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Third molar: position, caries, periodontal disease and quality of life

Terceiros molares: posição, carie, doença periodontal e qualidade de vida

Terceros molares: posición, caries, enfermedad periodontal y calidad de vida

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Abstract
Third molar teeth(3M) position can lead to periodontal disease(PD), caries and may also a significant impact on the oral health related quality of life (QoL). The aim of this study was to verify possible associations between QoL, PD, caries lesions and the position of the lower 3M. An observational cross-sectional study was performed in 116 patients (228 teeth), with the approval of ethics committee (280084) from University of São Paulo Dental School and registered on Clinicaltrials.gov (NCT04024644). Caries, PD and QoL were the evaluated outcomes. Caries were assessed by visual tactile examination and PD through probing sites around 3M. Both diseases were complementary diagnosed with radiographic's exams. The assessment of QoL was carried out using the Oral Health impact Profile questionnaire(OHIP-14), applied as an interview. The evaluation of the 3M's position was performed according to the classification of Pell; Gregory, 1942/Gregory and Winter. Data were analyzed according to STATA 13.0 with 95% of level of significance The higher degree of eruption and angulation of the 3M increased the incidence of caries and PD in these teeth. Age was also a risk factor that increased the occurrence of these oral diseases which negatively influenced the QoL. Patients with caries have impact on domains 1 and 7 and those with PD had impact on domain 2 and 7. Pathologies on the 3M region had an impact on domain 7. 3M's position influences the incidence of caries and PD in the lower 3M, with consequent negative impacts on the QoL.
Keywords: Molar third; Dental caries; Periodontal disease; Quality of life.

Resumo
A posição dos terceiros molares (3M) pode levar à doença periodontal (DP) e a cárie, e pode determinar um impacto significativo na qualidade de vida relacionada à saúde bucal (QV). O objetivo deste estudo foi verificar possíveis associações entre QV, DP, lesões de cárie e a posição do 3M inferior. Tratou-se de um estudo clínico observacional transversal realizado em 116 pacientes (228 dentes). O estudo foi aprovado pelo comitê de ética (280084) da Faculdade de Odontologia da Universidade de São Paulo e registrado no Clinicaltrials.gov (NCT04024644). Cárie, DP e QV foram os desfechos avaliados. A cárie foi avaliada por exame visual tátil e a DP por meio de sondagem em torno de 3M. Ambas as doenças foram diagnosticadas com exames radiográficos complementares. A avaliação da QV

foi realizada através do questionário Oral Health impact Profile (OHIP-14), aplicado sob forma de entrevista. A avaliação da posição do 3M foi realizada de acordo com a classificação de Pell; Gregory, 1942 / Gregory e Winter. Os dados foram analisados de acordo com o STATA 13.0 com nível de significância de 95%. Resultados: o maior grau de erupção e angulação do 3M aumentaram a incidência de cárie e DP nesses dentes. A idade também foi um fator de risco que aumentou a ocorrência dessas doenças bucais, influenciando negativamente a QV. Pacientes com cárie tiveram impacto nos domínios 1 e 7 e aqueles com DP tiveram impacto nos domínios 2 e 7. Patologias na região 3M têm impacto no domínio 7. A posição dos dentes terceiros molares (3M) podem levar à doença periodontal (DP) e a cárie também pode determinar um impacto significativo na qualidade de vida relacionada à saúde bucal (QV). Conclusão: nosso centro de referência mostrou que a posição dentária influencia a incidência de cárie e DP nos 3M inferiores, com consequentes impactos negativos na QV.
Palavras-chave: Terceiro molar; Cáries; Doença periodontal; Qualidade de vida.

