UNIVERSIDADE ESTADUAL DE CAMPINAS
FACULDADE DE ODONTOLOGIA DE
PIRACICABA

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JOHN LENNON SILVA CUNHA

LESÕES ORAIS E MAXILOFACIAIS EM IDOSOS: UM ESTUDO MULTI-INSTITUCIONAL

ORAL AND MAXILLOFACIAL LESIONS IN OLDER PEOPLE:
A MULTI-INSTITUTIONAL STUDY

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2023

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Tese apresentada à Faculdade de Odontologia de Piracicaba da Universidade Estadual de Campinas como parte dos requisitos exigidos para a obtenção do título de Doutor em Estomatopatologia, na Área de Patologia.

Thesis presented to the Piracicaba Dental School of the University of Campinas in partial fulfillment of the requirements for the degree of Doctor in Stomatopathology, in Pathology area.

Orientador: Prof. Dr. Felipe Paiva Fonseca
Coorientador: Prof. Dr. Oslei Paes de Almeida

ESTE EXEMPLAR CORRESPONDE À VERSÃO FINAL DA TESE DEFENDIDA PELO ALUNO JOHN LENNON SILVA CUNHA E ORIENTADA PELO PROF. DR. FELIPE PAIVA FONSECA.

Piracicaba

2023

Ficha catalográfica
Universidade Estadual de Campinas
Biblioteca da Faculdade de Odontologia de Piracicaba
Marilene Girello - CRB 8/6159

C914L

Cunha, John Lennon Silva, 1991-
Lesões orais e maxilofaciais em idosos : um estudo multi-institucional / John Lennon Silva Cunha. – Piracicaba, SP : [s.n.], 2023.

Orientador: Felipe Paiva Fonseca.
Coorientador: Oslei Paes de Almeida.
Tese (doutorado) – Universidade Estadual de Campinas, Faculdade de Odontologia de Piracicaba.

1. Epidemiologia. 2. Boca - Doenças. 3. Patologia bucal. 4. Idosos. I. Fonseca, Felipe Paiva, 1986-. II. Almeida, Oslei Paes de, 1948-. III. Universidade Estadual de Campinas. Faculdade de Odontologia de Piracicaba. IV. Título.

Informações Complementares

Título em outro idioma: Oral and maxillofacial lesions in older people : a multi-institutional study
Palavras-chave em inglês:
Epidemiology
Mouth - Diseases
Pathology, oral
Aged
Área de concentração: Patologia
Titulação: Doutor em Estomatopatologia
Banca examinadora:
Felipe Paiva Fonseca [Orientador]
Bruno Augusto Benevenuto de Andrade
Silvia Ferreira de Sousa
Helder Antonio Rebêlo Pontes
Gleyson Kleber do Amaral Silva
Data de defesa: 15-05-2023
Programa de Pós-Graduação: Estomatopatologia

Identificação e informações acadêmicas do(a) aluno(a)
- ORCID do autor: https://orcid.org/0000-0002-0679-8485
- Currículo Lattes do autor: http://lattes.cnpq.br/4810420348125574

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Faculdade de Odontologia de Piracicaba

A Comissão Julgadora dos trabalhos de Defesa de Tese de Doutorado, em sessão pública realizada em 15 de maio de 2023, considerou o candidato JOHN LENNON SILVA CUNHA aprovado.

PROF. DR. FELIPE PAIVA FONSECA

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A Ata da defesa, assinada pelos membros da Comissão Examinadora, consta no SIGA/Sistema de Fluxo de Dissertação/Tese e na Secretaria do Programa da Unidade.

AGRADECIMENTOS

À Universidade Estadual de Campinas, na pessoa do Magnífico Reitor, Prof. Dr. Antonio José de Almeida Meirelles.

À Faculdade de Odontologia de Piracicaba, na pessoa de seu Diretor, Prof. Dr. Flávio Henrique Baggio Aguiar e sua Diretora Associada, Profa. Dra. Karina Gonzales Silvério Ruiz.

Ao Prof. Dr. Valentim Adelino Ricardo Barão, Coordenador Geral da Pós-Graduação da Faculdade de Odontologia de Piracicaba.

Ao Coordenador do Programa de Pós-Graduação em Estomatopatologia, Prof. Dr. Pablo Agustin Vargas.

O presente trabalho foi realizado com apoio da Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq). Agradecemos todo apoio financeiro da instituição citada.

RESUMO

A população mundial está envelhecendo, e o aumento da população idosa exige cuidados de saúde bucal aprimorados. Estudos epidemiológicos com foco na prevalência de lesões bucais na população idosa do Brasil são escassos e oferecem informação limitada sobre o perfil das lesões orais nessa população. Portanto, o objetivo deste estudo foi descrever a frequência de lesões orais e maxilofaciais em idosos (≥60 anos) diagnosticados em três serviços brasileiros de patologia bucal (UFRJ, UEPB e UNIFOR) no período de 1999 a 2019. Trata-se de um estudo transversal descritivo retrospectivo que analisou dados provenientes de fichas histopatológicas. Informações referentes a idade, sexo, localização anatômica, cor da pele e diagnóstico histopatológico foram analisadas. A associação entre os vários grupos de lesões orais e os achados demográficos foi avaliada usando o teste qui-quadrado de Pearson e o teste exato de Fisher. Um total de 7.476 lesões orais foram diagnosticas em pacientes idosos nos três centros participantes no período estudado. A maioria dos casos foram diagnosticados em mulheres (n=4,403; 58.9%) (P < 0,001), com uma proporção de mulheres para homens de 1:0,7 e em pacientes com idade entre 60 e 69 anos (n = 4.487; 60,0%). As localizações anatômicas mais comuns foram a língua (n = 1.196; 16,4%), lábio inferior (n = 1.005; 13,8%) e mucosa jugal (n = 997; 13,7%). As lesões reacionais e inflamatórias (n = 3.840; 51,3%) foram as patologias não neoplásicas mais prevalentes (P < 0,001), seguidas pelos cistos (n = 475; 6,4%). Destes, 389 (5,20%) casos eram cistos odontogênicos enquanto 86 (1,15%) foram classificados como cistos não odontogênicos. As lesões císticas mais frequentes em cada grupo foram cistos periapicais (n = 166; 68,9%) e cistos do ducto salivar (n = 45; 52,3%), respectivamente. As neoplasias malignas foram mais frequentes (n = 1.353; 18,1%) do que as neoplasias benignas (n = 512; 6,8%). Entre os tumores odontogênicos, o ameloblastoma foi o mais frequente, representando 77,4% de todos os tumores dessa natureza (n = 65). As desordens orais potencialmente malignas representaram 10.2% (n = 759) do total de lesões, sendo o terceiro grupo de lesões mais comuns. No geral, a hiperplasia fibrosa/fibroepitelial (n = 2.042; 53,2%) (P < 0,001) e o carcinoma de células escamosas (n = 1.191; 88,03%) (P < 0,001) foram as lesões orais mais comumente observadas em idosos. O índice de concordância geral entre o diagnóstico clínico e histopatológico foi de 55,2% (3.209 de 5.812 casos). A frequência de lesões orais em idosos foi alta. Portanto, é necessário o desenvolvimento de políticas de saúde pública voltadas para a prevenção, diagnóstico e tratamento precoces para evitar morbidade significativa e melhorar a qualidade de vida desses indivíduos. A concordância moderada observada entre o diagnóstico clínico e histopatológico reforça a importância da análise histopatológica de todo material biopsiado.

Palavras-Chaves: Epidemiologia; Doenças da boca; Patologia bucal; Idoso.

ABSTRACT

The world population is aging, and the increasing elderly population requires enhanced oral health care. Epidemiological studies focusing on the prevalence of oral lesions in the elderly population of Brazil are scarce and provide limited information about the profile of oral lesions in this population. Therefore, the aim of this study was to describe the frequency of oral and maxillofacial lesions in elderly individuals (≥60 years) diagnosed in three Brazilian oral pathology services (UFRJ, UEPB, and UNIFOR) from 1999 to 2019. This was a descriptive retrospective cross-sectional study that analyzed data from histopathological records. Information regarding age, gender, anatomical location, skin color, and histopathological diagnosis was analyzed. The association between various groups of oral lesions and demographic findings was evaluated using the Pearson chi-square test and Fisher's exact test. A total of 7,476 oral lesions were diagnosed in elderly patients in the three participating centers during the study period. Most cases were diagnosed in women (n=4,403; 58.9%) ($P < 0.001$), with a female-to-male ratio of 1:0.7, and in patients aged 60-69 years (n = 4,487; 60.0%). The most common anatomical locations were the tongue (n = 1,196; 16.4%), lower lip (n = 1,005; 13.8%), and buccal mucosa (n = 997; 13.7%). Reactive and inflammatory lesions (n = 3,840; 51.3%) were the most prevalent non-neoplastic pathologies ($P < 0.001$), followed by cysts (n = 475; 6.4%). Among these, 389 (5.20%) cases were odontogenic cysts, while 86 (1.15%) were classified as non-odontogenic cysts. The most frequent cystic lesions in each group were periapical cysts (n = 166; 68.9%) and salivary duct cysts (n = 45; 52.3%), respectively. Malignant neoplasms were more frequent (n = 1,353; 18.1%) than benign neoplasms (n = 512; 6.8%). Among odontogenic tumors, ameloblastoma was the most frequent, accounting for 77.4% of all tumors of this nature (n = 65). Potentially malignant oral disorders represented 10.2% (n = 759) of the total lesions, being the third most common group of lesions. Overall, fibrous/fibroepithelial hyperplasia (n = 2,042; 53.2%) ($P < 0.001$) and squamous cell carcinoma (n = 1,191; 88.03%) ($P < 0.001$) were the most observed oral lesions in the elderly. The overall agreement rate between clinical and histopathological diagnosis was 55.2% (3,209 out of 5,812 cases). The frequency of oral lesions in the elderly was high. Therefore, the development of public health policies focused on prevention, early diagnosis, and treatment is necessary to avoid significant morbidity and improve the quality of life for these individuals. The moderate agreement observed between clinical and histopathological diagnosis reinforces the importance of histopathological analysis of all biopsied material.

Keywords: Epidemiology; Mouth Diseases; Oral pathology; Aged.

SUMÁRIO

1 INTRODUÇÃO

O envelhecimento populacional é um fenômeno global e uma das maiores conquistas da humanidade, fruto dos avanços na medicina, tecnologia e desenvolvimento econômico (Hartmann et al., 2022; Cheruvathoor et al., 2020). No entanto, o aumento da expectativa de vida traz consigo novos desafios e demandas para a sociedade, em especial para os sistemas de saúde e previdenciários (Hartmann et al., 2022; Cheruvathoor et al., 2020). É importante ressaltar que a longevidade não deve ser vista apenas como uma questão meramente demográfica ou estatística, mas como uma oportunidade para promover aos idosos, uma vida mais saudável e ativa, capaz de proporcionar bem-estar e realização pessoal (Leung e Chu, 2022; Hartmann et al., 2022). Para isso, é necessário investir em políticas públicas que garantam o acesso a serviços de saúde de qualidade, programas de prevenção e tratamento de doenças crônicas, além de atividades de lazer e socialização que possam promover a autonomia e a integração dos idosos na sociedade (Leung e Chu, 2022).

Estimativas mostram que o número de pessoas com mais de 60 anos será de cerca de 1,2 bilhão em 2025 e aproximadamente 2 bilhões em 2050, com 80% desses idosos vivendo em países em desenvolvimento (Silva et al., 2017). No Brasil, a expectativa de vida também tem crescido progressivamente ao longo dos anos. Em 54 anos, segundo o Instituto Brasileiro de Geografia e Estatística (IBGE), a expectativa de vida do brasileiro aumentou 26,6 anos, passando de 48 anos em 1960 para 74,6 anos em 2014 (IBGE, 2020). Esses dados demonstram que o desenvolvimento do país tem melhorado a qualidade de vida da população e impactado na expectativa de vida nas últimas décadas, acompanhando a tendência mundial (Silva et al., 2017). Contudo, no Brasil, apesar desses grandes avanços, ainda existem muitos desafios a serem enfrentados, principalmente no que se refere à qualidade dos serviços de saúde e à desigualdade social (Neves et al., 2019; Pucca et al., 2015). Portanto, é fundamental que o poder público, a iniciativa privada e a sociedade civil trabalhem juntos para superar esses obstáculos e garantir que o envelhecimento populacional seja acompanhado de mais saúde, qualidade de vida e dignidade para todos os brasileiros.

Essa mudança no perfil demográfico impõe novos desafios aos serviços de saúde (Hartmann et al., 2022; Leung e Chu, 2022), principalmente os relacionados à saúde bucal, pois a maioria dos idosos apresenta uma saúde bucal precária, resultado de um modelo de atenção à saúde que por muitas décadas favoreceu práticas odontológicas mutilantes e curativas

(Hartmann et al., 2022). Além disso, o número crescente de idosos é acompanhado por uma maior incidência de doenças bucais e sistêmicas (Hartmann et al., 2022; Fattori et al., 2019; Silva et al., 2017; Dhanuthai et al., 2016).

Com o avanço da idade, o epitélio de revestimento oral torna-se mais delgado, há uma redução da proliferação celular e o tecido conjuntivo subjacente apresenta redução da síntese de colágeno, alterações fibróticas e degenerativas e perda de elastina (Dhanuthai et al., 2016; Fattori et al., 2019). Além disso, a resposta imune reduzida desses indivíduos, a capacidade de reparo do DNA e o metabolismo carcinogênico prejudicados decorrentes do próprio processo de envelhecimento natural tornam a mucosa bucal mais permeável a substâncias nocivas e mais vulnerável a agentes cancerígenos. Essas mudanças acabam predispondo os indivíduos idosos a doenças crônicas, lesões orais benignas, processos infecciosos e câncer bucal (Dhanuthai et al., 2016; Bozdemir et al., 2019; Fattori et al., 2019; Guiglia et al., 2010; Jainkittivong, Aneksuk e Langlais, 2002; Souza, et al., 2015; Williams e Cruchley, 1994). No entanto, apenas a idade não é o único fator que contribui para a alta prevalência de lesões bucais nessa população. Outros fatores como traumas, doenças sistêmicas, estado nutricional deficiente, uso de alguns medicamentos, má higiene bucal e uso de dentaduras mal adaptadas também podem influenciar no desenvolvimento de lesões bucais (Fonseca et al., 2019; Fattori et al., 2019; Silva et al., 2017; Dhanuthai et al., 2016).

Estudos têm mostrado que a frequência relativa de lesões pré-malignas e malignas é mais comum nessa população do que em indivíduos mais jovens, além de aumentar nos idosos com o avançar da idade (KönÖnen et al., 1987; Scott e Cheah et al.., 1989; Pires et al., 2020). Outros estudos também mostraram uma incidência estatisticamente maior de lesões reacionais e inflamatórias, neoplasias malignas, desordens orais potencialmente malignas, doenças autoimunes e tumores de glândulas salivares em idosos em comparação com pacientes jovens (Scott e Cheah et al.., 1989; Lei et al., 2015; Dhanuthai et al., 2016; Cunha et al., 2020a; Cunha et al., 2023). Além disso, diversos cistos e tumores odontogênicos também podem ocorrer em na região oral e maxilofacial de indivíduos idosos (Silva et al., 2018; Silva et al., 2017; Dhanuthai et al., 2016; Nonaka et al., 2011). Nestes indivíduos, em especial, essas lesões tendem a causar significativa morbidade, tornando a reabilitação oral desafiadora e diminuindo consideravelmente a qualidade de vida (Silva et al., 2018).

Esses dados demonstram que a idade tem influenciado significativamente a prevalência e o padrão de doenças bucais observados nessa população (Dhanuthai et al., 2016; Leung e Chu, 2022). Nesse sentido, é necessário um enfoque em ações preventivas, com atenção para o

diagnóstico precoce e o tratamento adequado dessas doenças, a fim de garantir que os idosos possam envelhecer com saúde e qualidade de vida (Hartmann et al., 2022; Silva et al., 2017; Dhanuthai et al., 2016; Fattori et al., 2019). Para isso, é fundamental que haja não somente uma maior conscientização da população em relação à importância da saúde bucal, mas também o desenvolvimento de programas de educação e promoção da saúde bucal direcionados para essa população. É importante também que haja investimentos na formação de profissionais de saúde capacitados para atender as necessidades específicas dos idosos, a fim de garantir um atendimento de qualidade adequado às suas necessidades (Cheruvathoor et al., 2020; Neves et al., 2019; Pucca et al., 2015). Portanto, é essencial que as instituições de ensino e as políticas públicas de saúde se adaptem a essa nova realidade demográfica, garantindo uma formação adequada e atualizada dos profissionais da saúde, em especial, na área da odontologia.

