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TEMPOROMANDIBULAR JOINT DISORDERS DIAGNOSIS IN E DENTULOUS PATIENTS BASED ON DC-TMD AXIS I

(DIAGNOSIS GANGGUAN SENDI TEMPOROMANDIBULA PADA PASIEN TIDAK BERGIGI BERDASARKAN DC-TMD AXIS 1)

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ABSTRACT

Signs and symptoms of temporomandibular disorders/TMD often occur in edentulous patients. Etiology and clinical symptoms are different so the diagnosis is different. The diagnosis of TMD can be determined using Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) Axis I (clinical examination) and Axis 2 (psychological examination). The purpose of this study was to obtain a description of temporomandibular joint disorders in edentulous patients at the Dental Hospital of Padjadjaran University based on DC/TMD Axis I. This research was a descriptive study with a survey technique. The sample size was 32 patients that were collected by consecutive sampling. Temporomandibular disorders in edentulous patients were obtained by filling out symptom questionnaires and clinical examination based on DC/TMD Axis I, then grouped using the DC/TMD Axis I algorithm. The results showed that from 32 edentulous patients who visited the

Dental Hospital of Padjadjaran University, there were 23 subjects diagnosed with temporomandibular disorders, with disc displacement with reduction (40.63%) as a major diagnosis, followed by local myalgia and myofascial pain in 2 subjects (6.25%) each, and arthralgia in 1 subject (3.12%). Subjects who had more than one diagnosis as many as 5 people (15.62%). According to the result of the study, most of the edentulous patients visiting the Dental Hospital of Padjadjaran University were diagnosed with temporomandibular disorders, and disc displacement with reduction was the most common diagnosis.

Keywords: diagnostic criteria; edentulous, temporomandibular disorders

ABSTRAK

Tanda dan gejala gangguan sendi temporomandibula/TMD sering diderita oleh pasien tidak bergigi. Etiologi dan gejala klinisnya berbeda-beda sehingga diagnosisnya berbeda pula. Diagnosis TMD dapat ditentukan menggunakan Diagnostic Criteria for Temporomandibular Disorders (DC/TMD), yang terdiri dari Axis I (pemeriksaan klinis) dan Axis 2 (pemeriksaan psikologis). Tujuan penelitian ini adalah untuk memperoleh gambaran gangguan sendi temporomandibula pada pasien tidak bergigi di Rumah Sakit Gigi dan Mulut Universitas Padjadjaran (RSGM Unpad) berdasarkan DC/TMD Axis I. Jenis penelitian adalah penelitian deskriptif dengan teknik survei. Sampel diperoleh sebanyak 32 orang dengan menggunakan teknik consecutive sampling. Gangguan sendi temporomandibula pada pasien tidak bergigi didapat dengan melakukan pengisian kuesioner gejala dan pemeriksaan klinis berdasarkan DC/TMD Axis I, kemudian dikelompokkan menggunakan algoritma DC/TMD Axis I. Hasil penelitian menunjukkan bahwa dari 32 orang pasien tidak bergigi di RSGM Unpad, terdapat 23 orang (71%) yang terdiagnosis gangguan sendi temporomandibula, dengan diagnosis terbanyak pergeseran

diskus dengan reduksi sebanyak 13 orang (40,63%), diikuti mialgia lokal dan nyeri miofasial masing-masing 2 orang (6,25%), dan arthralgia sebanyak 1 orang (3,12%). Pasien yang memiliki lebih dari satu diagnosis sebanyak 5 orang (15,62%), Dari hasil penelitian didapatkan bahwa sebagian besar pasien tidak bergigi di RSGM Unpad menderita gangguan sendi temporomandibula, dengan diagnosis terbanyak adalah pergeseran diskus dengan reduksi (disc displacement with reduction).