Resumen
La posición de los dientes del tercer molar (3M) puede provocar enfermedad periodontal (PD), caries y también puede tener un impacto significativo en la calidad de vida (QoL) relacionada con la salud oral. El objetivo de este estudio fue verificar posibles asociaciones entre la CV, la EP, las lesiones de caries y la posición del 3M inferior. Se realizó un estudio transversal observacional en 116 pacientes (228 dientes), con la aprobación del comité de ética (280084) de la Facultad de Odontología de la Universidad de São Paulo y registrado en Clinicaltrials.gov (NCT04024644). Caries, EP y QoL fueron los desenlaces evaluados. Las caries se evaluaron mediante examen táctil visual y PD a través de sitios de sondaje alrededor de 3M. Ambas enfermedades fueron diagnosticadas complementariamente con exámenes radiográficos. La evaluación de la CV se realizó mediante el cuestionario Perfil de Impacto en Salud Oral (OHIP-14), aplicado como entrevista. La evaluación de la posición de 3M se realizó según la clasificación de Pell; Gregory, 1942/Gregory y Winter. Los datos fueron analizados según STATA 13.0 con un 95% de nivel de significancia. El mayor grado de erupción y angulación de los 3M incrementó la incidencia de caries y EP en estos dientes. La edad también fue un factor de riesgo que aumentó la ocurrencia de estas enfermedades orales que influyeron negativamente en la calidad de vida. Los pacientes con caries tienen impacto en los dominios 1 y 7 y aquellos con PD tienen impacto en el dominio 2 y 7. Las patologías en la región 3M tienen un impacto en el dominio 7. La posición de 3M influye en la incidencia de caries y PD en el 3M inferior, con la consiguiente impactos negativos en la calidad de vida.
Palabras clave: Tercer molar; Caries; Enfermedad periodontal; Calidad de vida.

1. Introduction

The third molars (3Ms) are teeth with limited function (Silvestri;Singh, 2003) and a high index of associated diseases (Kaveri;Prakash, 2012). Among them, caries and periodontal disease (PD) are chronic oral cavity conditions that affect most of the young adult population (Divaris et al., 2012).

Caries is a contagious infectious disease associated with the interaction of many risk factors and is considered multifactorial (Fejerskov, 2004). It is one of the leading causes of dentition loss in the first decades of life (Divaris et al., 2012). Some factors influence the occurrence of caries, such as education level, oral hygiene level, brushing frequency, water supply, frequency of visits to the dentist (McCoy, 2012), and socioeconomic conditions (Divaris et al., 2012). Diet is also a modifying factor. The position of the 3Ms and the patient's anatomical profile can lead to the identification of caries risk groups in the 3Ms (Ahmad et al., 2008).

Periodontal disease is an inflammatory disorder with a specific localized infection that affects one or more support or protection tissues, including alveolar bone, periodontal ligament, cementum, and/or gingiva (McCoy, 2012). An increased depth of the periodontal pocket is a cause of PD in the 3M region (Chang et al., 2009), also to the worsening of periodontal condition between the second molar (2M) and 3M (Blakey et al., 2006).

The position, angle, and degree of impaction of the 3Ms can influence the pathological Chang et al., 2009es in the 3Ms. These factors should be considered when considering extraction (Polat et al., 2008). The higher the angulation of the tooth, the greater the difficulty of sanitizing and removing food, consequently facilitating bacterial colonization (Falci et al., 2012). Often, the presence of these teeth can lead to a decrease in an individual's oral health, having a significant impact on their quality of life (QoL). Patients may report difficulty relaxing, interruptions in eating, irritability, and tension (Slade et al., 2004).

The purpose of this study was to verify the possible associations between oral health-related QoL (OHRQoL), the position of the mandibular 3Ms, and the occurrence of caries and PD.

2. Methodology

The study was approved by the ethics committee of the University of São Paulo Dental School (number 280084) and registered at clinicaltrials.gov (number NCT 04024644).

Patients who agreed to participate in this study signed the informed consent form after a verbal and written explanation of the research. We conducted an observational study with 116 healthy patients (228 mandibular 3Ms) of both sexes during the specialization course of oral and maxillofacial surgery at the FFO-University of SãoPaulo, Brazil. Data were collected over 12 months.

Sample Size Calculation

The sample size was calculated (G * Power software version 3.1.9.2) using the t-test for paired groups. The effect size was determined using the formula described below.

The worst scenario was selected, that is, the largest standard deviation between means. The mean values of the control and treated groups, as well as the standard deviation, were taken from one study (12). The error was set at 5% and the power test at 95%. This value was calculated to provide 95% strength (a = 0.05). According to the result, a sample of 116 patients was necessary to detect differences in QoL (12). Other factors related to secondary outcomes were statistically analyzed.