Muitos estudos sobre lesões bucais em idosos realizados anteriormente no Brasil e em outros países do mundo são baseados apenas em dados clínicos sem confirmação histopatológica (Radwan-Oczko et al., 2022; Rabiei et al., 2010; Saintrain et al., 2013; Mujica et al., 2008; Taiwo et al., 2009; Espinoza et al. al., 2003; Reichart, 2000; Dundar e Ilhan Kal, 2007; Lin et al., 2001). Como estudos multicêntricos baseados em laudos histopatológicos podem fornecer dados diagnósticos mais precisos e são escassos na literatura (Silva et al., 2017; Dhanuthai et al., 2016; Souza et al., 2015), este estudo teve como objetivo avaliar a frequência e as principais características demográficas de lesões orais e maxilofaciais diagnosticadas em idosos (≥60 anos) em três centros de patologia bucal no Brasil, a maior amostra de lesões bucais em idosos brasileiros até o momento, além de enfatizar os desafios e necessidade de chamar atenção para mudança nas estratégias de atendimento odontológico geriátrico visando o diagnóstico precoce dessas condições.

2 ARTIGOS

2.1 Artigo: A retrospective multicentre study of oral and maxillofacial lesions in older people

Artigo submetido ao periódico *Brazilian Oral Research* (Anexo 2)

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Abstract

Few studies regarding the distribution of oral diseases in older people are available in the literature. Herein, we investigated the frequency and main demographic findings of oral and maxillofacial lesions in geriatric patients (≥60 years). A retrospective descriptive cross-sectional study was performed. Histopathology reports were collected from files of three Brazilian oral pathology services over 20 years (1999-2019). Data regarding sex, age, anatomical site, skin color, and histopathological diagnosis were obtained and analyzed. The chi-square test was utilized to assess differences in the frequency of the different oral and maxillofacial lesion groups. A total of 7,476 older patient histopathology reports were analyzed. Most cases were diagnosed in patients aged 60 to 69 years old (n=4,487; 60.0%). Females were more affected (n=4,403; 58.9%) with a female-to-male ratio of 1:0.7 ($P < 0.001$). The tongue (n=1,196; 16.4%), lower lip (n=1,005; 13.8%), and buccal mucosa (n=997; 13.7%) were the most common anatomical sites. The most prevalent non-neoplastic pathologies were reactive

and inflammatory lesions (n=3,840; 51.3%) ($P < 0.001$), followed by cysts (n=475; 6.4%). Malignant neoplasms were more frequent (n=1,353; 18.1%) than benign neoplasms (n=512; 6.8%). Fibrous/fibroepithelial hyperplasia (n=2,042; 53.2%) ($P<0.001$) and squamous cell carcinoma (n=1,191; 88.03%) ($P<0.001$) were the most common oral lesions in the elderly. Studies based on histopathological records allow the accurate characterization of the prevalence of oral and maxillofacial lesions and encourage the improvement of public health policies that enable the prevention, early diagnosis, and adequate treatment of these lesions. Also, they bring valuable information that helps dentists and geriatricians diagnose these diseases.

Keywords: Epidemiology; Oral diseases; Oral pathology; Older adults.

1. INTRODUCTION

One of a country's most significant concerns is ensuring its population's aging with health and quality of life.[1] In recent decades, the number of elderly (≥60 years) has grown faster worldwide than any other age group.[1-3] Current estimates show that the number of individuals over 60 will be about 1.2 billion in 2025 and approximately 2 billion in 2050, with 80% of these older people residing in developing countries.[4] In Brazil, life expectancy has also grown progressively over the years. In 54 years, according to the Brazilian Institute of Geography and Statistics (IBGE), Brazilian life expectancy increased by 26.6 years, from 48 years in 1960 to 74.6 years in 2014.[5] This fact demonstrates that the country's development has improved the population's quality of life and has impacted life expectancy in recent decades, thus following a global trend.

This growing number of older people is accompanied by a greater incidence of systemic and oral diseases.[1,6-8] Studies have shown that the relative frequency of oral potentially malignant disorders (OPMDs) and malignant tumors was ten times more common in this population than in younger people, in addition to increasing in the elderly with advancing age.[1,9] Other studies have also shown a statistically higher number of reactional and inflammatory lesions, malignant epithelial neoplasms, premalignant lesions, autoimmune diseases, and salivary gland tumors in the elderly in comparison with the non-elderly group.[10,11] These data support that age has significantly influenced the prevalence of oral diseases observed in these individuals. This higher prevalence of oral lesions in the elderly deserves attention. It demands the development and improvement of public health policies that guarantee an early diagnosis and adequate treatment conditions, improving the well-being of these individuals.[1,2,6,7]

Most previous studies conducted in Brazil and other countries worldwide are based only on clinical data without histopathological confirmation.[12-19] As multi-institutional studies based on histopathology reports can supply more accurate information and are scarce in the literature,[1,6] this study aimed to evaluate oral and maxillofacial lesions diagnosed in older people (≥60 years) in three Brazilian oral pathology services. To the best of our knowledge, this study is the largest series of oral lesions in elderly Brazilians to date.

2. METHODOLOGY

2.1. STUDY DESIGN AND SAMPLE

In this multi-institutional retrospective study (1999-2019), histopathology reports were retrieved from the files of three Brazilian oral and maxillofacial pathology services (**Table 1**). All older people (≥60 years) who presented lesions in the oral and maxillofacial region submitted to histopathological examination at the participating institutions were included in the present study. Data such as age, sex, ethnicity, site, and clinical and histopathological diagnosis were obtained from biopsy records and evaluated. Biopsy results that showed no pathological changes were excluded from the present study.

Oral and maxillofacial lesions were grouped into the following categories: (1) reactive and inflammatory lesions, (2) benign and malignant neoplasms, (3) OPMDs, (4) cysts, (5) immunological diseases, (6) infectious diseases, (7) non-neoplastic bone lesions, (8) pigmented and calcified lesions and (9) normal variations of the oral cavity and tumor-like malformations. Neoplasms were classified according to the current Edition of the WHO Classification of Tumors.[20] Other categories were based on published studies[1,6] and the Manual of Oral and Maxillofacial Pathology, 4th Edition.[21] Additional immunohistochemical evaluation was carried out when routine staining (H&E stain) was insufficient to establish the lesions' final diagnosis.

The present study was approved by the Ethics Committee of the State University of Paraíba (Protocol number: 61639722.9.0000.5187).

2.2 DATA ANALYSIS

Data were subjected to descriptive and quantitative analysis using the Statistical Package for the Social Sciences (SPSS) for Windows 20.0 (SPSS. Inc., Chicago, IL, USA). Continuous variables were expressed as mean, median, and standard deviation values. Categorical variables were defined as the absolute number of cases and percentage values. X^2

test and Fisher's exact test were used to access the association between the different groups of oral and maxillofacial lesions and demographic characteristics, adopting a *P*-value of ≤ 0.05 and a 95% confidence interval.

3. RESULTS

A total of 34,648 surgical specimens were received at the services participating in the study; of these, 8,015 (23.1%) were diagnosed in older people (≥ 60 years). However, 539 records were excluded from the analysis due to incomplete data, insufficient material for analysis, and inconclusive/non-specific histopathological findings (**Figure 1**). The allocation of cases by the center is presented in **table 1**. There was a homogeneous distribution of groups of oral and maxillofacial lesions among the participating centers of the present study, and no difference in the prevalence of oral lesions by geographic region (northeast *versus* southeast) was observed (**Figure 2A-D**).

Most cases occurred in women (n = 4,403; 58.9%), with a male-to-female ratio of 0.7:1 (*P* < 0.001) (**Figure 3**), and 51.8% (n = 2,942) of individuals were Caucasian (*P* = 0.069). Lesions were found in several anatomical locations: tongue (n = 1,196; 16.4%), lower lip (n = 1,005; 13.8%), buccal mucosa (n = 997; 13.7%), alveolar ridge (n = 962; 13.2%), palate (n = 849; 11.7%), intraosseous locations in the mandibular and maxillary regions (n = 832, 11.4%), floor of the mouth (n = 355; 4.9%), gingiva (n = 328; 4.5%), buccal vestibule (maxillary and mandibular) (n = 315; 4.3%), upper lip (n = 183; 2.5%), retromolar trigone (n = 144; 2.0%), labial commissure (n = 39; 0.5%), maxillary sinus (n = 14; 0.2%), parotid gland (n = 14; 0.2%), oropharynx (n = 8; 0.11%); submandibular gland (n = 6; 0.08%), sublingual gland (n = 1; 0.01%), and extraoral locations (n = 30; 0.4%). There were 198 cases with unspecified intraoral locations. Despite this wide distribution, soft tissue lesions most commonly occurred in the tongue (16.4%), and intraosseous lesions occurred mainly in the mandible (n = 513; 7.0%) (*P* < 0.001).

Most cases were diagnosed in patients aged 60 to 69 years (n = 4,487; 60.0%) and the most common lesion groups were reactive/inflammatory lesions (n = 3,840; 51.3%) and malignant neoplasms (n = 1,865; 24.9%), followed by oral potentially malignant disorders (n = 759; 10.1%) (**Table 2**). A statistically significant association was observed between the frequency of reactive and inflammatory lesions, as well as neoplasms, and the first decade of the age group of elders (60-69 years) (*P* < 0.001).

Reactive and inflammatory lesions occurred mainly in women (n = 2,582; 67.2%) with a female-to-male ratio of 1:0.5. These lesions were usually found in patients aged between 60 and 69 years (n = 2,452; 63.9%) and Caucasians (n = 1,464; 38.5%). The most common lesion was inflammatory fibrous/fibroepithelial hyperplasia (n = 2,042; 53.2%) ($P < 0.001$). Of these, 18.8% of cases (n = 383) had a history of ill-fitting dentures (**Table 3**).

Regarding the neoplasms, 72.5% (n = 1,353) were malignant neoplasms and 27.5% were benign neoplasms (n = 512) (**Table 2**). About one in five older people has been diagnosed with oral cancer. Malignant tumors occurred mainly in men (n = 814; 60.6%) aged 60 to 69 years (n = 656; 48.5%) with a male-to-female ratio of 1.5:1. Although a wide variety of subtypes of malignant neoplasms have been observed (**Table 4**), oral squamous cell carcinoma (SCC) was the most common malignant neoplasm, accounting for about 88.0% of all cancers diagnosed in this population (n = 1,191) ($P < 0.001$), followed by verrucous carcinoma (n = 29; 2.14%), and mucoepidermoid carcinoma (n = 27; 2.0%) (**Table 4**). About 15.2% (n = 1,138) of the elderly were smokers, of whom 35.0% (n = 398) had oral SCC and 9.8% (n = 112) had oral potentially malignant disorders. Regarding alcohol use, few cases had a history of alcohol consumption (n = 127; 1.7%); 73 of these patients (57.5%) also had SCC. On the other hand, benign neoplasms were more prevalent in women (n = 313; 61.5%) with a female-male ratio of 1.6:1. The most common soft tissue neoplasms were fibroma (n = 146; 28.5%), lipoma (n = 143; 27.9%), and pleomorphic adenoma (n = 40; 7.8%). Ameloblastoma (n = 65; 12.7%) was the most commonly observed benign neoplasm in intraosseous sites. However, a wide variety of benign neoplasms occurred in this population, as seen in **table 5**.

OPMDs were the third most common group of lesions in the elderly (n = 759; 10.1%) and mainly included clinically diagnosed lesions such as oral leukoplakia, erythroplakia, and erythroleukoplakia. In these cases, mild epithelial dysplasia (n = 258; 34.0%), moderate dysplasia (n = 153; 20.2%), and severe dysplasia (n = 194; 25.6%) were commonly observed histologically (**Table 6**).

Regarding cystic lesions, 81.9% (n = 389) were odontogenic cysts and only 18.1% (n = 86) were non-odontogenic cysts. Odontogenic cysts were slightly more common in men (n = 211; 54.7%) with a male-to-female ratio of 1.2:1. On the other hand, non-odontogenic cysts were more common in women (n = 50; 58.1%) with a male-to-female ratio of 1:1.4. Among odontogenic cysts, periapical and residual cysts (n = 234; 49.3%) were the most common, followed by odontogenic keratocyst (n = 68; 14.3%). Regarding non-odontogenic cysts,

salivary duct cysts (n = 45; 9.5%) and nasopalatine duct cysts (n = 15; 3.2%) were the most prevalent in this population (**Table 3**).

Concerning immune-mediated diseases, the most common disorders were oral lichen planus (n = 80; 55.9%) and mucous membrane pemphigoid (n = 45; 31.5%). Both showed a strong predilection for females, with a female-to-male ratio of 4.3:1 and 3.1:1, respectively (**Table 3**). Various infectious diseases, pigmented and calcified lesions, non-neoplastic bone lesions, and normal variations of the oral cavity and tumor-like malformations were also found. **Table 3** provides a detailed presentation of the heterogeneous distribution of these lesions in this population.

Concordance between clinical and histopathologic diagnoses was 55.2% (3,209 of 5,812 cases) for all cases and varied depending on the diagnosis. The highest rate of concordance was related to infectious diseases (82.4%), followed by immunological diseases (67.4%). The lowest rate of concordance was related to cysts (48.7%) and non-neoplastic bone lesions (48.9%) (**Table 2**).

3. DISCUSSION

Several studies report the prevalence and incidence of oral and maxillofacial lesions in elders, [1,6,7,10,22-27] but many rely solely on clinical diagnosis,[12-19] which can lead to inaccurate results, as the final diagnosis often requires histopathological evaluation, considered the gold standard for the diagnosis of numerous diseases.[1] In this investigation, the overall concordance between clinical and histopathological diagnosis was only 55.2% (3,209 cases) for all cases and varied depending on the diagnosis (48.7-82.4%) (**Table 2**). It is important to emphasize that the lack of agreement between clinical and histopathological diagnoses can lead to treatment errors and unfavorable patient outcomes. Therefore, healthcare professionals should adopt the practice of sending all biopsied material for histopathological analysis for a more accurate and appropriate evaluation of the patient's condition to be ensured.

In the current study, the frequency of oral and maxillofacial lesions in elderly individuals ranged from 18.8% to 26.5% in the participating centers, similar to previous studies.[1,25] However, other studies have shown higher (31.1%)[26] and lower prevalences (9.2%-14.9%).[6,10,27] Disparities in socioeconomic status and cultural norms in different countries or regions of the same country may be responsible for variations in health behaviors and influence the disease profile of a population.[1] Another potential factor that may explain the variation in the prevalence of oral lesions observed between studies is that some describe a country's

national profile or representative areas.[1,6] In contrast, other studies report prevalences limited to a single faculty of medicine or dentistry, institutionalized patients, or nursing homes.[7,12,14,18,22]

The prevalence of oral and maxillofacial lesions has increased in elderly individuals compared to younger ones.[1,6] With advancing age, the oral lining epithelium becomes thinner, and there is a reduction in collagen synthesis in the underlying connective tissue. Additionally, the collagen undergoes degenerative changes and becomes fibrotic, while there is also a loss of elastin.[6] Also, reduced immune response, impaired DNA repair capacity, and impaired carcinogenic metabolism make the oral mucosa more permeable to harmful substances and more susceptible to carcinogenic agents. Therefore, oral lesions tend to develop more frequently and rapidly in aging populations.[6,28] However, age alone is not the only factor contributing to the high prevalence of oral lesions in the elderly. Other factors such as systemic diseases, trauma, deficient nutritional status, use of some medications, poor oral hygiene, and use of ill-fitting dentures also may contribute the development of lesions in the oral cavity.[6]

In Brazil and other economically developing countries, individuals over 60 are considered elderly; in developed countries, this age is ≥ 65 years.[1] As shown in **Table 2**, most patients (n = 4,428; 60.0%) were between 60 and 69 years, with a mean age of 69.1 years, findings similar to previous studies.[1,7,10,13,15,23] The average age of women and men was also similar, 69.26±7.50 and 68.78 ±7.44 (±SD), respectively. Nevertheless, a higher mean age is seen in developed countries and reflects better living conditions and health services.[6]

Several studies assessing the prevalence of oral and maxillofacial lesions in elders report a higher frequency in women,[1,6,7,12,14,17] similar to the present study (59.4%). However, some of them have found a higher prevalence of oral lesions in men.[15,18,19] These differences may be influenced by social, cultural, demographic, and geographic factors,[1] such as the proportion of men and women in a population. For instance, in China, where men represent over 50% of the population, a higher prevalence of oral lesions has been reported in men.[19] Additionally, disparities in healthcare access and utilization between men and women can affect the identification and diagnosis of these lesions. In Brazil, men, particularly those from less favored social classes, seem to seek medical and dental care less frequently, which can decrease the likelihood of diagnosing possible oral lesions.[1]

Regarding the location, the oral lesions occurred in different anatomical locations. The tongue and labial/buccal mucosa were the most commonly affected soft tissue locations,

corresponding to 46.5% of all diagnosed lesions (n = 3,381). On the other hand, intraosseous lesions occurred mainly in the mandible (n = 513; 7.0%). Similar data were previously reported.[1,6] The explanation for the tongue and labial/buccal mucosa being the most common anatomical locations is that the five most commonly diagnosed lesions occur primarily at these anatomical sites (fibrous/fibroepithelial hyperplasia, SCC, epithelial dysplasia, hyperkeratosis/acanthosis, and lichen planus).