Kata kunci: *edentulous; gangguan sendi temporomandibular*

INTRODUCTION

Edentulousness is caused by loss of teeth due to decay or caries, periodontal disease, accidental trauma, extraction for orthodontic treatment purposes, degenerative conditions, and others. Molar teeth are teeth that act as occlusal stops. Loss of the occlusal stop can cause disturbances in the temporomandibular joint.[1] Changes in the contact occlusion cause an imbalance in occlusion resulting in a change in the position of one or both condylar processes of the temporomandibular joint when it is in occlusion. Unbalanced excessive occlusion load that occurs continuously on one or both sides of the joint can cause erosion of the articular eminence, resulting in changes in the angle of the condyle. The decreased slope of the condylar pathway can lead to TMJ dysfunction.[2] Tooth loss can also affect masticatory system changes such as bone structure, oral mucosa, and masticatory muscles. Changes in the masticatory muscles are caused because the masticatory muscles receive a heavier load when functioning so that they can affect the structure of the temporomandibular joint and cause TMD.[3]

Each patient with temporomandibular joint disorders has a different etiology and severity so that it requires different and specific treatment needs. Different aetiology leads to different diagnoses. An appropriate and precise diagnosis in each patient is very important in determining the success of a treatment plan for temporomandibular joint disorders.[3] DC/TMD is an evidence-based and specific criterion for the diagnosis of temporomandibular joint disorders. DC/TMD is a comprehensive assessment, based on a biopsychological model of chronic disease. One patient may

experience more than one diagnosis. (4) The diagnosis of temporomandibular joint disorders based on DC/TMD can be determined from the results of the examination, and is divided into; Group I (pain disorders); (a) local myalgia, (b) myofascial pain with spreading, (c) myofascial pain with referral, (d) arthralgia, and (e) headache. Group II (joint disorders) is divided into; (a) disc displacement with reduction, (b) disc displacement with reduction with intermittent locking, (c) disc displacement without reduction with a limited opening, (d) disc displacement without reduction without limited opening, for the right and left joints, respectively. Group III is a degenerative disease.[4]

Based on the description above, the authors are interested in researching the diagnosis of temporomandibular joint disorders in edentulous patients at RSGM Unpad based on DC/TMD Axis I so that operators are expected to be able to know the description of TMD diagnosis that is commonly experienced by edentulous patients.

METHOD

The type of research is descriptive research with a survey technique. The populations of this study were all patients in the Prosthodontics Installation of the Dental and Oral Hospital/RSGM Unpad and the sample was edentulous patients at the Prosthodontics Installation from November to December 2018 who met the sample criteria taken by consecutive sampling. The inclusion criteria of research subjects were men and women who had lost all their maxillary and mandibular teeth and had never used complete dentures; willing to follow the research procedures and sign the informed consent. Exclusion criteria were the subject had experienced facial accidents and fractures of the jaw had undergone jaw surgery, had severe systemic disease, and had received treatment of the temporomandibular joint.

The research procedures were: (1) Applying for ethical approval from the Ethics Committee of the Faculty of Medicine, Padjadjaran University; (2) Calibrate the DC/TMD Axis I; (3) Selecting patients who meet the research criteria; (4) Prepare tools and materials; (5) Explaining the procedures, purposes, and objectives of the study and asking respondents to sign the informed consent form voluntarily; (6) Record the identity data of respondents who fill out the approval letter; (7) Guiding respondents to fill out the DC/TMD symptom questionnaire sheet; (8) Perform a clinical examination DC/TMD; (9) Record the results of clinical examinations obtained on the examination sheet; (10) Evaluating the inspection results and processing using

the DC/TMD Axis I algorithm; (11) Obtaining the correct diagnosis data for temporomandibular joint disorders. The data obtained were then collected, processed, and presented in tabular form.