Inclusion and Exclusion Criteria

Participants in this study were evaluated to meet the eligibility criteria: ASA I patients (negative medical history), with at least one 3M erupted or partially erupted. All participants, regardless of age, sex, cultural level, or socioeconomic status, were allowed to participate in the study.

Patients with the following were excluded: systemically compromised, allergies, pregnancies, and four 3Ms impacted or had already undergone the exodontia of one of them.

Outcome Measures

The outcome measures were sex, age, carious lesions, periodontal disease, 3M position, and OHRQoL.

Sex and age were assessed on a clinical form, including personal and demographic data, reasons that led to seeking care, and the last visit to the dentist. Caries were evaluated by visual tactile examination only on the occlusal surface in the erupted or partially erupted 3Ms (visual tactile examination) and by the image on the panoramic radiograph.

We considered the presence of a caries when cavities or radiolucency were present (Abesi et al., 2012 et al., 2012). Periodontal disease was evaluated by probing the gingival sulcus in 3Ms at two points: mesiobuccal and distobuccal regions. We considered the presence of PD when the pocket was ≥ 4 mm (Moss et al., 2007). The position and classification of the mandibular 3Ms were assessed by panoramic radiography, according to the classification of Pell; Gregory, 1942 and Gregory (1942) and Winter (1926) (Pell; Gregory, 1942) performed by the same evaluator, following the criteria of imaginary lines, as proposed by Almendros-Marques et al., 2007, et al. (Almendros-Marques et al., 2007) OHRQoL was assessed using the Brazilian version of the OHIP-14 questionnaire (Oliveira; Nadanovsky, 2005) (Table 1) and applied as an interview. This instrument consists of 14 items rated on a Likert-type scale that includes the following responses: never (coded 0), hardly ever (coded 1), occasionally (coded 2), fairly often (coded 3), and very often (coded 4). The results of the OHIP-14 questionnaire ranged from 0 to 56, with higher scores indicating poor OHRQoL. (Negreiros et al., 2012) The results were also evaluated by

domains. The answers were arranged on seven subscales: Domain 1 (functional limitation), domain 2 (physical pain), domain 3 (psychological discomfort), domain 4 (physical disability), domain 5 (psychological disability), domain 6 (social disability), and domain 7 (handicap).

Table 1. Ohip-14 questionnaire and its domains.

Domain Item	14 Questions
Domain 1: Functional limitation	1. Had trouble pronouncing any words 2. Felt sense of taste had worsened
Domain 2: Physical pain	3. Had painful aching 4. Found it uncomfortable to eat any foods
Domain 3: Psychological discomfort	5. Been self-conscious 6. Felt tense
Domain 4: Physical disability	7. Felt diet has been unsatisfactory 8. Had to interrupt meals
Domain 5: Psychological disability	9. Found it difficult to relax 10. Been a bit embarrassed
Domain 6: Social disability	11. Been a bit irritable 12. Had difficulty doing usual jobs
Domain 7: Handicap	13. Felt life less satisfying 14. Been totally unable to function

Source: Oliveira & Nadanovsky, (2005).

Data Analysis

Data were treated according to the software program Stata 13.0 (StataCorp, College Station, TX). Variables were evaluated using split-plot analysis of variance for repeated measures analysis to identify associations between QoL and positions of the mandibular 3M. A 95% significance level was used for all the analyses.

The results of the OHIP-14 questionnaire were evaluated by the domain averages and the impact in each of them, considering the presence of impact when the response was greater than zero.

3. Results

Sex and Age: During the study, questionnaires were administered to 117 patients, but one of them was excluded due to incomplete data. The number of patients evaluated was 116, which corresponds to 228 mandibular 3Ms.There were 63 female patients (54.31%) and 53 male patients (45.69%), with a mean age of 25.25 years (SD, 5.06 years).

Carious Lesions and PD: Upon assessing the presence of caries in the 3Ms of the mandible, it was found that 58.62% had no carious lesions, 1.72% had no anodontia, and 7.76% were enclosed (i.e., partially covered by soft or hard tissue). The presence of carious lesions was detected clinically or radiographically in 28.02% of the samples, and 3.88% of the teeth were obturated, which adds up to 31.9% of the teeth being clinically or radiographically detected (Table 2). Among the 228 3Ms mandibular evaluated in this study, 18.53% had periodontal probing depths deeper than 4 mm (periodontal pocket), 72.41% did not have periodontal pockets, and 7.46% had enclosed teeth (Table 2).