In this study, fibrous/fibroepithelial hyperplasia (n = 2,042; 27.3%), SCC (n = 1,191; 15.9%), and epithelial dysplasia (n = 605; 8.1%) were the three most common oral lesions in the elderly, data similar to previous biopsy-based studies.[1,6,22] In contrast, in clinical studies, the most prevalent oral lesions were herpetic infection, Fordyce granules, fissured tongue, dry mouth, hairy tongue, red spots, infection-related swellings, traumatic ulcers, denture stomatitis, irritative hyperplasias, and varices. [7,12-17,19,25] This apparent discrepancy among studies is not surprising as many diagnoses can be made based on clinical examination alone and do not require a biopsy. Although our study has higher accuracy because all lesions were histopathologically evaluated, it does not represent the true prevalence of some lesions routinely diagnosed only by clinical examination.

Various studies show that reactive/inflammatory lesions are the most seen in the elderly.[1,6,22] Just over half of all lesions analyzed in the current investigation were of a reactional and inflammatory nature (51.3%). This high frequency of reactive and inflammatory disorders may be associated with the greater use of removable dentures by the elderly. It may explain why the alveolar mucosa was one of the most affected sites in the present study. Inflammatory fibrous hyperplasias are usually caused by chronic trauma to the oral mucosa in individuals who wear removable dentures.[1,22] The quality of removable prostheses, anatomical factors, and the length of time the removable prosthesis can cause the appearance of these lesions. In this sense, health professionals must provide adequate instructions to individuals who use removable prostheses.[22,29] Additionally, seizures, Alzheimer's, Parkinson's disease, and other neurodegenerative disorders more common in the elderly can also influence the development of these lesions.[1,6,18]

Malignant neoplasms were this population's second most common group of lesions (29.8%). In addition, approximately one in five older adults were diagnosed with oral cancer, mainly SCC (83.4%). Oral SCC is the most prevalent oral cancer in elderly patients.[1,6,7,22] It often develops from OPMDs, the present study's third most common group of lesions. The clinical features, biological behavior, and prognosis of SCC vary.[1,30] The management and

prognosis of oral SCC depend on the tumor size at the time of diagnosis, histological grade, presence or absence of metastases, and the patient's general health status.[1] Despite recent advances in the treatment modality, only about 15% to 40% of patients diagnosed with SCC live more than five years. Therefore, there is an urgent need to adopt strategies to ensure early detection and diagnosis of these lesions. Since it contributes to reducing morbidity and mortality and alleviates the main adverse effects of antineoplastic therapy that significantly reduce the survival and quality of life of these individuals.[1,6,30]

The precise etiology of oral SCC remains unknown, but predisposing factors, such as smoking associated with alcohol use, are well known.[30,31] Other habits were also associated with oral SCC, such as chewing betel leaves and inverted smoking, commonly observed in Asian countries.[30,31] Other causal factors, such as nutritional deficiencies and DNA oncogenic viruses, have also been proposed.[1,30,31] In the present study, 15.2% (n = 1,138) of the elderly were smokers; of these, 35.0% of individuals (n = 398) had SCC, consistent with findings from another Brazilian multicenter study.[1]

On the European continent, the fact that the incidence and prevalence of oral cancer are high in France, a nation with one of the highest alcohol consumption rates globally, has led some researchers to suggest that alcohol consumption could be the determining factor in such cases.[18] Nonetheless, other studies indicate that alcoholism is not strongly associated with cases of SCCs or OPMDs.[32,33] Nevertheless, the synergistic effects of alcohol and tobacco consumption on the risk of oral SCC are well established.[30,31] In the sample studied, few cases had a history of alcohol consumption (n = 127; 1.7%); however, 73 of these patients (57.5%) had SCC. However, these numbers are likely underestimated due to the lack of information on smoking and alcohol consumption habits in many clinical records of oral cancer patients. These findings underscore the significance of filling medical records and histopathological examination request forms appropriately, as this is essential for precise diagnosis and evaluation of risk factors influencing oral cancer development.

Only in studies based on histopathological records can OPMDs be diagnosed accurately.[6] In the present study, epithelial dysplasia was the most common OPMD (**Table 6**). In clinical studies, this type of lesion is often diagnosed as leukoplakia, erythroplakia, or erythroleukoplakia.[6] Although studies have shown a statistically significant relationship between the male sex and the occurrence of leukoplakia, the only predictive risk factors associated with OPMDs were smoking and prior smoking.[32]

The present study observed a low prevalence of infectious diseases in all three studied oral pathology services. Many of these diseases reduce the quality of life and should not be overlooked during a routine clinical examination. The most common infection lesion was candidiasis (39.5%). Cases of oral candidiasis are not common in oral pathology services because it is a disease often diagnosed clinically, not requiring histopathological analysis.[1,6,22] In addition, this type of lesion is usually diagnosed in samples sent to microbiology laboratories.[6] Previous biopsy-based studies have also reported a low prevalence of oral infections in elderly people.[1,6,22]

Interestingly, paracoccidioidomycosis was the second most common infection (34.2%). Paracoccidioidomycosis is a systemic mycosis originally described by Adolfo Lutz in 1908, with the highest incidence recorded in South American countries (Brazil, Argentina, Colombia, and Venezuela). In Brazil, most cases have been reported in the south, southeast, and central-west regions.[34] In the present study, all cases of paracoccidioidomycosis were diagnosed in the oral and maxillofacial pathology service located in Rio de Janeiro (southeastern Brazil), an endemic area of this disease.

4. CONCLUSION

In conclusion, oral lesions were highly frequent in older people, most reactional and inflammatory, followed by malignant neoplasms. Due to the high prevalence of malignant tumors and OPMDs, geriatricians and dentists should perform a thorough periodic oral examination to detect these lesions early to reduce morbidity and mortality, contributing to a better quality of life. In addition, these professionals should use strategies for these patients to eliminate risk factors, especially smoking and alcohol consumption, acquiring a healthy lifestyle. Finally, the moderate agreement observed between clinical and histopathological diagnosis reinforces the importance of histopathological analysis of all biopsy material. This practice is essential, considering that clinical evaluations alone may not be sufficient to obtain an accurate diagnosis.

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Table 1. Sources of the cases reviewed.

Institution	State	Years	Lesions biopsied during the period studied	Geriatric oral lesions (%[a])	%[b]
UFRJ[c]	Rio de Janeiro	1999–2019	13,679	3,629 (45.3)	26.5
UNIFOR[d]	Fortaleza	1999–2020	16,977	3,637 (45.4)	21.4
UEPB[e]	Paraíba	2012–2019	3,992	749 (9.3)	18.8
Total	–	–	**34,648**	**8,015 (100)**	**23.1**

[a]Percent in relation to the number of cases of oral lesions in older people; [b]Percent of the sample of oral lesions in older people at each center; [c]Department of Oral Diagnosis and Pathology, School of Dentistry, Federal University of Rio de Janeiro (Southeast region); [d]School of Dentistry, University of Fortaleza (Northeast region); [e] Department of Dentistry, State University of Paraíba (Northeast region).

Table 2. Age and sex distribution of oral and maxillofacial lesions diagnosed in older people.

Lesions	Sex				Mean age (±SD)	Age				Total		Concordance between clinical and histopathological diagnosis		
	Male	Female	NI	M:F ratio		60-69	70-79	80-89	≥90	n	%	Yes	No	NI*
Reactive and inflammatory lesions	1,220	2,582	38	1:2.1	68.30±6.87	2,452	1,091	273	24	3840[a]	51.3	1760 (55.9%)	1389 (44.1%)	691
Malignant neoplasms	814	530	9	1.5:1	71.67±8.79	656	417	240	40	1353[a]	18.1	502 (53.3%)	440 (46.7%)	411
Benign neoplasms	196	313	3	1:1.6	69.10±7.18	309	147	52	4	512	6.8	178 (59.5%)	121 (40.5%)	213
Potentially malignant disorders	362	395	2	1:1.1	69.78±7.74	431	223	96	9	759	10.1	293 (51.0%)	282 (49.0%)	184
Cysts	247	225	3	1.1:1	68.07±6.88	314	126	32	3	475	6.4	192 (48.7%)	202 (51.3%)	81
Variations of normality and tumor-like malformations	70	105	2	1:1.5	69.86±6.94	96	60	20	1	177	2.4	103 (66.0%)	53 (34.0%)	21
Immunological diseases	29	113	1	1:3.9	69.41±7.06	86	43	13	1	143	1.9	87 (67.4%)	42 (32.6%)	14
Pigmented and calcified lesions	35	78	1	1:2.2	67.24±6.58	82	25	7	0	114	1.5	43 (49.4%)	44 (50.6%)	27
Non-neoplastic bone lesions	16	48	1	1:3	68.33±7.42	43	16	6	0	65	0.9	23 (48.9%)	24 (51.1%)	18
Infectious diseases	24	14	0	1.7:1	70.26±7.32	18	15	5	0	38	0.5	28 (82.4%)	6 (17.6%)	4
Total	**3,013**	**4,403**	**60**	**1:1.4**	**69.15±7.47**	**4,487**	**2,163**	**744**	**82**	**7,476**	**100**	**3,209 (55.2%)**	**2,603 (44.8%)**	**1664**

NI, not informed; M, male; F, female; SD, Standard deviation.
[a]Person's Chi-square test $P < 0.001$.
*Clinical diagnosis was not informed.

Table 3. Frequency of non-neoplastic tumors and tumor-like lesions observed in older people.

Lesions	n	Sex			Age				Mean age (±SD)	%[a]	%[b]
		Male	Female	NI	60-69	70-79	80-89	≥90			
Infectious diseases											
Candidal infection	15	9	6	0	6	5	4	0	72.80±8.64	0.20	39.5
Paracoccidioidomycosis	13	12	1	0	10	3	0	0	66.46±5.44	0.17	34.2
Actinomycosis	5	3	2	0	2	3	0	0	69.00±6.44	0.07	13.2
Multibacillary leprosy	1	0	1	0	0	1	0	0	75	0.01	2.6
Extrapulmonary tuberculosis	1	0	1	0	0	0	1	0	81	0.01	2.6
Larva migrans	1	0	1	0	0	1	0	0	75	0.01	2.6
Cytomegalovirus infection	1	0	1	0	0	1	0	0	75	0.01	2.6
Syphilis	1	0	1	0	0	1	0	0	72	0.01	2.6
Total (subgroup)	**38**	**24**	**14**	**0**	**18**	**15**	**5**	**0**	**70.26±7.32**	**0.51**	**100**
Immunological diseases											
Erythema multiforme	2	2	0	0	1	1	0	0	69.50±13.43	0.03	1.4
Wegener's granulomatosis	2	0	2	0	0	2	0	0	76.00±0.00	0.03	1.4
Pemphigus vulgaris	7	1	6	0	4	2	1	0	69.71±6.67	0.09	4.9
Lupus erythematosus	7	0	7	0	4	3	0	0	68.28±7.47	0.09	4.9
Mucous membrane pemphigoid	45	11	34	0	25	14	5	1	70.97±7.75	0.60	31.5
Lichen planus	80	15	64	1	52	21	7	0	68.43±6.53	1.07	55.9
Total (subgroup)	**143**	**29**	**113**	**1**	**86**	**43**	**13**	**1**	**69.41±7.06**	**1.91**	**100**
Reactive and inflammatory lesions											
Inflammatory fibrous/fibroepithelial hyperplasia[a]	2,042	571	1,455	16	1,329	572	132	9	68.02±6.71	27.31	53.22
Oral hyperkeratosis	495	220	273	2	300	150	40	5	68.79±7.01	6.62	12.90
Non-specific chronic inflammatory process	253	88	163	2	165	63	23	2	68.48±7.25	3.38	6.59
Pyogenic granuloma	205	76	127	2	138	49	16	2	68.15±7.02	2.74	5.34
Sialadenitis	182	38	140	4	117	61	3	1	67.90±5.86	2.43	4.74
Periapical granuloma	91	28	59	4	64	19	8	0	66.82±6.66	1.22	2.37
Osteonecrosis of the jaws	77	24	52	1	38	27	12	0	70.89±7.85	1.03	2.01
Oral mucus extravasation phenomenon	64	28	36	0	42	19	2	1	67.82±6.51	0.86	1.67
Peripheral ossifying fibroma	61	19	41	1	42	13	6	0	68.55±6.39	0.82	1.59
Lichenoid reaction	40	7	33	0	25	14	1	0	67.17±5.67	0.54	1.04
Peripheral giant cell lesion	32	17	13	2	20	10	2	0	67.46±5.92	0.43	0.83
Osteomyelitis	26	3	23	0	17	8	1	0	68.19±7.29	0.35	0.68
Thrombus	18	7	11	0	10	6	2	0	69.16±6.87	0.24	0.47
Traumatic neuroma	14	5	9	0	5	8	1	0	71.35±6.03	0.19	0.36
Eosinophilic ulcer	12	9	3	0	8	3	1	0	69.08±6.86	0.16	0.31
Amyloidosis	7	1	6	0	3	2	2	0	73.57±10.84	0.09	0.18

Granulomatous foreign body reaction to dermal cosmetic fillers	6	2	4	0	3	3	0	0	70.33±6.59	0.08	0.16
Oral focal mucinosis	6	2	4	0	4	2	0	0	67.16±5.98	0.08	0.16
Verruciform xanthoma	5	1	4	0	1	1	3	0	77.00±9.92	0.07	0.13
Masson's tumor	4	3	1	0	4	0	0	0	67.00±1.82	0.05	0.10
Nicotine stomatitis	4	0	4	0	2	1	1	0	71.25±7.08	0.05	0.10
Reactive lymphoid hyperplasia	3	1	2	0	0	2	1	0	78.66±4.61	0.04	0.08
Adenomatoid hyperplasia of minor salivary glands	2	1	1	0	2	0	0	0	63.00±4.24	0.03	0.05
Necrotizing sialometaplasia	2	1	1	0	2	0	0	0	63.50±0.70	0.03	0.05
Epstein–Barr virus-positive mucocutaneous ulcer	1	0	1	0	0	0	1	0	89	0.01	0.03
Angina bullosa hemorrhagica	1	0	1	0	1	0	0	0	63	0.01	0.03
Solitary circumscribed neuroma	1	1	0	0	1	0	0	0	60	0.01	0.03
Glandular cheilitis	1	0	1	0	1	0	0	0	69	0.01	0.03
Plasma cell cheilitis	1	0	1	0	0	0	1	0	87	0.01	0.03
Intraoral sebaceous hyperplasia	1	1	0	0	0	0	1	0	82	0.01	0.03
Xanthogranuloma	1	0	1	0	1	0	0	0	68	0.01	0.03
HPV-Induced benign proliferative epithelial lesions											
Squamous papilloma	170	61	107	2	101	55	11	3	69.00±7.19	2.27	4.43
Wart	8	4	2	2	3	2	2	1	79.00±10.03	0.11	0.21
Condyloma acuminatum	4	1	3	0	3	1	0	0	64.75±7.12	0.05	0.10
Total (subgroup)	**3,840**	**1,220**	**2,582**	**38**	**2,452**	**1,091**	**273**	**24**	**68.30±6.87**	**51.36**	**100**
Cysts											
Inflammatory odontogenic cysts											
Periapical cyst	166	93	70	3	119	36	10	1	67.28±6.72	2.22	34.9
Residual cyst	68	35	33	0	50	13	5	0	67.48±6.16	0.91	14.3
Inflammatory collateral cysts	7	4	3	0	5	2	0	0	66.28±5.31	0.09	1.5
Total (subgroup)	**241**	**132**	**106**	**3**	**174**	**51**	**15**	**1**	**67.37±6.51**	**3.22**	**50.7**
Non-inflammatory odontogenic cysts											
Odontogenic keratocyst	68	35	33	0	49	16	2	1	67.13±6.29	0.91	14.3
Odontogenic cyst not otherwise specified	37	23	14	0	18	17	2	0	70.00±6.62	0.49	7.8
Dentigerous cyst	19	10	9	0	13	4	2	0	67.63±6.68	0.25	4.0
Glandular odontogenic cyst	10	4	6	0	9	0	1	0	67.30±7.45	0.13	2.1
Calcifying odontogenic cyst	5	3	2	0	3	2	0	0	69.40±9.28	0.07	1.1
Gingival cyst of adult	4	2	2	0	0	2	2	0	80.25±8.05	0.05	0.8
Lateral periodontal cyst	3	0	3	0	2	1	0	0	66.33+9.23	0.04	0.6
Orthokeratinized odontogenic cyst	2	2	0	0	1	1	0	0	66.00±7.07	0.03	0.4
Total (subgroup)	**148**	**79**	**69**	**0**	**95**	**43**	**9**	**1**	**68.27±6.95**	**1.98**	**31.2**
Non-odontogenic cysts											
Bronchogenic cyst	1	0	1	0	1	0	0	0	61	0.01	0.2
Salivary duct cyst	45	15	30	0	25	16	3	1	69.57±7.86	0.60	9.5
Nasopalatine duct cyst	15	8	7	0	11	3	1	0	66.93±5.25	0.20	3.2
Epidermoid cyst	8	4	4	0	4	4	0	0	69.50±6.27	0.11	1.7

