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**ESTUDO DOS ASPECTOS RADIOGRÁFICOS DOS LINFOMAS E
LEUCEMIAS EM MAXILA E MANDÍBULA**

**Faculdade de Odontologia
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ESTUDO DOS ASPECTOS RADIOGRÁFICOS DOS LINFOMAS E LEUCEMIAS EM MAXILA E MANDÍBULA

Dissertação apresentada ao Colegiado de Pós-Graduação em Odontologia da Faculdade de Odontologia da Universidade Federal de Minas Gerais, como requisito parcial à obtenção do grau de Mestre em Odontologia - área de concentração em Estomatologia

Orientador: Prof. Felipe Paiva Fonseca

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ESTUDO DOS ASPECTOS RADIOGRÁFICOS DOS LINFOMAS E LEUCEMIAS EM MAXILA E MANDÍBULA NATHÁLIA RODRIGUES GOMES

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“Não é a montanha que conquistamos, mas a nós mesmos”

Edmund Hillary

RESUMO

Introdução: linfomas e leucemias são neoplasias linfohematopoiéticas que podem acometer região oral e maxilofacial, incluindo os ossos gnáticos, com aspectos imaginológicos semelhantes a outras neoplasias e processos reativos.

Objetivo: Investigar os aspectos radiográficos de linfomas e leucemias em maxila e mandíbula. **Metodologia:** Uma revisão sistemática foi realizada nas bases eletrônicas Pubmed, Web of Science e Scopus utilizando estratégias específicas de busca. Os critérios de inclusão compreenderam artigos que forneceram imagens do tipo periapical, panorâmica ou tomografia computadorizada (TC) dos casos individualizados e o diagnóstico de leucemia/linfoma pôde ser confirmado por imunoistoquímica. Três avaliadores analisaram e descreveram individualmente as imagens e a qualidade dos exames radiográficos. **Resultados:** Do total de 1079 artigos escaneados, foram selecionados 129 casos contendo 88 tomografias computadorizadas, 77 panorâmicas e 26 exames periapicais, a maioria (54%) classificados com uma qualidade excelente. O linfoma difuso de grandes células B, sem outras especificações (LDGCB SOE) (32,6%), linfoma de Burkitt (17,1%), infiltrado leucêmico (14,7%), linfoma plasmablastico (7,8%) e linfoma de células NK/T (5,4%) foram os subtipos mais comuns. Os dentes envolvidos apresentaram mobilidade em 37,2% dos casos e um diagnóstico primário de doenças infecciosa/inflamatória foi considerado em 49,2% dos pacientes. A maioria dos casos eram radiolúcidos em exames periapical e panorâmico e a TC estava disponível em 76% dos casos, com um aspecto hipodenso e de bordas mal definidas. Reação periosteal foi pouco comum (4,7%). **Conclusões:** linfomas/leucemia com destruição dos ossos gnáticos usualmente representam subtipos de alto grau e raramente apresentam reação periosteal na imagem radiográfica.

Palavras-chave: Linfoma, Leucemia, Maxila, Mandíbula, Ossos maxilares, Radiografia

ABSTRACT

Radiological aspects of lymphomas and leukemias affecting the jaws

Objective: To investigate the radiographic features of lymphomas and leukemias in the jaws. **Study Design:** A systematic review was carried out in the electronic databases Pubmed, Web of Science and Scopus using specific search strategies. Inclusion criteria comprised articles that provided periapical, panoramic or computed tomography (CT) images for individual cases and diagnoses of lymphoma/leukemia confirmed by immunohistochemistry. Three experts evaluated and described individually the images and the quality of the radiographic exams. **Results:** From 1079 reports screened, 129 cases containing 88 tomographic, 77 panoramic and 26 periapical exams were selected, most of them classified as excellent (54%). Diffuse large B-cell lymphomas NOS (DLBCL), Burkitt lymphoma, leukemic infiltration, T/NK-cell lymphoma and plasmablastic lymphoma were the most common subtypes. Involved teeth presented mobility in 37.2% of the cases and a provisional diagnosis of inflammatory/infectious dental disease was considered in 49.2% of the patients. Most cases were radiolucent in plain exams and conventional CT exams were available for 76% of the cases, with hypodense aspect and ill-defined borders. Periosteal reactions were uncommon. **Conclusion:** Lymphoma/leukemia with gnathic bone destruction are usually of high-grade subtypes and rarely present periosteal reactions.