Table 2 – Lower 3Ms according to caries lesions presence and PD.

Outcomes	Category	N (228)	%
Carie	**No caries lesions**	136	58.62%
	caries lesions	65	28.02%
	Restored	9	3.88%
	Carie+restoration	74	31.9%
	enclosed	18	7.76%
PD	periodontal pocket	43	18.85%
	Without periodontal pocket	168	73.68%
	enclosed	17	7.46

Source: Negreiros et al (2012).

Position: Among the 228 teeth, 54.74% were partially erupted, 35.78% erupted, and 35.78% were impacted. According to the Winter classification, most teeth were in a vertical position (60.34%), followed by mesioangular (18.97%) and horizontal (14.66%) positions. According to Pell; and Gregory's classification, 183 teeth were in position A (78.87%), followed by position B (17.24%); 100 (43.10%) of the teeth were classified as class II; and 40 (17.24%) as class I (Table 3).

Tabela 3 – Patients distribuiton according to Winter. Pell; Gregory, and oclusion relation.

POSITION		**Lower 3Ms**
Occlusal Plan	Erupted	83 (35.78%)
	Semi-erupted	127 (54.74%)
	Enclosed	18 (7.76%)
Winter	Vertical	140 (60.34%)
	Mesioangular	44 (18.97%)
	Horizontal	34 (14.66%)
	Distoangular	10 (4.31%)
Pell; Gregory, 1942 e Gregory	Position A	183 (78.87%)
	Position B	40 (17.24%)
	Position C	5 (2.15%)
	Classe I	40 (17.24%)
	Classe II	100 (43.10%)
	Classe III	1 (0.43%)
	Anodontia	4 (1.72%)

Source: Negreiros et al (2012).

Caries, PD, Age, and Position: The older patients had 4% more carious lesions and increased PD, showing statistical significance (p = 0.00 caries and p = 0.01 PD) (Table 4).

Regarding the occlusal plane, the erupted mandibular 3Ms presented two times more carious lesions than partially erupted ones, with statistical significance (p = 0.00). The mandibular 3Ms that erupted had 60% more PD than partially erupted teeth, without a statistically proven relationship (Table 4).

Regarding Winter´s classification, the mandibular 3Ms in the distoangular position had less caries than the mesioangular ones. The mesioangular teeth had 10% more caries than the vertical teeth, and more caries than the horizontal teeth (p = 0.00) (Table 4). The mandibular 3Ms mesioangular teeth had more PD than the vertical teeth, with a statistically significant difference (p = 0.05) (Table 4).

Regarding Pell; Gregory, 1942 and Gregory´s classification (positions A, B, and C), the mandibular 3Ms at position B had twice as many carious lesions as position A; position C had 25% more carious lesions than position A, with statistical significance. Position B had more PD than in position A; position C had more PD than position A, with statistical significance (p = 0.00) (Table 4).

Table 4 - Patients distribution according to caries and Pd, age and position.

	RP	STD ERR	P	IC(95%)	
CARIE X AGE	**1.049**	**0.013**	**0.000**	**1.022**	**1.076**
PD X AGE	**1.060**	**0.024**	**0.012**	**1.0013**	**1.110**
CARIE X ERUPTION	**2.079**	**0.436**	**0.000**	**1.378**	**3.137**
DP X WINTER	**1.882**	**0.608**	**0.050**	**0.999**	**3.547**
CÁRIE X PELL; GREGORY, 1942	**1.989**	**0.336**	**0.000**	**1.427**	**2.772**
DP X PELL; GREGORY, 1942	**2.541**	**0.662**	**0.000**	**1.524**	**4.237**

Source: Negreiros et al (2012).

QoL: Among the 116 patients, the mean total OHIP questionnaire was 12.13 (0-51). Regarding the evaluation of domains, we obtained: domain 1 (functional evaluation) 0.27; domain 2 (physical pain) 1.77, (impact); domain 3 (psychological discomfort) 1.61, (impact); domain 4 (physical disability) 0.75; domain 5 (psychological incapacity) 0.71; domain 6 (social incapacity) 0.85; domain 7 (social disadvantage) 0.34.