Oral lymphoepithelial cyst	7	5	2	0	2	3	2	0	74.00±9.29	0.09	1.5
Dermoid cyst	5	4	1	0	1	3	1	0	71.60±8.26	0.07	1.1
Nasolabial cyst	4	0	4	0	1	3	0	0	72.00±3.91	0.05	0.8
Thyroglossal duct cyst	1	0	1	0	0	0	1	0	83	0.01	0.2
Total (subgroup)	**86**	**36**	**50**	**0**	**45**	**32**	**8**	**1**	**69.75±7.48**	**1.15**	**18.1**
TOTAL (Cysts)	**475**	**247**	**225**	**3**	**314**	**126**	**32**	**3**	**68.07±6.88**	**6.35**	**100**
Pigmentated and calcified lesions											
Exogenous pigmentation											
Amalgam tattoo	34	11	23	0	27	6	1	0	66.70±4.96	0.45	29.8
Others	3	2	1	0	2	0	1	0	72.33±10.40	0.04	2.6
Endogenous pigmentation											
Melanotic macule	23	7	16	0	16	6	1	0	66.21±6.36	0.31	20.2
Racial pigmentation	8	2	5	1	4	4	0	0	69.75±6.79	0.11	7.0
Post-inflammatory pigmentation	3	0	3	0	3	0	0	0	64.00±2.64	0.04	2.6
Melanoacanthoma	1	0	1	0	0	0	1	0	81	0.01	0.9
Calcified lesions											
Sialolithiasis/sialolith	42	13	29	0	30	9	3	0	67.30±7.40	0.56	36.8
Total (subgroup)	**114**	**35**	**78**	**1**	**82**	**25**	**7**	**0**	**67.24±6.58**	**1.52**	**100**
Non-neoplastic bone lesions											
Fibro-osseous lesions											
Central ossifying fibroma	8	2	5	1	5	3	0	0	68.50±5.97	0.11	12.3
Fibrous dysplasia	4	0	4	0	3	1	0	0	65.25±9.21	0.05	6.2
Cemento-osseous dysplasia											
Florid cemento-osseous dysplasia	17	1	16	0	12	2	3	0	68.52±7.86	0.23	26.2
Focal cemento-osseous dysplasia	14	4	10	0	10	3	1	0	66.92±6.47	0.19	21.5
Periapical cemento-osseous dysplasia	4	1	3	0	4	0	0	0	64.50±4.12	0.05	6.2
Fibro-osseous lesion not otherwise specified	6	2	4	0	4	2	0	0	67.00±5.65	0.08	9.2
Giant cell lesions and pseudocysts											
Central giant cell lesion	9	5	4	0	2	5	2	0	74.44±8.32	0.12	13.8
Simple bone cyst	2	1	1	0	2	0	0	0	67.00±0.00	0.03	3.1
Aneurysmal bone cyst	1	0	1	0	1	0	0	0	63	0.01	1.5
Total (subgroup)	**65**	**16**	**48**	**1**	**43**	**16**	**6**	**0**	**68.33±7.42**	**0.87**	**100**
Normal variations and tumor-like malformations											
Vascular malformation	72	30	41	1	38	21	12	1	70.81±8.11	0.96	40.7
Varicose	35	13	22	0	16	14	5	0	71.08±6.60	0.47	19.8
Exostoses and Tori	20	7	13	0	14	6	0	0	66.90±4.10	0.27	11.3
Neurovascular hamartoma	18	6	12	0	11	7	0	0	67.38±4.81	0.24	10.2
Geographic tongue	10	3	6	1	5	3	2	0	70.70±7.70	0.13	5.6
Caliber-persistent labial artery	8	4	4	0	5	3	0	0	69.25±4.16	0.11	4.5
Fordyce spots	4	2	2	0	2	2	0	0	67.25±6.60	0.05	2.3
Subgemmal neurogenous plaque	4	2	2	0	2	1	1	0	71.00±7.95	0.05	2.3

Angiolipomatous hamartoma	1	1	0	0	0	1	0	0	71	0.01	0.6
Cartilaginous choristoma	1	0	1	0	0	1	0	0	72	0.01	0.6
Lipomatous hamartoma	1	0	1	0	1	0	0	0	64	0.01	0.6
Angiomyolipomatous hamartoma	1	1	0	0	1	0	0	0	65	0.01	0.6
Odontogenic epithelial hamartoma	1	1	0	0	1	0	0	0	63	0.01	0.6
Pilous tongue	1	0	1	0	0	1	0	0	79	0.01	0.6
Total (subgroup)	**177**	**70**	**105**	**2**	**96**	**60**	**20**	**1**	**69.86±6.94**	**2.37**	**100**
TOTAL	**4,852**	**1,641**	**3,165**	**46**	**3,091**	**1,376**	**356**	**29**	**68.36 ±6.89**	**64.9**	**100**

NI, not informed; [a]Percent in relation to the total number of cases; [b]Percent within the group; [a]Person's Chi-square test $P < 0.001$.

Table 4. Frequency of malignant neoplasms observed in older people.

Malignant neoplasms	n	Sex			Age				Mean age (±SD)	%[a]	%[b]
		Male	Female	NI	60-69	70-79	80-89	≥90			
Epithelial and melanocytic tumors											
Squamous cell carcinoma	1,191	746	437	8	582	366	207	36	71.63±8.78	15.93	88.09[a]
Verrucous carcinoma	29	13	16	0	9	9	11	0	74.86±9.23	0.39	2.14
Basal cell carcinoma	19	10	9	0	6	7	5	1	74.57±10.48	0.25	1.41
Sebaceous carcinoma	1	1	0	0	1	0	0	0	62	0.01	0.07
Merkel cell carcinoma	1	1	0	0	0	0	1	0	81	0.01	0.07
Melanoma	5	1	4	0	5	0	0	0	66.80±3.49	0.07	0.37
Total (subgroup)	**1,246**	**772**	**466**	**8**	**603**	**382**	**224**	**37**	**71.73±8.83**	**16.67**	**92.16**
Salivary gland tumors											
Mucoepidermoid carcinoma	27	11	16	0	17	8	1	1	68.18±7.49	0.36	2.00
Polymorphous adenocarcinoma	18	5	13	0	8	7	2	1	70.72±8.44	0.24	1.33
Adenoid cystic carcinoma	18	8	9	1	8	7	2	1	72.27±8.81	0.24	1.33
Adenocarcinoma not otherwise specified	8	5	3	0	2	4	2	0	74.37±8.24	0.11	0.59
Acinic cell carcinoma	1	0	1	0	1	0	0	0	61	0.01	0.07
Hyalinizing clear cell carcinoma	1	0	1	0	0	1	0	0	75	0.01	0.07
Secretory carcinoma	1	0	1	0	1	0	0	0	61	0.01	0.07
Carcinoma ex pleomorphic adenoma	1	0	1	0	0	0	1	0	83	0.01	0.07
Total (subgroup)	**75**	**29**	**45**	**1**	**37**	**27**	**8**	**3**	**70.53±8.34**	**1.00**	**5.55**
Hematolymphoid tumors											
Diffuse large B-cell lymphoma	8	3	5	0	4	0	4	0	74.87±8.54	0.11	0.59
Follicular lymphoma	1	0	1	0	1	0	0	0	64	0.01	0.07
CD30-positive T-cell lymphoproliferative disorder	1	0	1	0	1	0	0	0	62	0.01	0.07
ALK-negative anaplastic large cell lymphoma	1	1	0	0	0	0	1	0	88	0.01	0.07
Non-Hodgkin lymphoma	2	0	2	0	1	0	1	0	74.50±16.26	0.03	0.15
Multiple myeloma	1	1	0	0	1	0	0	0	65	0.01	0.07
Solitary plasmacytoma	2	0	2	0	1	1	0	0	70.00±4.24	0.03	0.15

Total (subgroup)	**16**	**5**	**11**	**0**	**9**	**1**	**6**	**0**	**72.93±9.43**	**0.21**	**1.18**
Mesenchymal tumors											
Osteosarcoma	1	1	0	0	0	1	0	0	70	0.01	0.07
Angiosarcoma	1	1	0	0	1	0	0	0	61	0.01	0.07
Leiomyosarcoma	2	0	2	0	0	2	0	0	71.00±1.41	0.03	0.15
Total (subgroup)	**4**	**2**	**2**	**0**	**1**	**3**	**0**	**0**	**68.25±4.92**	**0.05**	**0.3**
Oral metastases											
Intestinal-type adenocarcinoma	1	0	1	0	1	0	0	0	69	0.01	0.001
Ductal breast carcinoma	4	1	3	0	2	1	1	0	73.5±10.14	0.05	0.003
Renal cell carcinoma	3	1	2	0	0	3	0	0	78.66±0.57	0.04	0.002
Prostatic adenocarcinoma	2	2	0	0	1	0	1	0	77.0±11.31	0.03	0.001
Pulmonary adenocarcinoma	1	1	0	0	1	0	0	0	65	0.01	0.001
Total (subgroup)	**11**	**5**	**6**	**0**	**5**	**4**	**2**	**0**	**73.83±7.89**	**0.15**	**0.01**
Odontogenic tumors											
Ameloblastic carcinoma	1	1	0	0	1	0	0	0	68	0.01	0.1
Total (subgroup)	**1**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	68	**0.01**	**0.1**
TOTAL	**1,353**	**814**	**530**	**9**	**656**	**417**	**240**	**40**	**71.67±8.79**	**18.1**	**100**

NI, not informed; [a]Percent in relation to the total number of cases; [b]Percent in the group (malignant tumors); [a]Person's Chi-square test $P < 0.001$.

Table 5. Frequency of benign neoplasms observed in older people.

Benign neoplasms	n	Sex			Age				Mean age (±SD)	%[a]	%[b]
		Male	Female	NI	60-69	70-79	80-89	≥90			
Odontogenic tumors											
Ameloblastoma	65	29	36	0	31	21	13	0	71.12±7.30	0.87	12.7
Odontoma	6	1	5	0	5	1	0	0	67.33±7.00	0.08	1.2
Adenomatoid odontogenic tumor	3	1	2	0	2	1	0	0	70.00±6.08	0.04	0.6
Odontogenic myxoma	2	0	2	0	1	0	1	0	72.00±12.72	0.03	0.4
Calcifying epithelial odontogenic tumor	2	0	2	0	1	1	0	0	70.50±7.77	0.03	0.4
Central odontogenic fibroma	2	0	2	0	2	0	0	0	63.00±0.00	0.03	0.4
Peripheral odontogenic fibroma	2	0	2	0	1	0	1	0	73.00±9.89	0.03	0.4
Squamous odontogenic tumor	1	0	1	0	1	0	0	0	63	0.01	0.2
Total (subgroup)	**83**	**31**	**52**	**0**	**44**	**24**	**15**	**0**	**70.75±7.25**	**1.11**	**16.2**
Salivary gland tumors											
Pleomorphic adenoma	40	16	21	3	24	11	3	2	69.50±8.33	0.54	7.8
Canalicular adenoma	9	2	7	0	7	1	1	0	66.66±8.80	0.12	1.8
Cystadenoma	5	2	3	0	1	2	2	0	76.00±7.07	0.07	1.0
Sialadenoma papilliferum	4	0	4	0	1	3	0	0	71.25±4.92	0.05	0.8
Basal cell adenoma	3	0	3	0	2	1	0	0	69.50±4.94	0.04	0.6
Oncocytoma	1	0	1	0	0	0	1	0	85	0.01	0.2
Myoepithelioma	1	0	1	0	1	0	0	0	63	0.01	0.2
Total (subgroup)	**63**	**20**	**40**	**3**	**36**	**18**	**7**	**2**	**69.73±8.30**	**0.84**	**12.1**
Mesenchymal tumors											
Fibroma	146	53	93	0	98	38	10	0	67.76±6.62	1.95	28.5
Lipoma	143	59	84	0	83	44	16	0	69.42±7.01	1.91	27.9
Hemangioma	15	6	9	0	7	5	2	1	71.93±8.85	0.20	2.9
Neurofibroma	10	7	3	0	8	2	0	0	65.90±6.40	0.13	2.0
Giant cell fibroma	21	4	17	0	14	6	0	1	67.66±7.35	0.28	4.1
Lymphangioma	7	4	3	0	3	4	0	0	70.85±4.48	0.09	1.4
Granular cell tumor	6	3	3	0	4	2	0	0	68.16±5.49	0.08	1.2
Solitary fibrous tumor	4	2	2	0	2	2	0	0	67.50±4.20	0.05	0.8
Angioleiomyoma	2	0	2	0	1	1	0	0	67.50±4.94	0.03	0.4
Osteoma	1	0	1	0	1	0	0	0	69	0.01	0.2

Inflammatory myofibroblastic tumor	1	1	0	0	1	0	0	0	63	0.01	0.2
Other tumors											
Melanocytic nevi	6	3	3	0	5	1	0	0	68.50±1.64	0.08	1.2
Nasopharyngeal angiofibroma	2	2	0	0	0	0	2	0	88.50±0.70	0.03	0.4
Sinonasal hemangiopericytoma	1	0	1	0	1	0	0	0	62	0.01	0.2
Angiomyxoma	1	1	0	0	1	0	0	0	62	0.01	0.2
Total (subgroup)	**366**	**145**	**221**	**0**	**229**	**105**	**30**	**2**	**68.63±6.22**	**4.9**	**71.5**
TOTAL	**512**	**196**	**313**	**3**	**309**	**147**	**52**	**4**	**69.10±7.18**	**6.8**	**100**

NI, not informed; [a]Percent in relation to the total number of cases; [b]Percent in the group (benign tumors).

Table 6. Frequency of oral potentially malignant disorders observed in older people.

Oral potentially malignant disorders		Sex			Age						
	n	Male	Female	NI	60-69	70-79	80-89	≥90	Mean age (±SD)	%[a]	%[b]
Oral erythroplakia, leukoplakia or erythroleukoplakia											
Mild dysplasia	258	100	156	2	150	68	36	4	69.91±7.95	3.45	34.0
Moderate dysplasia	153	60	93	0	87	43	23	0	69.82±7.96	2.05	20.2
Severe dysplasia	194	101	93	0	102	59	29	4	70.59±8.17	2.59	25.6
No dysplasia	32	9	23	0	20	11	1	0	68.00±6.13	0.43	4.2
Actinic cheilitis	122	92	30	0	72	42	7	1	68.66±6.48	1.63	16.1
Total	**759**	**362**	**395**	**2**	**431**	**223**	**96**	**9**	**69.78±7.74**	**10.15**	**100.0**

NI, not informed; [a]Percent in relation to the total number of cases; [b]Percent in the group (oral potentially malignant disorders).