The clinical examination of the temporo-mandibular joint was done by observing the location of pain, incisal relationship, jaw opening pattern, jaw opening movements, lateral and protrusive movements, temporomandibular joint sounds when opening and closing the jaw, temporomandibular joint sounds during lateral and protrusive movements, joint locking, palpation of temporomandibular muscles and joints, and supplemental muscle. Lateral movement and deviation can be seen from the point of contact between the two maxillary and mandibular central incisors.[5] Because the subjects were edentulous, the midpoint of the face was used as a guide for establishing the maxillary and mandibular midpoints. The midline of the face consisted of the glabella point, the nasion point, the subnasale point, and ends at the pogonion point. The subnasale point is located below the nasal bone and can be considered the midpoint of the maxilla. The pogonion point is located anterior to the chin and can be considered the midpoint of the mandible.[6]

Measurement of protrusive movement was carried out by measuring the distance between the upper and lower jaws in the horizontal plane in the resting position and then measured again when the patient was in the protrusive position. Examination of the incisal relationship could not be done because the study sample was an edentulous patient. Although not performed, examination of the incisal relationship does not affect the determination of the diagnosis.[5]

The movement of the jaw opening should be measured by calculating the distance between the incisal edges of the maxillary and mandibular central incisors.[5] In the edentulous patient, the measurement of jaw opening was measured from the crest of the maxillary and mandibular ridges, minus the length of the central incisors of both jaws. The mean crown length of the maxillary central incisors was 10 to 11 mm from the cervical line to the incisal edge. Meanwhile, the average crown length of the mandibular central incisors was 8 to 9 mm from the cervical line to the incisal edge.[7]

RESULT

Based on the results of research conducted on 32 edentulous patients, the distribution data was shown in Table 1.

Table1. Sample distribution

Variable	Category				
Gender	Male		Female		Total
	12		17		32
Age	year	35 - 44	45 - 54	55 - 64	≥ 65
	n	2	9	13	8	32
Duration of edentulous	month	< 3	3-6	7-12	> 12
	n	13	5	10	4	32

The description of temporomandibular joint disorders was grouped based on the DC/TMD Axis I diagnostic criteria, which was shown in Table 2.

Table 2. Diagnosis of temporomandibular joint disorders on edentulous patients based on DC/TMD

	TMD Diagnosis	Frequency	%
Ia	Local myalgia	2	6.25
Ib	Myofascial pain with spreading	2	6.25
Ic	Myofascial pain with referred pain	0	0.00
Id	*Arthralgia*	1	3.12
Ie	Headache attributed with TMD	0	0.00
IIa	Disc displacement with reduction	13	40.63
IIb	Disc displacement with reduction with intermittent locking	0	0.00
IIc	Disc displacement without reduction with limited opening	0	0.00
IId	Disc displacement without reduction without limited opening	0	0.00
III	Degenerative disease	0	0.00
More than 1 diagnosis (Ia dan IIa)		5	15.62
Without TMD		9	28.13
Total		32	100.00

Overview of temporomandibular joint disorders grouped by sex, age, and duration of edentulous are presented in Table 3.

Table 3. Diagnosis of TMD on edentulous patients based on gender, age and duration

Sex	**Male**		**Female**	
	F	**%**	**F**	**%**
Ia	0	0.00	2	11.77
Ib	0	0.00	2	11.77
Id	0	0.00	1	5.87
IIa	7	46.67	6	35.30
More than 1 diagnosis	3	20.00	2	11.77
without TMD	5	33.33	4	23.52
Total	15	100.00	17	100.00

Age (year)	**35-44**	**45-54**	**55-64**	**≥ 65**	**Total**
Ia	1	0	1	0	2
Ib	0	0	2	0	2
Id	0	0	1	0	1
IIa	1	5	4	3	13
More than 1 diagnosis	0	3	1	1	5
without TMD	0	1	4	4	9
Total	2	9	13	8	32

Duration (month)	**< 3**	**3-6**	**7-12**	**> 12**	**Total**
Ia	0	1	1	0	2
Ib	0	0	2	0	2
Id	1	0	0	0	1
IIa	8	1	3	1	13
More than 1 diagnosis	2	1	2	0	5
without TMD	1	2	2	4	9
Total	12	5	10	5	32

Table 4 describes the description of other temporomandibular joint disorders.