The average total OHIP was similar in all patients, in the presence or absence of carious lesions in the mandibular 3Ms. When QoL was evaluated by analyzing domains, a relationship was found between caries and QoL in domains 1 (p = 0.04) and 7 (p = 0.00) (Table 5). Patients with PD in 3Ms had more impact in domain 2 (physical pain) (p = 0.03) and domain 7 (handicap) (p = 0.04) than in patients without diseases (Table 5).

Considering the presence of caries or PD, 3Ms with pathological occurrence, patients who have PD or caries had higher scores of OHIP in domain 7 (handicap/social disadvantage) (p = 0.06) (Table 5).

Table 5 – Patients distribution according to caries and PD in 3Ms and quality of life.

	RP	STD ERR	P	IC(95%)	
CÁRIE X DOM 1 WITHOUT CÁRIE	**0.717**	**0.114**	**0.038**	**0.524**	**0.981**
CÁRIE X DOM7 WITHOUT CÁRIE	**0.592**	**0.110**	**0.005**	**0.411**	**0.853**
PD X DOM 2 WITHOUT PD	**0.720**	**0.109**	**0.031**	**0.534**	**0.970**
PD X DOM 7 WITHOUT PD	**0.634**	**0.146**	**0.049**	**0.403**	**0.999**
DISEASES X DOM7 WITHOUT PATHOLOGIES	**0.150**	**0.413**	**0.064**	**0.413**	**1.024**

Source: Negreiros et al (2012).

4. Dicussion

Caries are infectious and irreversible diseases that cause demineralization of the calcified elements of the tooth, which can affect enamel, dentin, and cementum (Shugars et al., 2005). The decision to treat carious lesions or to extract 3Ms depends on the experience of each patient and surgeon (Ahmad et al., 2008 et al.). Currently, caries is the most common bacterial disease, and when it affects the 3M region, restorative treatment is difficult due to limited access (Shugars et al., 2005). The presence of caries in 3Ms is associated with caries in other teeth (Ahmad et al., 2008 & Moss et al., 2007), and it is rare that a patient has caries in a 3M without having caries in the other teeth (White et al., 2011 et al.).

PD comprises a wide range of inflammatory conditions that affect the supporting structures of the teeth (gingiva, bone, and periodontal ligament). PD develops over time with the accumulation of dental plaque, bacterial dysbiosis, occurrence of periodontal pockets, gum recession, tissue destruction, and alveolar bone loss, and can lead to tooth loss (Michaud et al., 2017). Some gram-negative anaerobic bacteria are accepted as the etiologic factors of PD (Moss et al., 2007). However, the presence of microbial biofilms might not be sufficient for the pathogenesis of PD. Disease occurs when the balance between the microbial biofilm and the host is lost, leading to dysbiosis or immune overreaction of the host to microbial presence. This imbalance is difficult to unravel, as there are variances in both dental plaque and the host genetic and immune system profiles (Kinane et al., 2017).

Renton et al., 2012 et al., 2012 et al. (Renton et al., 2012 et al., 2012), stated that the main etiological causes of 3M extraction were pericoronitis (64%), caries (31%), and periodontitis (8%). McArdle (Marciani, 2012), who obtained similar results, reported as the main causes of 3M removal, pericoronitis (49%), caries (27%), and periodontal disease (5%). In our study, 31.9% of the assessed 3Ms presented with carious lesions and 18.53% presented with PD.

In this clinical observational study with 228 mandibular 3M teeth, carious lesions were added to restored teeth and classified as caries-affected teeth. The teeth were divided into two groups, considering the presence of caries or PD, and naming them with or without pathological occurrence. Another adjustment was to exclude impacted teeth, evaluating only erupted and partially erupted teeth. We analyzed only teeth that were present in the oral cavity.