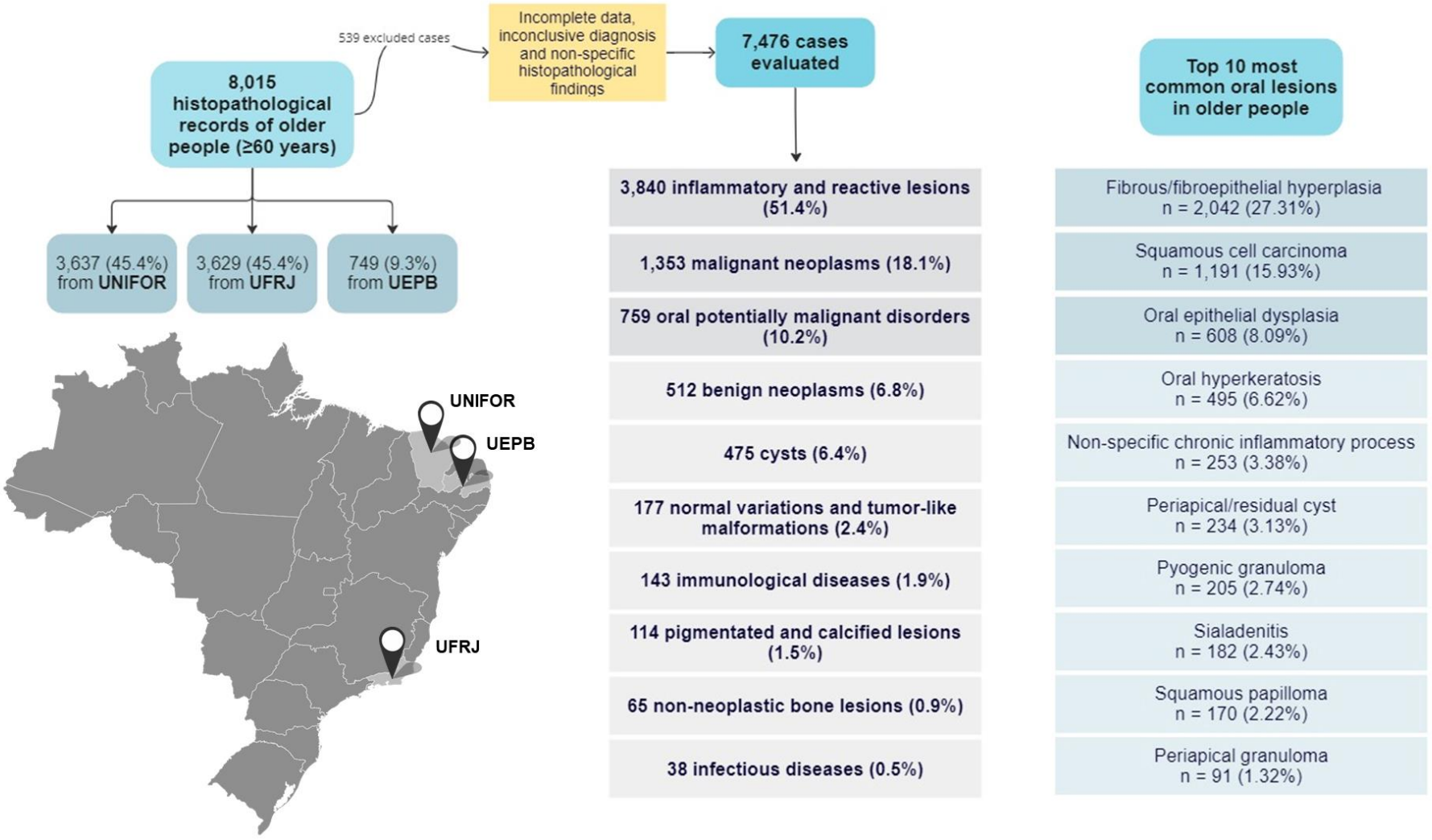

Figure 1. Flowchart showing the sample selection from the three oral pathology centers participating in the present study.

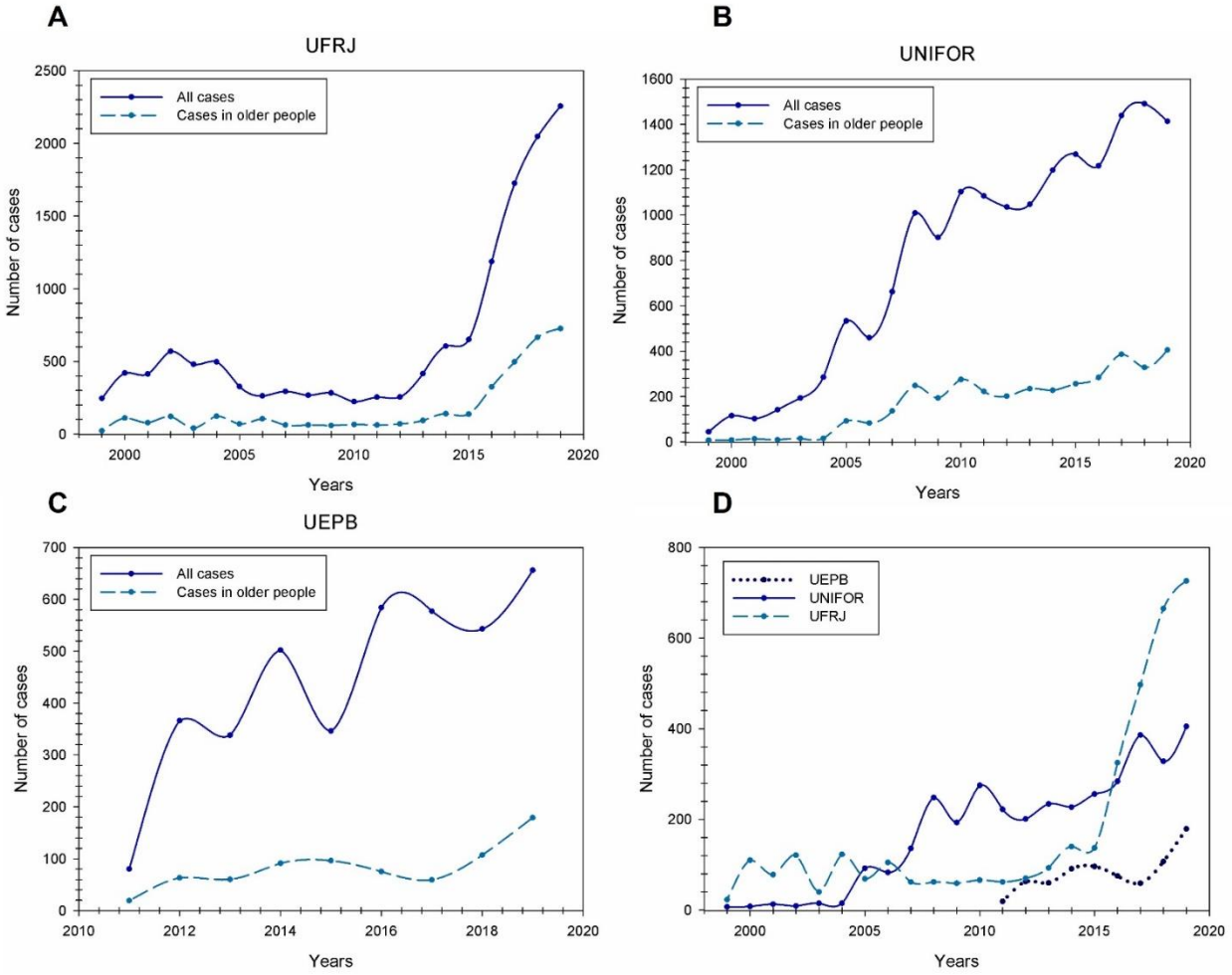

Figure 2. (A-C) The total number of cases diagnosed in each service and the number of lesions diagnosed in older people between 1999 and 2019. **(D)** Comparison between the number of cases diagnosed in older people in each service.

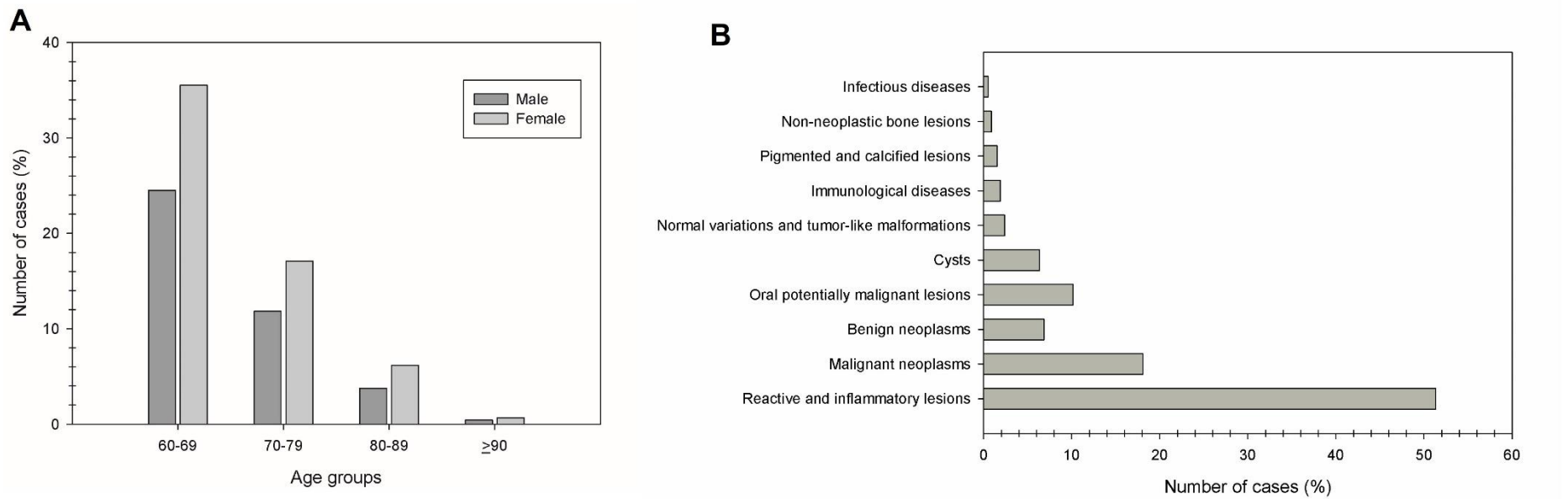

Figure 3. Distribution of oral and maxillofacial lesions diagnosed in older people according to age (A) and type of lesion (B).

2.2 Artigo: Cystic lesions and odontogenic tumors in older people: a Brazilian multicenter study

Artigo submetido ao periódico *Medicina Oral, Patologia Oral, Cirugia Bucal* (Anexo 3)

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Abstract

Background: Some odontogenic cysts (OCs) and odontogenic tumors (OTs) are infiltrative and often recur, causing bone destruction and tooth loss. In the elderly, in particular, these injuries cause significant morbidity, making rehabilitation difficult and compromising the quality of life of these individuals. **Objective:** To determine the frequency and demographic characteristics of OCs, non-odontogenic cysts (NOCs), and OTs diagnosed in an elderly Brazilian population (≥60 years). **Methodology:** A retrospective descriptive cross-sectional study was carried out in three Brazilian pathology referral centers (1999-2019). Data regarding age, sex, anatomical location, symptomatology, and histopathological diagnosis were obtained from histopathological records and analyzed. The association between the various groups of oral lesions and demographic findings was evaluated using Pearson's Chi-squared test and Fisher's exact test, adopting a *P*-value of ≤ 0.05 and a 95% confidence interval. **Results:** A total of 7,476 histopathological records were evaluated, of which 389 (5.2%) cases were classified as OCs, 86 (1.15%) as NOCs, and 83 (1.11%) as OTs. Periapical cysts (n = 166; 68.9%), ameloblastomas (n = 65; 77.4%), and salivary

duct cysts (n = 45; 52.3%) were the most common lesions in each group. Overall, males were slightly more affected (n=279, 50.2%). Most individuals were between 60 and 69 years (n=358; 64.2%). OCs and OTs preferentially affected the mandible (n = 280; 62.2%). NOCs occurred more frequently in the lips (n = 19; 22.1%), followed by buccal mucosa (n=18; 20.9%). The overall concordance between clinical and histopathologic diagnoses was 47.2% (213 of 451 cases). **Conclusions:** OCs were relatively common, whereas NOCs and OTs were rarer among the elderly. The poor concordance between clinical and histopathological diagnosis highlights the importance of histopathological analysis to ensure an accurate diagnosis. Dentists and geriatricians must be familiar with these lesions to ensure an early diagnosis, reduce morbidity and improve the quality of life of these individuals.

Keywords: Odontogenic cysts, Non-odontogenic cysts, Odontogenic tumors, Oral diseases, Older people, Oral lesions.

Introduction

The segment of the elderly population is growing worldwide, more than any other age group (1-3). Population aging is followed by a high prevalence of systemic and oral diseases (1,2), which will increase the demand for oral medicine services (1). This modification in the demographic profile of the population imposes new challenges on health services, especially those related to oral health, because most older people have precarious oral health, resulting from a healthcare model that, for many years, favored mutilating and curative dental practices (dental restorations and extractions) rather than prevention strategies (1). Therefore, knowing the most prevalent oral lesions in this population through histopathological studies is essential for geriatricians and dentists as it provides accurate information on the profile of these lesions in the elderly, contributing to early diagnosis (2,4).

OCs and OTs occur mainly in the jaws of individuals between the 2nd and 4th decades of life (5). In most cases, these lesions have an indolent behavior. However, some OCs and OTs, such as ameloblastomas and odontogenic keratocysts (OKCs), have a locally invasive behavior and frequently recur, causing considerable bone destruction and tooth loss (2,5). Also, most malignant OTs have aggressive nature, metastatic potential, and a poor prognosis (4). In the elderly, specifically, these lesions tend to cause significant morbidity, making oral rehabilitation challenging and considerably decreasing the quality of life of these individuals (2,4). On the other hand, NOCs generally have indolent clinical behavior. They can be located either in soft tissues or intraosseous sites, such as the maxilla and mandible and rarely recur and cause extensive bone destruction (2,6,7).

Although numerous studies have documented the incidence and prevalence of OTs and cystic lesions in the oral and maxillofacial region, only a few have characterized the lesions according to age group (8-10). This analysis is essential because it facilitates understanding the most common lesions in each age group, guiding clinicians in the correct diagnosis (2). In addition, they provide valuable information that supports the development of appropriate preventive and therapeutic measures. Therefore, this study aimed to evaluate the frequency and main demographic characteristics of OCs, NOCs, and OTs in a population of elderly Brazilians population (≥ 60 years).

Methodology

Study design and sample

In this multi-institutional retrospective study (1999-2019), the histopathological records of all older people (≥60 years old) diagnosed with OCs, NOCs, and OTs in the oral and maxillofacial region were retrieved from the archives of three Brazilian oral pathology services (**Figure 1**). Data such as age, sex, anatomical site, symptomatology, and histopathological diagnosis were collected from biopsy records and evaluated. The lesions were categorized into OCs, NOCs, and OTs according to the 5th edition of the World Health Organization (WHO) Classification of Head and Neck Tumours (2022) (11). The cysts not included in the current classification were classified according to previous literature (2).

This multi-institutional retrospective study is part of a previous assessment carried out by our research group, which analyzed 7,476 cases of oral and maxillofacial lesions in older people (≥ 60 years). This study was approved by the Ethics Committee of the State University of Paraíba (UEPB) (CAAE: 61639722.9.0000.5187).

Data analysis

Data were subjected to descriptive and quantitative analysis using the Statistical Package for the Social Sciences (SPSS) for Windows 20.0 (SPSS. Inc., Chicago, IL, USA). Continuous variables were expressed as mean, median, and standard deviation values (SD). Categorical variables were defined as the absolute number of cases and percentage values. Fisher's exact and Chi-square tests were used to assess the association between the different groups of oral lesions and demographic characteristics, adopting a *P*-value of ≤ 0.05 and a 95% confidence interval.

Results

A total of 7,476 cases of oral and maxillofacial lesions were diagnosed in the elderly (≥ 60 years) at the three Brazilian centers participating in the study (1999-2019), of which 389

(5.2%) were OCs, 86 (1.15%) NOCs, and 84 (1.12%) OTs (**Figure 1**). This study provides detailed features of these lesions.

Overall, males were slightly more affected (n = 279, 50.2%). Most individuals were aged between 60 and 69 years (n = 358; 64.2%), with few cases over 80 years (n = 50; 8.9%). A statistically significant association was found between the age of the individuals (60-69 years) and the lesion groups (odontogenic cysts) ($P = 0.0011$). OCs were the most common lesions (n = 389; 69.7%), followed by NOCs (n = 86; 15.3%) and OTs (n = 84; 15.0%) (**Table 1**).

Regarding OCs, males (n = 211; 54.7%) were more affected than females (n = 175; 45.3%), with a male-to-female ratio of 1.2:1; however, there was no statistically significant association (**Table 2**). Inflammatory odontogenic cysts were more common (n = 241; 62.0%) than developmental odontogenic cysts (n = 148; 38.0%). Among those of an inflammatory nature, the most common were periapical cysts (n = 166; 68.9%) and residual cysts (n = 68; 28.2%). Concerning developmental cysts, the most common cyst was OKC (n = 68; 45.9%), followed by odontogenic cyst *not otherwise specified* (n = 37; 25.0%), and dentigerous cyst (n = 19; 12.8%). Other cysts such as calcifying odontogenic cyst (n = 5; 3.4%), adult gingival cyst (n = 4; 2.7%), lateral periodontal cyst (n = 3; 2.0%), and orthokeratinized odontogenic cyst (n = 2; 1.4%) were highly uncommon in this population.

The mandible was the most affected anatomical location (n = 215; 57.9%), principally in the developmental cyst group. Inflammatory odontogenic cysts were more common in the maxilla when compared to the mandible ($P = 0.0008$) (**Figure 2**). Signs and symptoms, such as pain and swelling, were reported in 167 (42.9%) odontogenic cysts, while 131 cysts (33.7%) were asymptomatic. No signs or symptoms were described in 91 cases (23.4%). The pain was significantly more present in older adults with inflammatory cysts (n = 104; 62.3%) than those with developmental cysts (n = 31; 18.6%) ($P < 0.001$).

Regarding odontogenic neoplasms, most tumors were benign (n = 83; 98.8%). Only one malignant odontogenic tumor was diagnosed in this population (1.2%). Overall, OTs occurred mainly in the mandible (n = 65; 82.3%) of women (n = 52; 61.9%), with a female-to-male ratio of 1.6:1 (**Figure 2**). Ameloblastoma was the most common benign tumor (n = 65; 77.4%), and the rarest was the squamous odontogenic tumor (n = 1; 1.2%) (**Table 3**). Signs and symptoms, such as swelling and pain, were reported in 41.7% of cases (n = 35), while 23 (27.4%) cases were asymptomatic. In 26 cases, signs/symptoms were not reported (31.0%).