Keywords: lymphoma, leukemia, gnathic bones, imaging, periapical, panoramic, computed tomography

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LISTA DE ABREVIATURAS E SIGLAS

BL	Burkitt Lymphoma
CBCT	Cone Beam Computed Tomography
CT	Computed Tomography
DLBCL	Difuse Large B Cell Lymphoma
EBV	Epstein-Barr Virus
ECTNK-TN	Linfoma de Células NK/T Extranodal, Tipo Nasal
LDGCB	Linfoma Difuso de Grandes Células B
LH	Linfoma de Hodgkin
LNH	Linfoma Não-Hodgkin
MALT	Tecido Linfoide Associado a Mucosa
SOE	Sem Outra Especificação
TC	Tomografia Computadorizada
TCFC	Tomografia Computadorizada de Feixe Cônico

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1 CONSIDERAÇÕES INICIAIS

As neoplasias de origem linfohematopoiéticas são denominadas leucemias e linfomas. Leucemia é o termo empregado às diversas desordens malignas que se apresentam com um número aumentado de leucócitos anormais no sangue e/ou na medula óssea, enquanto que os linfomas representam neoplasias de células linfoides imaturas ou maduras, podendo ser da linhagem B, T ou NK, que deixam de exercer suas funções fisiológicas normais de defesa imunológica e exibem um crescimento descontrolado, principalmente em linfonodos, mas também em regiões extra-nodais e que se apresentam clinicamente como crescimentos sólidos (JULIUSSON; HOUGH, 2016; SWERDLOW SH *et al.*, 2017).

Os linfomas e leucemias representam um importante grupo de lesões que podem acometer a cavidade oral e as estruturas anatômicas adjacentes, incluindo os ossos maxilares, os quais podem ser afetados de forma primária por diferentes subtipos de linfomas e leucemias, ou secundariamente por meio da extensão destas lesões em direção à maxila e mandíbula.

O presente estudo representa uma continuação da linha de trabalho que objetiva melhor compreender as manifestações clínicas, microscópicas e imunoistoquímicas dos principais subtipos de linfomas orais e maxilofaciais, cujos resultados tem sido continuamente reportados na literatura por nosso grupo de trabalho ao longo dos últimos anos, na forma de séries de casos organizadas inicialmente em função dos subtipos histológicos definidos pela Organização Mundial da Saúde (DE ARRUDA *et al.*, 2021; DE SENA *et al.*, 2021) e posteriormente em função de algumas topografias anatômicas mais específicas como as glândulas salivares maiores (ARAUJO *et al.*, 2022). Ressalta-se ainda, que temos desenvolvido estudos laboratoriais que buscam avaliar as bases moleculares de alguns destes linfomas orais, com destaque para o linfoma difuso de grandes células B sem outra especificação e o linfoma plasmablastico, dois principais subtipos de linfomas em cavidade oral, cujos resultados iniciais estão sendo preparados para divulgação.

Desta forma, buscamos nesta dissertação de mestrado contribuir com a expansão desta linha de pesquisa por meio da investigação do padrão radiográfico/imaginológico dos linfomas e leucemias quando do acometimento dos ossos gnáticos. Muito pouco tem sido discutido até então sobre este assunto e acreditamos que uma análise dos casos já relatados na literatura por meio de uma

metodologia sistematizada de revisão poderá contribuir para que estomatologistas, radiologistas e patologistas orais possam aperfeiçoar suas condutas diagnósticas no contexto de pacientes afetados por estas neoplasias malignas. Além disso, entendemos que os resultados obtidos com este projeto poderão ser utilizados como referência para que novos estudos originais avaliem de forma mais detalhada os aspectos radiográficos/imaginológicos de linfomas e leucemias em maxila e mandíbula.