Among the patients in our study, carious lesions and PD were more prevalent in older people. This result is consistent with those of other studies. Blakey (Blakey et al., 2006), Moss (Moss et al., 2007), Haug (Haug et al., 2009), Marciani, (Marciani, 2012), and Jung;Cho, (Jung;Cho, 2013) reported a higher incidence of carious lesions in 3Ms in patients with a higher age. Blakey (Blakey et al., 2006), Moss. (Moss et al., 2007), and Araujo (Araujo et al., 2010) also observed that the higher prevalence of PD in 3Ms of older patients was also observed by Blakey. (Blakey et al., 2006), Moss (Moss et al., 2007), and Araujo (Araujo et al., 2010). It is likely that the longer exposure time of the teeth of older patients to etiological factors,

such as biofilm, explains the higher incidence of pathological changes in 3Ms. Younger patients have greater potential to cure PD in the 3M region (Fisher et al., 2012), with 3M extraction. (Blakey et al., 2006). This should be considered when indicating the exodontia of 3Ms.

The most prudent age indicated for 3M extraction is before 25 years of age, or before root development is complete (Rafetto;Synan, 2012 & Celikoglu;Miloglu, 2010). According to Pogrel, (Pogrel, 2012), after root development, there is an increase in the technical difficulty of extraction. Over the years, periodontal ligaments become thicker, ankylosis may appear, the mandible becomes more sclerotic, and hypercementosis becomes more common. In addition, higher age increases the risk of systemic illness and intraoperative or postoperative complications (Shoshani-Dror et al., 2018).

In this study, the most affected tooth position according to the Winter classification was mesioangular. Carious lesions and PD were more common in this 3M position, the same result reported by Jung;Cho, (Jung;Cho, 2013). However, Al Anqudi (Al-Anqudi et al., 2014) and Celikoglu;Miloglu,. (Celikoglu;Miloglu, 2010) described more carious lesions and PD in 3Ms in the horizontal position. Knutsson (Knutsson et al., 1996) reported 5 to 12 times more pathologies in distoangular 3Ms. It is known that mesioangular, distoangular, and horizontal 3Ms are positions that increase the accumulation of food and make local brushing difficult. Therefore, in these situations, the occurrence of biofilm accumulation and inflammation can culminate in carious lesions and PD. The greater the angle of the 3M, the greater the food retention and consequently the difficulty in sanitizing. All authors emphasize the idea that angulation eventually leads to a prophylactic indication of extraction to prevent the development of cavities in the mandibular region (Falci et al., 2012). Semi-erupted and erupted mesioangular teeth need special attention and should be extracted prophylactically (Allen et al., 2009).

According to Pell and Gregory´s classification, in our study, the B position had twice as many carious lesions as the A position; position C had 25% more carious lesions than position A. This result agrees with Oderinu. (Oderinu et al., 2012), who reported a higher risk of carious lesions; the lower the 3Ms were from the cementoenamel limit of the second molar. The more impacted the tooth, more food retention, and, consequently, the greater difficulty in cleaning, increasing the risk of caries and PD. However, Ventä (Venta et al., 2018) reported that a 3M located deeper in the bone was more likely to be disease-free than a tooth at the occlusal level. This discrepancy may be explained by the different samples that were evaluated. Ventä (Venta et al., 2018) included the entire population aged 30–98 years, adding up to 5665 3Ms, while our present study assessed 228 3Ms of young adults, with a mean age of 25.25 years.

PD has a high incidence rate in semi-erupted or erupted teeth in this region. Some authors advocate prophylactic extraction of partially erupted mandibular 3Ms due to the possibility of cavities, periodontal disease, or painful symptoms (Falci et al., 2012). In corroborating our sample, we also found that erupted and semi-erupted teeth pose a risk for PD.

Due to the bone architecture and poor soft tissue in the 3M region, periodontal problems are more common (Blakey et al., 2006). The combination of partial eruption in older patients and the anatomical location of 3Ms leads to the accumulation of biofilms colonized by anaerobic pathogens in the region, which are difficult to eradicate (Blakey et al., 2006), increasing the risk of PD (Moss et al., 2007).

The association of PD in 3M and other molars may exist; however, the study population is extremely limited, as 3M data are often excluded from clinical analysis (Blakey et al., 2006, Fisher et al., 2012). The second most common cause of 3M extraction is PD, which is present in 25% of patients older than 25 years (Bardshaw et al., 2012). There are many conflicts related to the 3M extraction and periodontal status in the region (Dicus-bookes et al., 2013).