Table 4. Another TMD diagnosis

TMD Diagnosis	Frequency
Open Locking	6
Deviation	4
Total	10

DISCUSSION

Based on gender, it was found that more edentulous female patients came to RSGM Unpad than male patients. A woman's risk of losing her teeth increases after menopause. This is due to the decrease in estrogen levels that occurs during menopause. Estrogen deficiency stimulates immune cells such as monocytes and macrophages to produce large amounts of cytokines. Cytokines produced will activate osteoclasts, which play a role in bone resorption. Alveolar bone resorption in postmenopausal women can cause tooth loss. [8]

A large number of female edentulous patients can also be caused because women tend to pay more attention to the aesthetics of their teeth. The need to look beautiful causes women to be more motivated to make dentures than men.[9] This indicates that there is a variation in the incidence of edentulousness in patients with gender. The incidence of edentulous jaws is influenced by age. Older people tend to lose all their teeth. Most of the people in the world who have lost all their teeth are over 65 years old. In Indonesia, the incidence of edentulous jaws is mostly experienced by people aged over 65 years, followed by those aged 55-64 years, 45-54 years, and at least 35-44 years.[10]

The results of this study found that the edentulous patients who came to RSGM Unpad had an age range of 42-89 years. The cause of tooth loss in young patients in this study, among others, was due to poor oral and dental health. Systemic factors can also influence tooth loss, such as diabetes mellitus, a history of hormonal therapy, or cancer therapy.[11] The number of edentulous patients at RSGM Unpad, aged 55-64 years, was found to be more than patients aged over 65 years. According to a study conducted by Ghani[12] at a Dental Hospital in Pakistan, most of the dentate patients seeking denture treatment are aged 51-65 years. This may be since dental and oral health in patients over 65 years old is often neglected. The declining physical condition limits the elderly (elderly) patients from carrying out a long series of denture treatments. In addition to declining physical condition, another cause is that elderly patients often have to depend on others for treatment. This is different from the case with patients aged 55-64 years who often experience cases of losing all their teeth and still have the motivation to improve their appearance and make it easier to seek dental and oral care.[12]

In this study, most of the

edentulous patients who came had lost their teeth in less than one year. This may be because the level of public awareness about dental health is currently increasing. As the level of public awareness of dental health increases, the need for denture treatment also increases. The results of this study are supported by Padu's research[13] on the dentition community in West Tondado District, showing that 77.1% of research respondents understand the purpose and benefits of using dentures.

Based on research, most edentulous patients have signs and symptoms of TMD. This is similar to the study conducted by Alzaera[14] on dentureless patients in Saudi Arabia. The results of this study showed that most of the denture less patients had signs and symptoms of TMD.

Ribka[15] reported an association between tooth loss and TMD based on the number of quadrants of posterior tooth loss, occlusal support, and the number of tooth loss and there was an increase in the incidence of TMD along with the increase in the number of tooth loss. Occlusion affects the functional relationships between components of the masticatory system, such as the teeth and supporting tissues, TMJ, and craniofacial. In addition, in people who have lost their teeth, mandibular over closure occurs. The vertical dimension will decrease and the cheek muscles will drop due to the absence of support. During the function, the lower jaw tries to make contact with the upper jaw, so that the absence of the maxillary and mandibular teeth will cause the condyle to deviate from a centric position and the mandible to become protrusive, which can cause temporo-mandibular joint disorders.[16] That is the reason why a toothless patient should immediately replace the missing tooth with a denture.

The percentage of edentulous patients who had signs and symptoms of TMD ranged from 0% to 94%. This shows that there is a variation in the incidence of temporomandibular joint disorders in patients without teeth. This significant difference may be due to the different and less specific diagnostic criteria used in describing TMD and the multifactorial etiology of TMD.[16] Women have a higher percentage of TMD disorders than men based on research conducted. This is in line with research conducted by Gabriela[17] which showed that the majority of edentulous patients with temporomandibular joint disorders were female. In elderly women, there is a deficiency of the hormone estrogen. Estrogen plays a role in the balance of the metabolism of collagen tissue in ligaments. The bone mass of women at the age of 35

years generally reaches its maximum. After that point, more bone mass is lost than formed so women are more likely to experience bone loss.[18] This explains why elderly female patients experience TMD more often than male elderly patients.