2 REVISÃO DE LITERATURA

O diagnóstico e classificação de leucemias e linfomas é complexo e necessita de análises microscópicas, reações imunoistoquímicas, avaliação de translocações genéticas e outros eventos moleculares, investigação da presença de agentes virais como o vírus Epstein-Barr (EBV) e o vírus da imunodeficiência humana (HIV), além de uma forte correlação com achados clínicos. Para tanto, os exames de imagem se mostram fundamentais para compreender o tamanho das lesões e os sítios que elas acometem, permitindo assim realizar um estadiamento da doença de forma mais acurada, além de contribuir com o seguimento clínico pós-terapêutico dos pacientes afetados (MACDONALD; MARTIN; SAVAGE, 2021; SWERDLOW SH *et al.*, 2017).

As leucemias podem ser classificadas de acordo com o tipo predominante de células, em mielocítica ou linfocítica, pelo estágio de diferenciação das células e considerando também o curso clínico da doença (aguda ou crônica). Elas irão acometer tanto pacientes infantis (entre um e quatro anos de vida) quanto adultos (na faixa dos 40 anos) e pacientes idosos (entre 60 e 70 anos). Além das manifestações sistêmicas, as manifestações orais incluem aumento de volume e sangramento gengival, ulcerações orais, petéquias e perda de coloração da mucosa. Estas são resultado tanto da infiltração de células leucêmicas, constituindo uma manifestação primária, quanto um reflexo das alterações sistêmicas (secundárias) (FRANCISCONI *et al.*, 2016; JULIUSSON; HOUGH, 2016). Estudos recentes demonstram que os sintomas orais são mais frequentes em leucemias agudas, podendo representar sinais suspeitos para o diagnóstico inicial da doença. Os sintomas mais comuns são o sangramento gengival e aumento de volume gengival (DE SENA *et al.*, 2021; WATSON *et al.*, 2018).

Os linfomas são originados de linfócitos, podendo ser divididos em linfoma de Hodgkin (LH) e linfoma não-Hodgkin (LNH) em função das suas características microscópicas que repercutem em diferenças biológicas e clínicas. Os LH são menos comuns e estão virtualmente restritos aos linfonodos. Os LNH podem se manifestar em sítios extra-nodais em aproximadamente 40% dos casos e compõem uma grande lista de subtipos reconhecidos pela Organização Mundial de Saúde baseado em seus achados microscópicos, características clínicas, imunofenotipagem e eventos

genéticos (KOLOKOTRONIS *et al.*, 2005; KUSUKE; CUSTÓDIO; DE SOUSA, 2019; SWERDLOW SH *et al.*, 2017). Em 2020, estima-se que 544.352 pacientes em todo o mundo foram diagnosticados com LNH e 259.793 faleceram em decorrência da doença (SUNG *et al.*, 2021). Em geral, os linfomas constituem o segundo grupo de malignidades mais comuns na região de cabeça e pescoço, inferior apenas ao grupo de malignidades de origem epitelial. É notável o linfoma difuso de grandes células B (LDGCB) como variante predominante de ocorrência em região oral e maxilofacial, seguido de outros subtipos de linfomas de células B de alto grau, como o linfoma plasmablastico e o linfoma de Burkitt, e em menor ocorrência os de baixo grau, como o linfoma folicular e o linfoma da zona marginal do tecido linfoide associado a mucosa (MALT). Os linfomas de células T correspondem a aproximadamente um terço dos subtipos que afetam a região oral, sendo o linfoma de células NK/T extranodal, tipo nasal (ECTNK-TN) o mais comum. As áreas mais acometidas são a região alveolar da gengiva e o palato, apesar de a região do anel de Waldeyer (que representa a coleção de tecido linfoide circundante à naso e orofaringe) ser o sítio mais comum de acometimento de linfomas em cabeça e pescoço (CABEÇADAS *et al.*, 2019; DE ARRUDA *et al.*, 2021; KUSUKE; CUSTÓDIO; DE SOUSA, 2019).

Aproximadamente um terço a metade dos linfomas e leucemias orais acometem os ossos maxilares e mostram alterações radiográficas significativas, podendo acometer também regiões anatômicas vizinhas como fossa nasal e seios maxilares (DE SENA *et al.*, 2021; EISENBUD *et al.*, 1984; KEMP *et al.*, 2008; MACDONALD; MARTIN; SAVAGE, 2021; VAN DER WAAL *et al.*, 2005). Em relação às características clínicas dos linfomas em maxila e mandíbula, nota-se que o aumento de volume é o sinal mais relatado em um primeiro momento, podendo haver também dor e parestesia. A parestesia é um sintoma importante em lesões que afetam mandíbula, pela anatomia do canal mandibular na região, mas também merece atenção em lesões maxilares, pela proximidade com o nervo infra-orbital, e ambos são relatados na literatura. Nos casos descritos na literatura, os pacientes notaram o aparecimento da lesão apenas um a dois meses antes de buscarem atendimento diagnóstico especializado e as primeiras hipóteses diagnósticas consideradas foram infecção dentária e carcinoma de células escamosas (LIU *et al.*, 2022; MACDONALD; LIM, 2018; MORTAZAVI *et al.*, 2020).