The presence of PD or carious lesions in 3Ms suggests that the retention of these teeth in the mouth should be monitored regularly (Chang et al., 2009, Marciani, 2012, Blakey et al., 2006, Garaas ate al., 2011). 3M is the last tooth to develop, erupt, and mineralize in the permanent dentition (Garaas ate al., 2011). Impacted 3Ms are associated with an increased risk of pathology in middle-aged male adults, and the risk of PD is twice as high (Nunn et al., 2014). Clinically, it is

the tooth that is most commonly impacted and responsible for conditions such as periodontitis, pericoronitis, crowding, pain, cysts, etc. (Chang et al., 2009). Most 3Ms are extracted due to associated pathologies (Moss et al., 2007). (Haug et al., 2009) and Kaveri and Prakash (Kaveri;Prakash, 2012) stated that 3Ms are teeth with no essential function. McCoy (McCoy, 2012) stated that 95% of 18-year-old Americans have 3Ms that do not function in chewing. However, 3Ms can have clinical value in some cases; people have benefits in restoring 3Ms when they support fixed or removable prostheses (Mikic et al., 2013). The longer teeth remain in the mouth, the more vulnerable they are to caries (Mikic et al., 2013).

Patients with asymptomatic 3Ms should be carefully evaluated (Fisher et al., 2012) because caries and PD often do not produce symptoms (White et al., 2011),

The extraction of 3M is considered the most difficult decision faced by oral and maxillofacial surgeons (Polat et al., 2008, Negreiros et al., 2012, Knutsson at al., 1996). The indication for prophylactic extraction should be based on risk-benefit. It can be considered a long-term oral health-promoting modality (Jung;Cho, 2013), such as caries prevention and PD (Celikoglu;Miloglu, 2010). Specifically, when talking about some positions, the use of QoL terms and related therapies has increased in the field of oral medicine. OHRQoL is a multidimensional construct that reflects comfort in eating, sleeping, social interaction, self-esteem, and satisfaction with oral health (Al Habashneh).

The OHIP-14 questionnaire is an excellent instrument that measures the impact of oral disease on QoL (Schalch et al., 2019). Caries and PD can affect the patient's day-to-day life and OHRQoL, and this concept must be considered when deciding the prophylactic extraction of 3Ms.

Some bias should be considered in our study, such as the subjectivity of the data, based on the perception of the patient. QoL is a subjective measure that is based on a patient's perception, which means different things for each, which can supplement traditional health measures (Locker;Allen, 2007, Allen et al., 2009).

The presence of carious lesions had an impact on the functional limitation domain and impairment (domains 1 and 7) in our study. The presence of PD had an impact on physical pain and impairment (domains 2 and 7), indicating its influence on the patient's QoL. Araujo (Araujo et al., 2010), also found an impact of PD on QoL in the functional limitation domain. In another study, domain 2, physical pain, had the greatest impact. All domains, except functional limitations, differed according to the type of PD. PD causes several clinical signs and symptoms, some of which have an impact on QoL (Al Habashneh et al., 2012). This domain represents physical disability, indicating that pathological changes can make the patient incapable of performing daily tasks.

The prevalence and severity of hip scores were calculated and showed an impact on patients with PD. Patients with PD or caries had higher OHIP scores in domain 7, handicap.

The presence of these teeth can often lead to injury and damage to an individual's oral health, having a significant impact on their QoL, which may include difficulty relaxing, meal interruptions, irritability, and tension, often affecting a person's ability to work (Slade et al., 2004). QoL indices are as important as clinical parameters in the indications for 3M tooth extractions (Negreiros et al., 2012).

5. Conclusion

The associations between QoL, PD, caries, and position of the mandibular 3Ms were verified in this study.

- The 3M position, such as angulation and degree of eruption, interferes with carious lesion incidence, especially in patients with caries in other teeth.
- The 3M position, such as angulation and degree of eruption, interferes with the incidence of PD, unrelated to PD in other teeth.

- Age is a factor associated with caries and PD that influences OHIP values. OHRQoL worsens with increasing age.
- OHRQoL is negatively influenced by caries and PD.

We suggest future researches to correlate clinical parameters and quality of life When managing third molars treatment.

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