NOCs occurred mainly in women (n = 50; 58.1%) with a female-to-male ratio of 1.4:1. The lips (n = 19; 22.1%) were the most affected anatomical location, followed by buccal mucosa (n = 18; 20.9%) and floor of the mouth (n = 17; 19.8%). On the other hand, the maxilla was the

most affected intraosseous site (n = 16; 18.6%) (**Figure 3**). The most common NOCs were salivary duct cysts (n = 45; 52.3%), followed by nasopalatine duct cysts (n = 15; 17.4%) and epidermoid cysts (n = 8; 9.3%) (**Table 4**). As for symptoms, most cases were asymptomatic (n = 47; 54.7%), 13 (15.1%) reported pain, and in 26 cases (30.2%), this information was not available.

The overall concordance between clinical and histopathologic diagnoses was 47.2% (213 of 451 cases). The highest agreement was observed in the group of OCs (53.5%), followed by OTs (36.8%) and NOCs (25.4%).

Discussion

Herein, we report the demographic characteristics of 558 cystic lesions and OTs in older people diagnosed at three Brazilian oral pathology services, from a total of 7,476 diagnostics. Of these, 389 (5.2%) were diagnosed as OCs, 86 (1.15%) as NOCs, and 84 (1.12%) as OTs, similar to previously reported prevalence rates (2,12).

By definition, a cyst is a pathological cavity covered by epithelium, often filled with liquid or semi-solid material. Various cysts can arise in the oral and maxillofacial region (2,11). In the 2017 WHO Classification of Head and Neck Tumours, the jaw cysts were separated into two groups: (i) inflammatory OCs and (ii) odontogenic/non-odontogenic developmental cysts. In the current WHO classification (2022), the umbrella term '*cysts of the jaws*' was utilized without any subdivision (11). Nevertheless, herein, we have discussed them under the subheadings of NOCs and OCs to emphasize their origin (11). In the current study, the frequency of OCs was four times greater than NOCs, slightly smaller than that observed in a previous study among the elderly (2), but similar to the general population (8,9,13,14).

NOCs were uncommon in the present study, accounting for only 1.11% of all lesions diagnosed in the elderly. However, these lesions are uncommon in all age groups (2,8-10,13). In our study, salivary duct cyst was the most commonly seen NOCs in the elderly, followed by nasopalatine duct cyst (NDC), similar to previous reports (2). However, some studies have shown the nasopalatine duct cyst as the most prevalent NOC in the elderly and the general population (8-10,13,15). Regarding the anatomical site, most soft tissue cysts occurred in the lips, buccal mucosa, and the floor of the mouth, similar to previous studies (6,7). On the other hand, as previously reported, most cases of intraosseous NOCs were located in the maxilla (2,6-10,13,15). Overall, conservative surgical excision effectively treats these lesions. NOCs have low recurrence rates and an excellent prognosis (2).

Inflammatory odontogenic cysts correspond to about 38 to 60% of all cysts and commonly occur in adults and the elderly; lesions in children and adolescents are uncommon (14).

In the present study, the inflammatory cysts were the most common in older people, with the periapical and residual cysts as the most prevalent. Although residual cysts have been included in the periapical cyst diagnosis in the 2017 WHO classification (16), we addressed them separately for didactic reasons. If analyzed separately, the residual cyst corresponded to the 2nd most common lesion in our study. The development of periapical and residual cysts occurs due to inflammatory and degenerative changes in the dental pulp, often leading to tooth loss (2). The higher prevalence of these cysts has been associated with poor oral health conditions and lower socioeconomic status (17,18), which emphasizes the importance of developing and encouraging preventive oral health policies to ensure better oral health conditions in this population worldwide (5). When not appropriately treated, these lesions can reach large sizes and involve adjacent teeth (2). Therefore, an accurate early diagnosis and adequate therapeutic approach are essential to prevent loss of teeth and bone support, facilitating oral rehabilitation and improving masticatory efficiency and quality of life.

Regarding developmental OCs, the most common in the elderly was OKC (17.5%). Contrary to previous studies, dentigerous cysts are often the most common developmental cysts, especially among young people in the second and third decades of life (8,10,11,14,15,19-21). As they arise due to fluid accumulation between the crown of the unerupted tooth and the reduced enamel epithelium, usually impacted lower third molars and upper canines, the low prevalence of these cysts in the elderly is not surprising. On the other hand, since OKC has a high infiltrative capacity and recurrence rates, its treatment typically involves aggressive surgical approaches, which cause significant bone loss and tooth loss (2,22). Although these findings have already led the WHO to classify the OKC as an OT of epithelial origin, it was reclassified as a developmental OC in 2017 (11,16). Most OKCs show PTCH1 gene mutations but rarely *PTCH2* or *SUNU* mutations (11). Although the incidence and prevalence of OCs and OTs vary according to the type of classification used for the lesions and the geographic location of the study, the OKCs are usually the third most common cysts in the general population. However, they are usually less frequent in elderly patients (≥60 years) (2).

Regarding the anatomical site, OCs occurred mainly in the mandible (n = 215; 57.9%). Accordingly, previous studies on the elderly demonstrated that the most affected anatomical location is the mandible, responsible for more than 50% of all cases (2). These data indicate that the preferred anatomical site of these cysts does not vary among different age groups. However, in the present investigation, OCs were more frequent in older men, unlike previous reports, which showed a higher prevalence in women (2). On the other hand, NOCs were slightly more frequent in females. It has been proposed that the higher prevalence of oral lesions in females may result from a greater concern for oral health than in men. Perhaps women seek more health services

when needed; therefore, some of these lesions are diagnosed more frequently in this population (2).

The frequency of OTs in the present study was low (1.11%) but similar to another Brazilian survey of oral lesions in the elderly (2). OTs are more common in young people between the 2nd and 4th decades of life, with a small proportion of cases appearing in the elderly (10,13,15,23-26). In the current study, the most common OT was ameloblastoma (77.4%), but many other subtypes occurred in the elderly population studied (**Table 3**). Despite this variety of histological subtypes, the most clinically significant tumors are ameloblastomas. These neoplasms have a potential for bone destruction and high recurrence rates, causing major aesthetic and functional complications (11). Ameloblastomas arise mainly in the mandible, especially in the posterior region, of individuals between the 4th and 5th decades and do not exhibit sex predilection (11). In contrast, in the current study, ameloblastomas were slightly more common in women, with a female-to-male ratio of 1.2:1 (2).

In the present investigation, only one malignant OT was diagnosed in the elderly (1.2%), similar to previous data (2,24). Although these tumors are extremely rare at all ages, the chances of developing a malignant tumor increase with age (2,24). In addition to its rarity, which complicates the diagnosis, this group of tumors has variable biological behavior and a broad spectrum of morphological findings, which often overlap, making the morphological diagnosis challenging even for experienced pathologists. These aspects cause many odontogenic malignancies to be diagnosed only as malignant odontogenic tumors *not otherwise specified* (2,24).

NOCs represent only 1.15% (n = 86) of all cases diagnosed at the three centers participating in this study (**Table 1**). Although these cysts are generally uncommon in the elderly, they were more frequent in our sample than in a previous Taiwanese study that evaluated 7,726 oral lesions in the elderly (12). In the present study, only 0.16% (n = 13) of all diagnosed lesions were NOCs. Also, radicular cysts, ameloblastomas, and epidermoid cysts were the most prevalent lesions of each group in the elderly, respectively (12). These findings are similar to our study, except for the salivary duct cyst, the most commonly observed NOC.

According to our findings, there was only a 47.2% concordance between clinical and histopathological diagnoses in all cases, with varying levels of agreement depending on the specific lesion type (ranging from 25.4% to 53.5%, as shown in **Table 1**). This low concordance has also been reported in previous studies (27-29) and highlights the importance of sending all biopsy materials for histopathological analysis to ensure an accurate diagnosis and, consequently, adequate treatment for the patient. Furthermore, it is crucial to improve diagnostic skills,

regardless of clinical specialty. To achieve this goal, it is important to provide continuous personnel training and make proper use of available diagnostic tools.

In summary, more multi-institutional studies should be encouraged better to characterize the profile of oral diseases in the elderly. Also, it is crucial to highlight the importance of periodic oral examinations of older people, ideally by health professionals experienced in diagnosing oral diseases, since early diagnosis is essential to minimize patient morbidity and, consequently, improve the quality of life of these people (30), in addition to assisting in the development of public policies and prevention strategies (2,4).

Some limitations of this study need to be pointed out. First, despite the multicentric nature of the study, which involved data from three oral pathology services situated in different regions of Brazil, the sample does not represent the entire Brazilian elderly population. It is also essential to analyze follow-up data to verify long-term outcomes after treating these lesions. However, as this was a study carried out in oral pathology centers, unfortunately, these data were not available. In addition, we recognize as another limitation the lack of information from young individuals to compare with data from the elderly.

Conclusion

The OCs were relatively common in the elderly, while the NOCs and OTs were rare. Overall, this population's most common OCs, NOCs, and OTs were periapical cysts, salivary duct cysts, and ameloblastomas, respectively. Knowing the profile of the most common cystic lesions and OTs in the elderly is essential for dentists and geriatricians. Most of these lesions are asymptomatic, and early diagnosis depends on periodic clinical and radiographic examinations, helping to avoid significant morbidity and compromising the quality of life of this population. The poor concordance between clinical and histopathological diagnosis highlights the importance of histopathological examination for ensuring precise diagnosis.

Conflict of interest

No conflicts of interest were declared concerning the publication of this article.

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Table 1. Age group and sex distribution of cystic lesions and odontogenic tumors in older people.

Lesions	Sex (n, %)				*P*-value	Mean age (±SD)	Age groups				Total		*P*-value	Concordance between clinical and histopathological diagnosis		
	Male	Female	NI	M:F ratio			60-69	70-79	80-89	≥90	n	%		Yes	No	NI*
Odontogenic cysts	211	175	3	1.2:1	0.0555§	**67.82±6.63**	269	94	24	2	389	69.7	0.0011§	175 (53.5%)	152 (46.5%)	62
Non-odontogenic cysts	36	50	0	1:1.4		**69.75±7.48**	45	32	8	1	86	15.3		17 (25.4%)	50 (74.6%)	19
Odontogenic tumors	32	52	0	1:1.6		**70.75±7.25**	45	24	15	0	84	15.0		21 (36.8%)	36 (63.2%)	27
Total	**279 (50.2%)**	**277 (49.8%)**	**3**	**1:1**		**69.44±7.12**	**359 (64.2%)**	**150 (26.8%)**	**47 (8.4%)**	**3 (0.5%)**	**559**	**100**		213 (47.2%)	238 (63.2%)	108

N, number of cases; %, percentage; SD, standard deviation.
For statistical analysis, the age groups were divided into Group A (60-69 years) and Group B (≥70 years).
§Pearson's chi-squared test.
*Clinical diagnosis was not informed.

Table 2. Patient sex and anatomical site of odontogenic cysts in older people.

Odontogenic cysts	Sex						*P*-value	Anatomical site						*P*-value	Total (within the group)	
	Male		Female		NI	M:F ratio		Maxilla		Mandible		NI	Man:Max ratio			
	n	%	n	%	n			n	%	n	%	n			n	%
Inflammatory odontogenic cysts																
Periapical cyst	93	24.1	70	18.1	3	1.3:1	0.7525§	78	21.0	81	21.8	7	1:1	0.0008§	166	42.7
Residual cyst	35	9.1	33	8.5	0	1.1:1		33	8.9	30	8.1	5	1:1.1		68	17.5
Inflammatory collateral cysts	4	1.0	3	0.8	0	1.3:1		1	0.3	6	1.6	0	6:1		7	1.8
Total	**132**	**34.2**	**106**	**27.5**	**3**	**1.2:1**		**112**	**30.2**	**117**	**31.5**	**15**	**1:1**		**241**	**62.0**
Developmental odontogenic cysts																
Odontogenic keratocyst	35	9.1	33	8.5	0	1.1:1		14	3.8	52	14.0	2	3.7:1		68	17.5
Dentigerous cyst	10	2.6	9	2.3	0	1.1:1		8	2.2	9	2.4	2	1.1:1		19	4.9
Glandular odontogenic cyst	4	1.0	6	1.6	0	1:1.5		3	0.8	7	1.9	0	2.3:1		10	2.6
Calcifying odontogenic cyst	3	0.8	2	0.5	0	1.5:1		1	0.3	2	0.5	2	2:1		5	1.3
Gingival cyst of adult	2	0.5	2	0.5	0	1:1		1	0.3	3	0.8	0	3:1		4	1.0
Lateral periodontal cyst	0	0.0	3	0.8	0	0:3		1	0.3	2	0.5	0	2:1		3	0.8
Orthokeratinized odontogenic cyst	2	0.5	0	0.0	0	2:0		1	0.3	1	0.3	0	1:1		2	0.5
Odontogenic cyst *not otherwise specified*	23	6.0	14	3.6	0	1.6:1		15	4.0	22	5.9	0	1.5:1		37	9.5
Total	**79**	**20.5**	**69**	**17.9**	**3**	**1.1:1**		**44**	**11.86**	**98**	**26.4**	**6**	**2.2:1**		**148**	**38.0**
TOTAL	**211**	**54.7**	**175**	**45.3**	**3**	**1.2:1**		**156**	**42.06**	**215**	**57.9**	**21**	**1.4:1**		**389**	**100**

NI, not informed; N, number of cases; %, percentage.
For statistical analysis, the odontogenic cysts were divided into Group A (inflammatory cysts) and Group B (developmental cysts).
§Fisher's exact test.

Table 3. Patient sex and anatomical site of odontogenic tumors in older people.

Odontogenic Tumors	Sex				M:F ratio	*P*-value	Anatomical site					Man:Max ratio	*P*-value	Total (within the group)	
	Male		Female				Maxilla		Mandible		NI				
	n	%	n	%			n	%	n	%	n			n	%
Benign odontogenic tumors															
Ameloblastoma	29	34.5	36	42.9	1:1.2	0.3810[§]	6	7.6	54	68.4	5	9:1	0.1772[§]	65	77.4
Odontoma[*]	1	1.2	5	6.0	1:5		2	2.5	4	5.1	0	2:1		6	7.1
Adenomatoid odontogenic tumor	1	1.2	2	2.4	1:2		1	1.3	2	2.5	0	2:1		3	3.6
Odontogenic myxoma	0	0.0	2	2.4	0:2		2	2.5	0	0.0	0	2:0		2	2.4
Calcifying epithelial odontogenic tumor	0	0.0	2	2.4	0:2		0	0.0	2	2.5	0	2:0		2	2.4
Central odontogenic fibroma	0	0.0	2	2.4	0:2		2	2.5	0	0.0	0	0:2		2	2.4
Peripheral odontogenic fibroma	0	0.0	2	2.4	0:2		0	0.0	2	2.5	0	2:0		2	2.4
Squamous odontogenic tumor	0	0.0	1	1.2	0:1		0	0.0	1	1.3	0	1:0		1	1.2
Total	**31**	**36.9**	**52**	**61.9**	**1:1.7**		**13**	**16.5**	**65**	**82.3**	**5**	5:1		**83**	**98.8**
Malignant odontogenic tumors															
Ameloblastic carcinoma	1	1.2	0	0.0	1:0		1	1.3	0	0	0	0.0		**1**	**1.2**
TOTAL	**32**	**38.1**	**52**	**61.9**	**1:1.6**		**14**	**17.7**	**65**	**82.3**	**5**	**4.6:1**		**84**	**100**

N, number of cases; %, percentage.

For statistical analysis, the odontogenic tumors were divided into Group A (benign tumors) and Group B (malignant tumors).

[*]Four were compound odontomas, and two were complex odontomas.

[§]Fisher's exact test.

Table 4. Patient sex and anatomical site of non-odontogenic cysts in older people.

Non-odontogenic cysts	Sex					Anatomical site (n, %)									Total (within the group)	
	Male		Female		M:F ratio	Maxilla	Mandible	Floor of the mouth	Lip	Palate	Buccal mucosa	Tongue	Nasolabial sulcus	Perioral skin		
	n	%	n	%											n	%
Salivary duct cyst	15	17.4	30	34.9	1:2	0	1	6	17	4	15	2	0	0	45	52.3
Nasopalatine duct cyst	8	9.3	7	8.1	1.1:1	15	0	0	0	0	0	0	0	0	15	17.4
Oral lymphoepithelial cyst	5	5.8	2	2.3	2.5:1	0	0	5	0	0	0	2	0	0	7	8.1
Epidermoid cyst	4	4.7	4	4.7	1:1	1	0	2	1	0	3	0	0	1	8	9.3
Dermoid cyst	4	4.7	1	1.2	4:1	0	1	2	1	0	0	0	0	1	5	5.8
Nasolabial cyst	0	0.0	4	4.7	0:4	0	0	0	0	0	0	0	4	0	4	4.7
Thyroglossal duct cyst	0	0.0	1	1.2	0:1	0	0	1	0	0	0	0	0	0	1	1.2
Bronchogenic cyst	0	0.0	1	1.2	0:1	0	0	1	0	0	0	0	0	0	1	1.2
TOTAL	**36**	**41.9**	**50**	**58.1**	**1:1.4**	**16 (18.6%)**	**2 (2.3%)**	**17 (19.8%)**	**19 (22.1%)**	**4 (4.7%)**	**18 (20.9%)**	**4 (4.7%)**	**4 (4.7%)**	**2 (2.3%)**	**86**	**100**

N, number of cases; %, percentage.