A literatura para análise de linfomas e leucemias acometendo os ossos maxilares, até o presente momento, é majoritariamente baseada em relatos de casos.

Alguns poucos estudos, entretanto, buscaram descrever as características radiográficas do linfoma plasmablastico (NEL *et al.*, 2021) e revisaram as características destas lesões quando presentes na forma de imagens periapicais (MORTAZAVI *et al.*, 2020). Além disso, series de casos de alguns subtipos específicos demonstraram que o linfoma de células NK/T extranodal, tipo nasal (ECTNK-TN) está usualmente associado com a presença de imagens osteolíticas na região central do palato/maxila, ao passo que pacientes afetados por linfoma de Burkitt com frequência exibem uma destruição significativa do rebordo alveolar que leva ao padrão conhecido por “dentes flutuantes” (LIU *et al.*, 2022; MACDONALD; MARTIN; SAVAGE, 2021).

As técnicas de aquisição de imagens evoluíram para o formato digital e tiveram seu acesso mais disseminado nos últimos anos, especialmente as tomografias computadorizadas de feixe cônico. Entretanto, uma melhor caracterização imaginológica de cada subtipo de linfoma ainda é escassa e necessária. A tomografia computadorizada por feixe cônico (TCFC) pode auxiliar o cirurgião-dentista a reconhecer se lesões que envolvem dentes não-vitais ou com raízes reabsorvidas em imagens convencionais teriam um aspecto sugestivo de lesões mais agressivas que possam sugerir uma natureza maligna ou inflamatória. Vale ressaltar, que os aspectos radiográficos de lesões malignas podem não receber adequada atenção se não associados a um aspecto clínico convencionalmente reconhecido como malignidade, como necrose e ulceração, que nem sempre estão presentes em manifestações orais de linfomas e leucemias (MACDONALD; LIM, 2018).

Alguns estudos que reuniram dados imaginológicos de LNH descrevem as lesões como osteolíticas, com bordas irregulares e mal definidas, densidade homogênea e envolta por massas de tecido mole (em exames de tomografias computadorizadas e ressonância magnética). Em mandíbula, as lesões se infiltram pelo longo eixo do osso, podendo estar acompanhadas por destruição da cortical ou aumento do diâmetro do canal mandibular. Os linfomas em maxila podem facilmente envolver os seios maxilares, palato duro, órbitas, cavidade nasal, fossa pterigopalatina e canal infraorbital, de forma que se torna difícil distinguir se a origem do linfoma é a região alveolar da maxila ou os seios maxilares, sendo agrupados como uma mesma entidade. Podem também ser multicêntricas, acometendo mais de uma região dos ossos gnáticos, vir acompanhados de linfadenopatia e a reação periosteal é raramente

encontrada. Por seu aspecto altamente destrutivo, quando acometem a região dos dentes, pode-se visualizar o aspecto de dentes flutuantes nas imagens, por ausência de suporte ósseo, podendo se assemelhar a doença periodontal ou lesão infecciosa (LIU *et al.*, 2022; MACDONALD; MARTIN; SAVAGE, 2021).

Em estudo focado nos aspectos radiológicos de pacientes com linfoma plasmoblástico encontrou-se imagens semelhantes às descritas, osteolíticas e com margens mal definidas, porém observou-se prevalência pela região da maxila e seios maxilares. Este subtipo pode envolver um ou mais sítios e por ter forte associação com infecções por HIV e EBV, apresenta maior prevalência em homens, que são a população prevalente destas doenças (NEL *et al.*, 2022).