Based on this research, the diagnosis of disc displacement with reduction is most commonly found in edentulous patients. Similar results were shown by the studies of Nardini*et al*.[20] and Manfredini*et al*.[21], the diagnosis of disc displacement with reduction was the most common diagnosis found in edentulous patients. This may be because the edentulous patient has lost his teeth.

Loss of teeth can cause the mandible to close excessively (overclosure) which results in excessive load on the temporomandibular joint.[16] Under normal physiological conditions, there is a balance between bone resorption and remodeling in the temporomandibular joint. The excessive occlusive load will cause the condyle to experience too much pressure on the glenoid fossa. The remodeling process will be hampered and initiate structural changes in the articular eminence, disc, and condyle.[22] This results in a decrease in the angle of the condyle.[2]

The results showed that the diagnosis of local myalgia, myofascial pain with spreading, and arthralgia were only found in female patients and not in male patients. This may be related to biological, anatomical, hormonal, or a combination of these factors. Older women will experience menopause and along with that, there are psychological changes that cause women to experience stress more easily. Emotional stress can cause increased muscle activity in a resting position which can lead to fatigue and muscle spasms. Muscle spasms that occur will increase the sympathetic nervous response which causes masticatory muscle pain.

Each individual can adapt to changes in temporomandibular joint stability. Even adaptation can occur when the signs and symptoms of TMD are evident. Adaptation is done to restore the lost function of the temporomandibular joint.[23] Symptoms of severe TMD become mild with age. Patients aged over 60 years may suffer from temporomandibular joint disorders, but there is a process of adaptation to pain and disturbances. As a result, patients aged 60 years and over complained less frequently of TMD symptoms and decreased desire to seek treatment compared to younger patients.[23] In this study, edentulous patients were found to have no impairment. Patients who do not suffer from TMD are those aged between 55 to 65 years and over 65 years.

The duration of edentulous is

related to the severity of temporomandibular joint disorders. Several studies have shown that patients with longer dentures exhibit reduced signs and symptoms of temporomandibular joint disorders than patients with shorter dentition periods.[14] However, the Shet[24] study showed a high rate of signs and symptoms of TMD in patients with an edentulous period of more than 5 years. In this study, it was found that the signs and symptoms of temporomandibular joint disorders seen over a long edentulous time showed many variations. This diversity is due to temporomandibular joint disorders being a complex process and are influenced by many factors. Factors that can affect temporo-mandibular joint disorders are occlusion disorders, orthodontic treatment, bruxism, bone imbalance, trauma, and the influence of the hormone estrogen. Psychological factors such as stress, mental stress, excessive anxiety, or depression can also cause temporomandibular joint disorders.[25]

The DC/TMD only looked at closed locking symptoms, while open locking symptoms were not included in the calculation of the algorithm.[5] From the research result, it was found that 6 edentulous patients had difficulty closing their mouths when opening their mouths too large or opening locking. Signs and symptoms of disc displacement with reduction include clicking sound and deviation. The deviation is a mandibular movement that is indicated by disturbance during movement but ends in the middle position.[5] In this study, it was found that 4 edentulous patients have deviated, of which 2 were deviated to the left, while the remaining 2 have deviated to the right. The results showed that 4 people experienced deviation accompanied by changes in disc displacement with reduction. However, not all patients are diagnosed with disc displacement with reduction accompanied by deviation.

The diagnosis criteria for temporomandibular joint disorders can serve as a guide in determining the correct diagnosis of temporo-mandibular joint disorders. The DC/TMD contains several specific tests and is relatively easy to apply. This DC/TMD can be used as a reference to determine the patient's condition specifically so that clinicians can determine the right treatment according to their diagnosis.[5]

CONCLUSION

Based on the research, it can be concluded that most of the edentulous patients at the Dental and Oral Hospital, University of Padjadjaran suffered from temporomandibular joint disorders, with the

most common diagnosis disc displacement with reduction.

CONFLICT OF INTEREST

No potential conflict of interest was reported by the authors

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