. The Characteristics of Patients with Clicking and Non-Clicking Symptom based on Age and Gender.

Age	Clicking			Non-Clicking		
	L	P	Σ	L	P	Σ
12 – 20 years	0	0	0	0	2	2
21 – 45 years	3	4	7	2	14	16
46 – 60 years	3	1	4	1	1	2
Σ	6	5	11	3	17	20

Based on table 1, the highest number of patient with clicking and non clicking are presented at the age of 21-45 years. The results for temporomandibular joint position measurement in the radiographs of clicking and non-clicking patients are presented in Table 2.

Tabel 2. Representations of *Temporomandibular Joint Position* on Panoramic Radiographs of Clicking and Non-Clicking Patients.

	Clicking (mm)			Non-Clicking (mm)		
	A	S	P	A	S	P
Right	1.39	1.95	1.58	1.42	1.59	1.49
	- 0.09	0.55	0.52	- 0.12	0.91	0.61
Left	1.51	1.87	1.33	1.29	1.68	1.51
	- 0.21	0.63	0.77	0.01	0.82	0.59

Table 2 represents the position of TMJ in patients with clicking symptom with the largest displacement position was in superior distance, which is 1.95 mm. It is similar with the non-clicking patient where the largest displacement was found at superior distance with 1.59 mm on the right side of TMJ and 1.68 mm on the left side of the TMJ.

DISCUSSION

The theory mentions that abnormal position can be observed among patients with clicking symptom.⁹ These changes can be in the form of condyle displacement which is shifting away or approaching glenoidal fossa. The condyle is displaced approaching the glenoidal fossa if it is less than the normal distance, which is 1.3 mm (anterior), 2.5 mm (superior) and 2.1 mm (posterior). It is frequently associated with factors such as trauma, parafunction activity, and tooth loss.

If TMJ position was found in a distance that exceeds the normal range, it indicates the displacement of the condyle away from glenoidal fossa. It is an antagonistic response from other TMJ aspects. If the anterior aspect of the condyle is away from the glenoidal fossa, it can be observed that the condyle approaches the glenoidal fossa from the posterior aspect.¹⁰ Furthermore, the possibility of condyle moving away from the superior aspect may be due to the existing treatment of the patient or the occurrence of trauma, tooth loss, and habitual chewing imbalance between the right and left side of TMJ.

The most frequent TMJ clicking position in this study is the approximation of condylar head posteriorly. There is a literature mentioning that clicking patients are caused by anterior displacement of the disc and accompanied by the approach of condylar head posteriorly¹¹. This is also in accordance with the process of clicking in which the disc is displaced anteriorly. This causes the condylar head to move posteriorly and increasingly press the disc forward during the process of mouth closing and opening.

The study conducted by Alkoshab in 2015 using CBCT radiographs on Malay race patients with TMJ clicking showed the results of TMJ disorder patients with an average superior distance of 2.5 mm, whereas in this study found an average superior distance of 1.91 mm in clicking patients and 1.64 mm in non-clicking patients.

The results of position measurements on non-clicking TMJ found that most TMJ displacements were reported with approximation to the superior direction. According to the theory, it is explained that there are two possible TMJ positions in non-clicking patients; normal or abnormal position. Nonetheless, the results of this study indicate that abnormal TMJ position can also be observed even in patients without clicking symptom. The presence of an abnormal position in patients with non-clicking manifestation can be resulted from changes in the position of the disc to the anterior during the opening and closing of the jaw. Several symptoms may arise from the change in TMJ position such as the limitations in jaw opening and the onset of pain.¹²

Condyle position in clicking patient can be said as abnormal due to condyle approximation or dissociation from the glenoid fossa. The displacement of the condyle approaching glenoidal fossa is promoted by excessive occlusal load and masticatory muscles contraction. The contraction of the masticatory muscles causes a change in the position of the TMJ (dislocation of the disc and condyle), followed by a change in shape and later initiates the clicking. The divergence of condyle position away from the

glenoidal fossa is caused by a history of trauma, tooth loss, and the habit of chewing unilaterally, emerging the imbalanced pressure.

Normal and abnormal position of the condyle may be observed in non-clicking patients. Normal position is stipulated when the condyle is located in standard range, while abnormal position is associated with less or larger range than its normal limit. Changes in the position of the condyle that do not cause clicking indicate that the patient has experienced minor trauma and other TMD symptoms, such as pain or sustaining the locking or crepitus stage.¹³

Abnormal position in non-clicking patients may be precipitated by the displacement of disc position. This is followed by the limitation in jaw movement resulting in restricted ability for mouth closing and opening.¹⁴ Non-clicking TMJ with no changes in the position of the condyle may imply that the patient is not traumatized or presented with other parafunction activities.

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