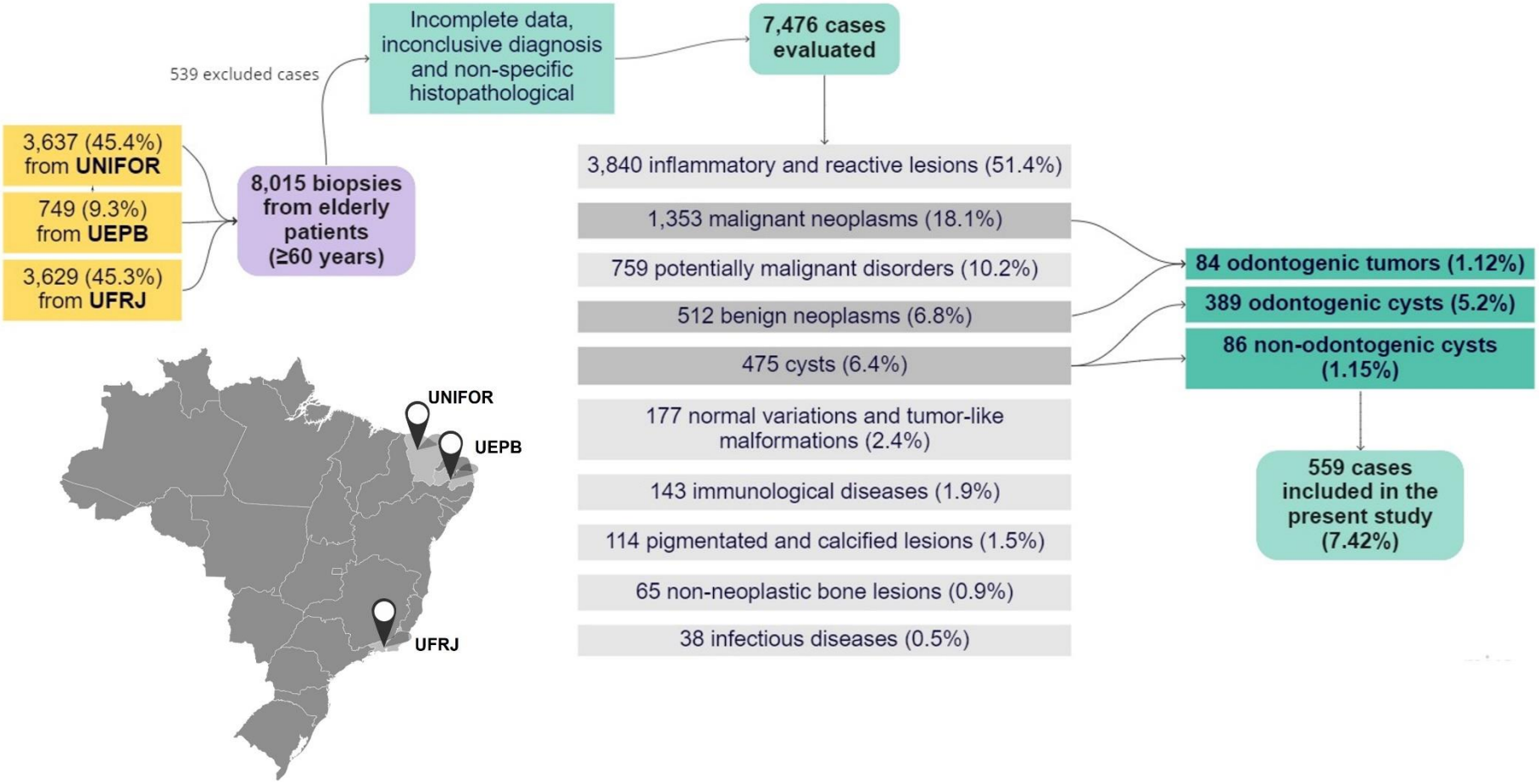

Figure 1. Flowchart showing the sample selection from the three oral pathology centers participating in the study. A more detailed analysis of the characteristics of cystic lesions and odontogenic tumors was carried out in the present study. The sample with primary data corresponds to paper 1. Scheme adapted from Silva et al. (2).

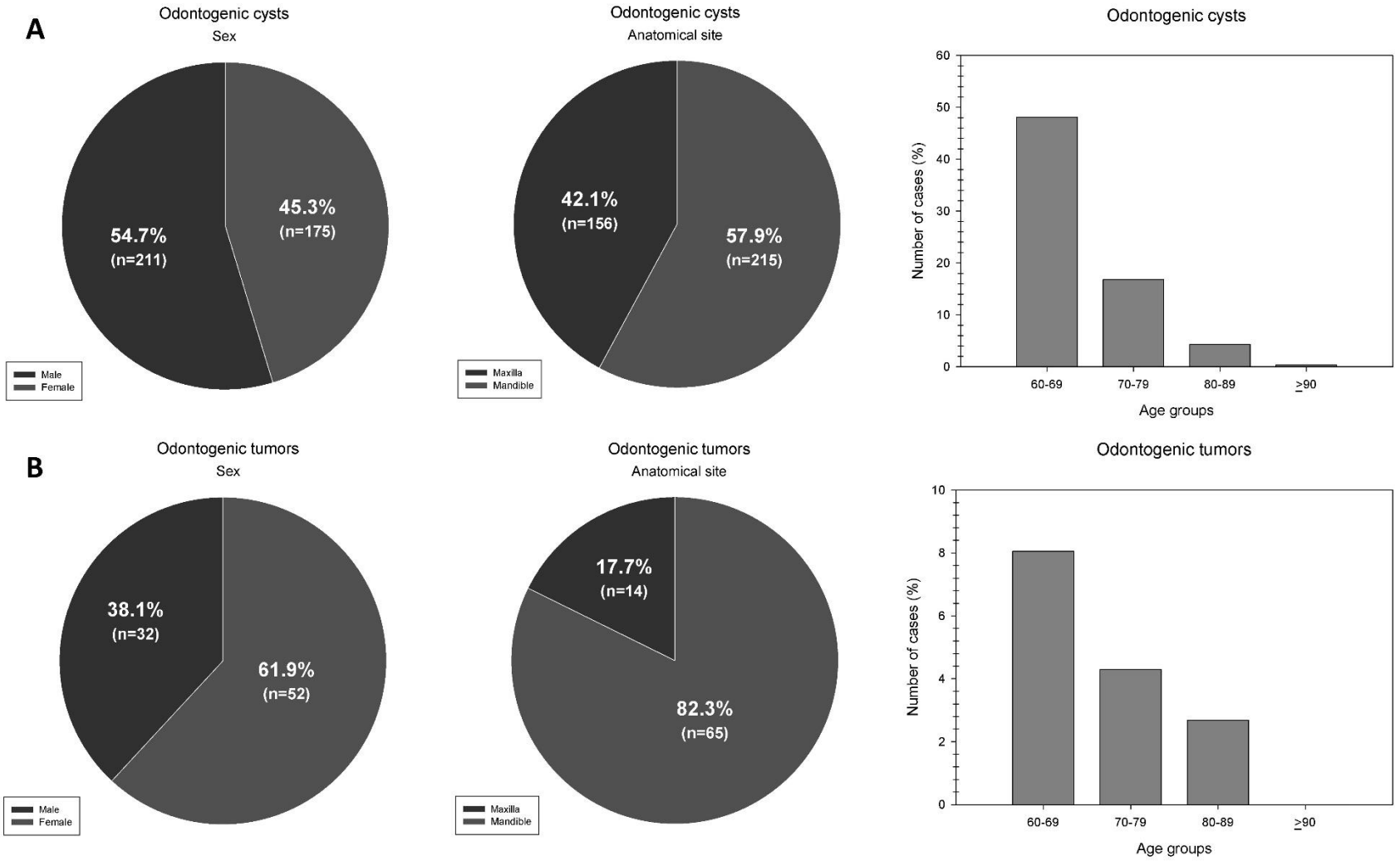

Figure 2. Age group (decade of life), sex, and anatomical site distribution of (A) odontogenic cysts and (B) odontogenic tumors in the elderly.

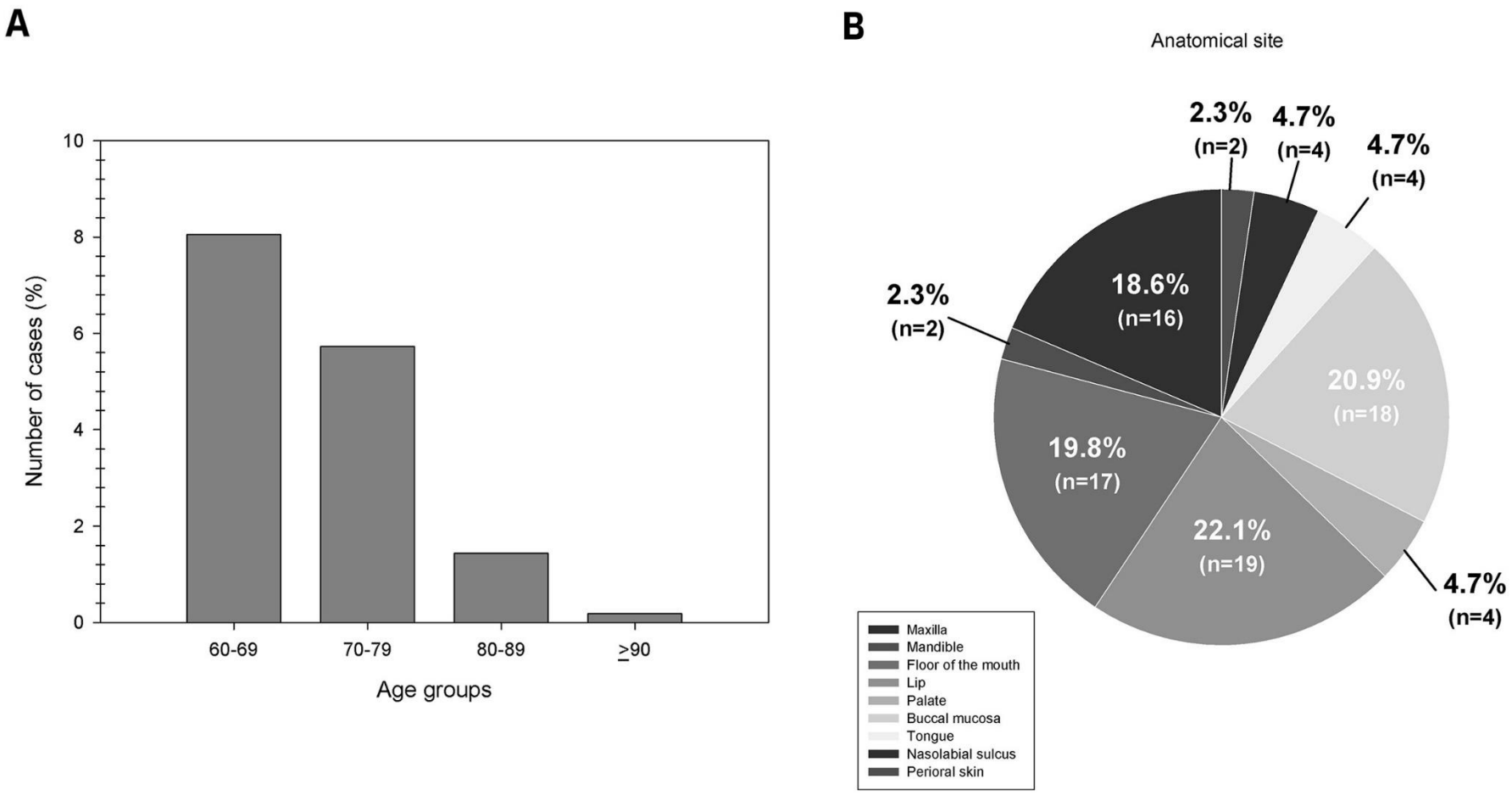

Figure 3. (A) Age group (decade of life), and (B) anatomical site distribution of non-odontogenic cysts in the elderly

3 DISCUSSÃO

Nesta seção, apresentaremos os principais resultados de cada capítulo, acompanhados de uma breve discussão e conclusões dos estudos. Como os aspectos mais relevantes de cada artigo já foram discutidos anteriormente, concentrar-nos-emos apenas nos principais resultados.

No primeiro capítulo, traçamos um perfil detalhado da frequência e distribuição das lesões orais e maxilofaciais em pacientes idosos diagnosticados em três centros de referência em patologia oral no Brasil: dois situados na região nordeste (Laboratório de Histopatologia Oral do Departamento de Odontologia da Universidade Estadual da Paraíba, Campus I, Campina Grande e Serviço de Patologia Oral da Faculdade de Odontologia da Universidade de Fortaleza, Fortaleza, Ceará) e um na região sudeste (Faculdade de Odontologia da Universidade Federal do Rio de Janeiro, Rio de Janeiro). Observou-se uma alta frequência de lesões reacionais e inflamatórias, bem como um elevado número de desordens orais potencialmente malignas e tumores malignos nessa população. Essa alta frequência de desordens orais potencialmente malignas e câncer bucal em idosos, especialmente o carcinoma espinocelular, tem sido reportada em estudos prévios (Martins-de-Barros et al., 2021; Pires et al., 2020; Fonseca et al., 2019; Silva et al., 2017) e merece atenção especial. Como o carcinoma de células escamosas é frequentemente assintomático em seus estágios iniciais, é essencial que os profissionais de saúde realizem exames clínicos periódicos para detectar essas lesões precocemente, seguidos de avaliação histopatológica para garantir um diagnóstico preciso e, consequentemente, reduzir a morbimortalidade e melhorar a qualidade de vida desses indivíduos (Cunha et al., 2020b).

No geral, não se observou uma diferença marcante na frequência de lesões bucais entre as regiões geográficas (nordeste versus sudeste), havendo uma distribuição homogênea dos grupos de lesões bucais entre os centros participantes do estudo. A diferença principal foi em relação ao grupo de doenças infecciosas, mais especificamente à paracoccidioidomicose. No presente estudo, todos os casos de paracoccidioidomicose foram diagnosticados no serviço de patologia oral da Faculdade de Odontologia da UFRJ, localizada no Rio de Janeiro, o que se justifica pelo fato das regiões sul, sudeste e centro-oeste do Brasil serem áreas endêmicas dessa micose sistêmica (de Oliveira et al., 2023; Shikanai-Yasuda et al., 2018).

Outro aspecto importante é que muitos estudos anteriores se baseiam apenas em dados clínicos sem a confirmação histopatológica (Radwan-Oczko et al., 2022; Rabiei et al., 2010; Saintrain et al., 2013; Mujica et al., 2008; Taiwo et al., 2009; Espinoza et al. al., 2003; Reichart, 2000; Dundar e Ilhan Kal, 2007; Lin et al., 2001). Essa abordagem pode comprometer a precisão das informações, já que a avaliação histopatológica é considerada o padrão-ouro para o diagnóstico de muitas dessas condições. Além disso, a concordância geral observada entre o diagnóstico clínico e histopatológico (55,2%) no nosso estudo, ressalta a importância da análise histopatológica de todo o material biopsiado para garantir um diagnóstico preciso. No entanto, é importante ressaltar que o diagnóstico de algumas condições orais é essencialmente clínico (Fonseca et al., 2019) e, embora nossos resultados apresentem maior acurácia diagnóstica, é preciso levar em conta que eles foram obtidos em serviços de patologia oral. Portanto, a comparação desses dados com estudos que avaliaram a frequência de lesões orais de forma eminentemente clínica deve ser feita com cautela, uma vez que acaba direcionando os resultados para lesões que requereram biópsias e exames anatomopatológicos, enquanto subnotifica aquelas que foram diagnosticadas apenas clinicamente. Para melhorar a precisão dos dados, sugerimos que estudos futuros incluam tanto serviços clínicos quanto laboratoriais. Dessa forma, será possível evitar a subnotificação de doenças com importância clínica e ajudar a evitar estimativas imprecisas da prevalência e incidência dessas lesões.

No entanto, uma análise reflexiva dos resultados de nosso estudo (Figura 2, artigo 1) mostra que os serviços de diagnóstico oral participantes estão se esforçando para atender a uma demanda cada vez maior. Graças ao trabalho em equipe, cooperação com outras especialidades odontológicas e práticas contínuas de educação em saúde, esses centros têm contribuído significativamente para aumentar a oferta de serviços. Embora ainda haja um longo caminho a percorrer, é encorajador ver que a conscientização dos profissionais sobre a importância do envio de todo o material biopsiado para análise morfológica está rendendo resultados positivos. Com esse comprometimento em busca de melhores resultados, podemos garantir um diagnóstico preciso e oferecer um tratamento adequado aos pacientes. Portanto, é essencial continuar investindo em práticas e abordagens colaborativas para alcançar progressos maiores no futuro.

No segundo capítulo, apresentamos uma análise mais detalhada das lesões císticas e tumores odontogênicos (TOs), o segundo grupo de lesões não neoplásicas mais comum em idosos. Os cistos odontogênicos (COs) foram mais comuns nesses indivíduos em

comparação com os cistos não-odontogênicos (CNOs) e tumores odontogênicos (TOs). Em geral, os cistos periapicais, cistos do ducto salivar e ameloblastomas foram os COs, CNOs e TOs mais comuns, respectivamente. Esses dados dão semelhantes a um estudo multicêntrico prévio que avaliou a frequência dessas lesões em uma população de idosos brasileiros (Silva et al., 2018). Entretanto, os autores não forneceram dados sobre a concordância entre os diagnósticos clínicos e histopatológicos. Embora os cirurgiões-dentistas estejam relativamente familiarizados com essas lesões, é importante destacar que houve uma baixa concordância entre o diagnóstico clínico e morfológico tanto para os cistos (48,7%) quanto para os tumores odontogênicos (36,8%). Nos idosos, especificamente, algumas lesões, como o ceratocisto odontogênico e o ameloblastoma, podem causar significativa morbidade devido à sua natureza infiltrativa, tornando a reabilitação oral desafiadora e diminuindo consideravelmente a qualidade de vida desses indivíduos (Silva et al., 2018). Por isso, é essencial que cirurgiões-dentistas conheçam o perfil das lesões císticas e TOs mais comuns em idosos. O diagnóstico precoce depende de exames clínicos e radiográficos periódicos (Silva et al., 2018). Por outro lado, os CNOs geralmente apresentam comportamento clínico indolente, podendo estar localizados tanto em tecidos moles quanto em sítios intraósseos, como maxila e mandíbula, e raramente recorrem e causam extensa destruição óssea (Silva et al., 2018; Nonaka et al., 2011).

Em resumo, fornecemos uma ampla estimativa em relação à frequência, padrão e distribuição de várias lesões orais em uma população de idosos brasileira. Espera-se que os resultados deste estudo possam ajudar os profissionais de saúde a aprimorar suas habilidades de diagnóstico, permitindo melhor conhecimento das lesões orais mais comuns em idosos. Além disso, os resultados fornecem subsídios para que gestores possam planejar e direcionar recursos e ações de saúde que atendam às reais demandas desses indivíduos.

4 CONCLUSÃO

- Houve uma alta frequência de lesões bucais em idosos, principalmente de lesões reacionais e inflamatórias, seguidas das neoplasias malignas e desordens orais potencialmente malignas.
- Devido à alta prevalência de tumores malignos e desordens orais potencialmente malignas, médicos e cirurgiões-dentistas devem realizar um exame bucal periódico minucioso para detectar essas lesões precocemente com o objetivo de reduzir morbimortalidade, contribuindo para uma melhor qualidade de vida.
- Estratégias de educação em saúde devem ser empregadas e incentivadas para que esses pacientes eliminem os fatores de risco, principalmente o tabagismo e o etilismo, adquirindo um estilo de vida saudável.
- A concordância moderada observada entre o diagnóstico clínico e histopatológico destaca a importância da análise histopatológica de todo o material biopsiado para reduzir erros diagnósticos e, portanto, evitar tratamentos inadequados. Programas de educação continuada e colaboração multidisciplinar entre as diferentes especialidades odontológicas devem ser incentivados para melhorar a qualidade dos diagnósticos e tratamentos ofertados a esses indivíduos.
- Dado o crescente aumento populacional de idosos, é essencial que os serviços de estomatologia e patologia oral se adaptem a essa realidade, a fim de garantir a oferta de serviços adequados para essa população em crescimento.

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[*] De acordo com as normas da UNICAMP/FOP, baseadas na padronização do International Committee of Medical Journal Editors - Vancouver Group. Abreviatura dos periódicos em conformidade com o PubMed.

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ANEXOS

Anexo 1: Certificado do Comitê de Ética em Pesquisa

FACULDADE DE ODONTOLOGIA DE PIRACICABA DA UNIVERSIDADE DE CAMPINAS - FOP/UNICAMP

PARECER CONSUBSTANCIADO DO CEP

Elaborado pela Instituição Coparticipante

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: ANÁLISE EPIDEMIOLÓGICA DAS LESÕES BUCOMAXILOFACIAIS DIAGNOSTICADAS EM IDOSOS EM UMA POPULAÇÃO BRASILEIRA
Pesquisador: JOHN LENNON SILVA CUNHA
Área Temática:
Versão: 4
CAAE: 61639722.9.3001.5418
Instituição Proponente: Faculdade de Odontologia de Piracicaba - Unicamp
Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 6.024.262

Apresentação do Projeto:
O parecer inicial é elaborado com base na transcrição editada do conteúdo do registro do protocolo na Plataforma Brasil e dos arquivos anexados à Plataforma Brasil. Os pareceres de retorno, emendas e notificações são elaborados a partir do último parecer e dos dados e arquivos da última versão apresentada. Trata-se de PROTOCOLO em Coparticipação, originalmente aprovado pelo CEP do Centro Proponente (UNIVERSIDADE ESTADUAL DA PARAÍBA - PRÓ-REITORIA DE PÓS-GRADUAÇÃO E PESQUISA - UEPB / PRPGP), na versão em tramitação (E1) em 05/04/2023, para avaliação junto ao CEP da FOP-UNICAMP.

A EQUIPE DE PESQUISA citada na capa do projeto de pesquisa inclui JOHN LENNON SILVA CUNHA (Cirurgião Dentista, Doutorando no PPG em Estomatopatologia da FOP-UNICAMP, Professor do Departamento de Odontologia da Universidade Estadual da Paraíba, Pesquisador participante), POLLIANNA MUNIZ ALVES (Cirurgiã Dentista, Professora do Departamento de Odontologia da Universidade Estadual da Paraíba), FELIPE PAIVA FONSECA (Cirurgião Dentista, Professor de Patologia Oral da Faculdade de Odontologia da Universidade Federal de Minas Gerais, Professor do PPG em Estomatopatologia da FOP-UNICAMP), o que é confirmado na PB.

Endereço: Av.Limeira 901 Caixa Postal 52, Prédio Administrativo, Segundo Piso, Setor de Secretarias de Ensino
Bairro: Areião **CEP:** 13.414-903
UF: SP **Município:** PIRACICABA
Telefone: (19)2106-5349 **Fax:** (19)2106-5349 **E-mail:** cep@unicamp.br

FACULDADE DE ODONTOLOGIA DE PIRACICABA DA UNIVERSIDADE DE CAMPINAS - FOP/UNICAMP

Continuação do Parecer: 6.024.262

Outros	TERMO_DE_AUTORIZACAO_INSTITUCIONAL_PARA_USO_E_COLETA_DE_DADOS_EM_ARQUIVOS.pdf	15/08/2022 21:22:23	JOHN LENNON SILVA CUNHA	Aceito
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Situação do Parecer:
Aprovado

Necessita Apreciação da CONEP:
Não

PIRACICABA, 26 de Abril de 2023

Assinado por:
jacks jorge junior
(Coordenador(a))

Anexo 2: Comprovante de submissão do artigo 1

Brazilian Oral Research

Decision Letter (BOR-2022-0738)

From: smpaiva@uol.com.br

To: lennon@servidor.uepb.edu.br

CC:

Subject: Brazilian Oral Research - Decision on Manuscript ID BOR-2022-0738

Body: 17-Mar-2023

Dear Prof. Cunha:

Manuscript ID BOR-2022-0738 entitled "A retrospective multicentre study of oral and maxillofacial lesions in older people" which you submitted to the Brazilian Oral Research, has been reviewed. The comments of the reviewer(s) are included at the bottom of this letter.

The reviewer(s) have recommended publication, but also suggest some minor revisions to your manuscript. Therefore, I invite you to respond to the reviewer(s)' comments and revise your manuscript.

To revise your manuscript, log into https://mc04.manuscriptcentral.com/bor-scielo and enter your Author Center, where you will find your manuscript title listed under "Manuscripts with Decisions." Under "Actions," click on "Create a Revision." Your manuscript number has been appended to denote a revision.

You may also click the below link to start the revision process (or continue the process if you have already started your revision) for your manuscript. If you use the below link you will not be required to login to ScholarOne Manuscripts.

*** PLEASE NOTE: This is a two-step process. After clicking on the link, you will be directed to a webpage to confirm. ***

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You will be unable to make your revisions on the originally submitted version of the manuscript. Instead, revise your manuscript using a word processing program and save it on your computer. Please also highlight the changes to your manuscript within the document by using the track changes mode in MS Word or by using bold or colored text.

Once the revised manuscript is prepared, you can upload it and submit it through your Author Center.

When submitting your revised manuscript, you will be able to respond to the comments made by the reviewer(s) in the space provided. You can use this space to document any changes you make to the original manuscript. In order to expedite the processing of the revised manuscript, please be as specific as possible in your response to the reviewer(s).

IMPORTANT: Your original files are available to you when you upload your revised manuscript. Please delete any redundant files before completing the submission.

Because we are trying to facilitate timely publication of manuscripts submitted to the Brazilian Oral Research, your revised manuscript should be submitted by 17-May-2023. If it is not possible for you to submit your revision by this date, we may have to consider your paper as a new submission.

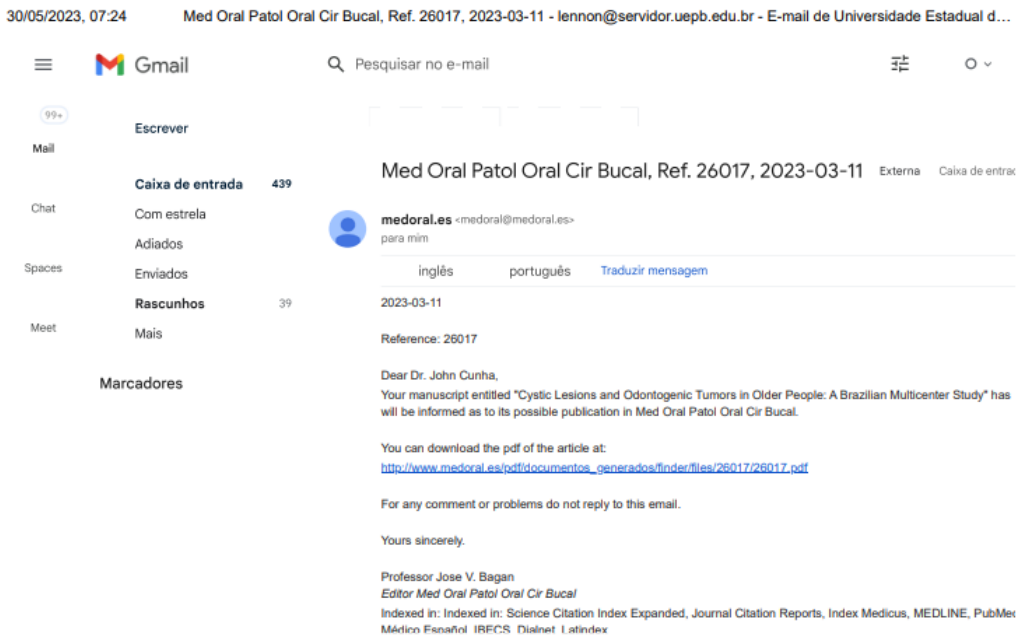
Once again, thank you for submitting your manuscript to the Brazilian Oral Research and I look forward to receiving your revision.

Sincerely,
Dr. Saul Paiva
Editor-in-Chief, Brazilian Oral Research
smpaiva@uol.com.br

Associate Editor Comments to Author:

You r manuscript was reviewed by expert referees who have made a number of recommendations
regarding the suitability of your paper for publication in the Brazilian Oral Research. The reviewers'

Anexo 3: Comprovante de submissão do artigo 2



30/05/2023, 07:24 Med Oral Patol Oral Cir Bucal, Ref. 26017, 2023-03-11 - lennon@servidor.uepb.edu.br - E-mail de Universidade Estadual d...

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2023-03-11

Reference: 26017

Dear Dr. John Cunha,
Your manuscript entitled "Cystic Lesions and Odontogenic Tumors in Older People: A Brazilian Multicenter Study" has will be informed as to its possible publication in Med Oral Patol Oral Cir Bucal.

You can download the pdf of the article at:
http://www.medoral.es/pdf/documentos_generados/finder/files/26017/26017.pdf

For any comment or problems do not reply to this email.

Yours sincerely.

Professor Jose V. Bagan
Editor Med Oral Patol Oral Cir Bucal
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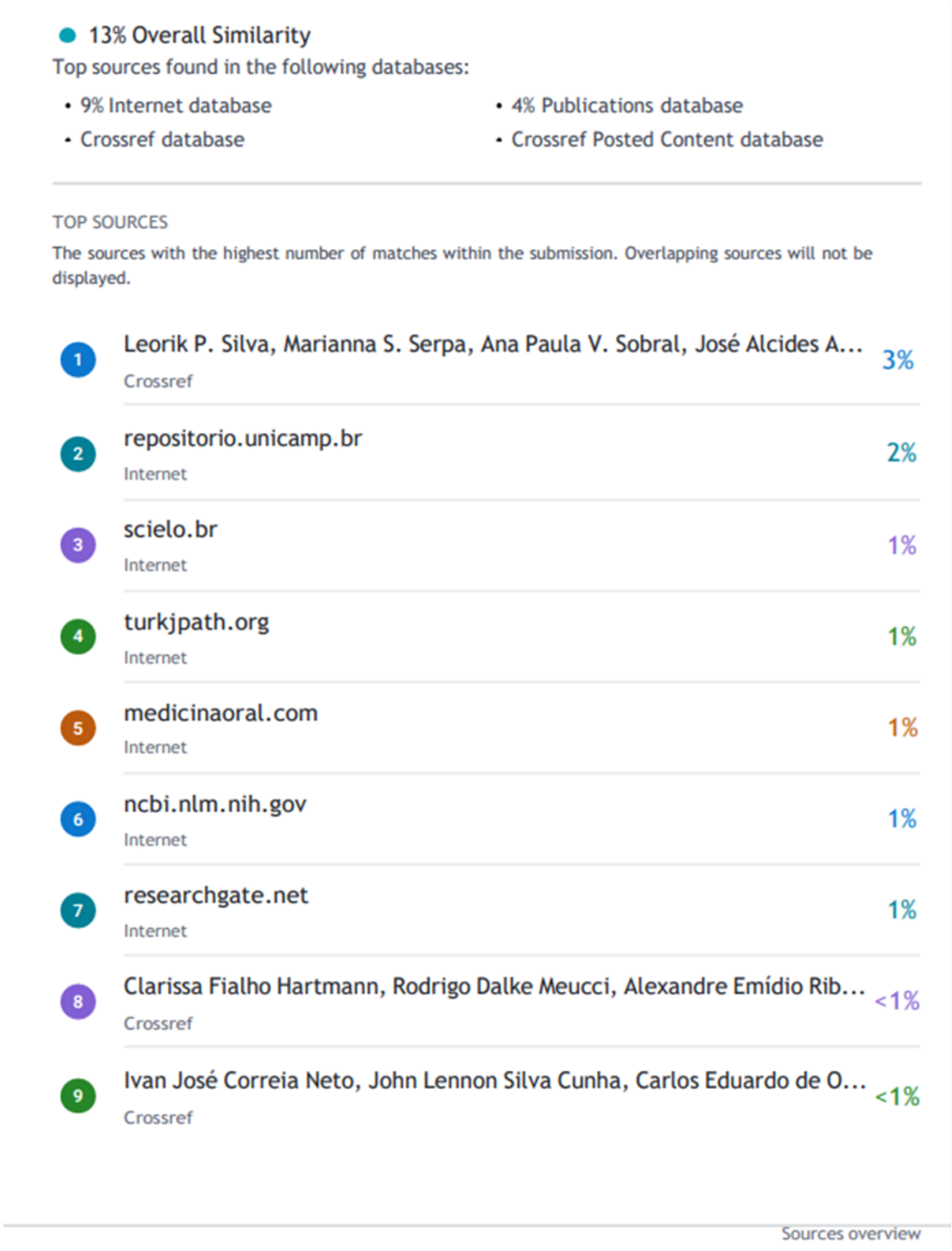
Anexo 4: Relatório de verificação de originalidade e prevenção de plágio



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