As manifestações orais de leucemias, quando atingem os ossos gnáticos, têm como principais características radiográficas a expansão da cortical do osso alveolar, áreas osteolíticas, aumento do espaço do ligamento periodontal e perda da lâmina dura e moderada perda óssea angular nos dentes afetados com mobilidade (DE SENA *et al.*, 2021. QUISPE *et al.*, 2022).

Em uma primeira abordagem clínica e com exames complementares radiográficos, o diagnóstico diferencial e a escolha de conduta clínica deverão se basear na junção destes dados. Quando acometem região periapical dos dentes, lesões com as margens mal definidas, teste de sensibilidade positivo em dente acometido e mudança de posição dos dentes podem sugerir uma lesão neoplásica em detrimento de reação inflamatória (MORTAZAVI *et al.*, 2020). Lesões que acometem maxila e região sinonasal podem se assemelhar ao carcinoma de células escamosas (CCE). Radiograficamente, o CCE em geral demonstra um aspecto mais destrutivo das paredes dos seios maxilares, enquanto os LNH apresentam um crescimento mais permeativo, podendo ocasionar remodelação e esclerose óssea e geralmente mantém a integridade das paredes dos seios maxilares (KATO *et al.*, 2015; KIM *et al.*, 2018).

Por geralmente demonstrarem um crescimento rápido e sintomático, muitas vezes o cirurgião-dentista é o primeiro profissional procurado por esse paciente. Dessa forma se faz necessário que esse profissional esteja ciente dessa possibilidade diagnóstica e saiba diferenciá-la de outras entidades, como lesões reativas inflamatórias, utilizando os recursos diagnósticos disponíveis, sendo muitas vezes o

exame de imagem convencional (radiografias panorâmicas e periapicais) um dos principais e mais amplamente disponível (MACDONALD; LIM, 2018).

3 OBJETIVOS

3.1 Objetivo Geral

Descrever os aspectos radiográficos dos linfomas e leucemias nos ossos maxilares relatados na literatura.

3.2 Objetivos Específicos

- Avaliar os aspectos radiográficos dos diferentes tipos de linfoma e leucemias em maxila e mandíbula;
- Investigar as características radiográficas e tomográficas dos linfomas e leucemias em ossos maxilares em função de sua relação com os dentes adjacentes;
- Investigar as características radiográficas e tomográficas dos linfomas e leucemias em ossos maxilares em função de sua relação com a ocorrência de alterações periosteais;
- Analisar a qualidade das imagens radiográficas disponibilizadas nos artigos incluídos neste estudo.

4 METODOLOGIA EXPANDIDA

Esta revisão sistemática foi conduzida de acordo com as normas preconizadas pelo PRISMA (*Preferred Report Items for Systematic reviews and Meta-Analyses*) com a intenção de investigar as características clinorradiográficas das neoplasias malignas linfohematopoiéticas afetando os ossos gnáticos disponíveis na literatura.

4.1 Fontes de dados e estratégia de busca

Para a identificação dos artigos, buscas eletrônicas nas bases de dados PubMed, Web of Science e SCOPUS foram realizadas em julho de 2021. As estratégias de busca utilizadas em cada base de dados estão agrupadas na Tabela 1. As neoplasias de plasmócitos, como o mieloma múltiplo e o plasmocitoma, afetando a região oral e maxilofacial foram excluídos.

As referências recuperadas em cada base de dado foram exportadas para o software EndNote Web. Referências em duplicatas foram removidas após identificação.

Tabela 1 Estratégia de busca utilizada em cada base de dados eletrônica

Base de dados	Ano	Palavras- Chave
Pubmed	2008-2021	(lymphoma OR leukaemia OR leukemia) AND (mandible OR maxilla OR jaw OR gnathic OR "gnathic bones")
Web of Science	2008-2021	(lymphoma OR leukaemia OR leukemia) AND (mandible OR maxilla OR jaw OR gnathic OR "gnathic bones")
Scopus	2008-2021	(lymphoma OR leukaemia OR leukemia) AND (mandible OR maxilla OR jaw OR gnathic OR "gnathic bones")

Fonte: Elaborado pelo autor, 2022.

4.2 Critérios de elegibilidade

Foram considerados elegíveis artigos originais observacionais descritivos, como relato de casos ou série de casos, contendo diagnóstico confirmado de linfomas ou infiltrados leucêmicos em região de maxila e/ou mandíbula. Os artigos

deveriam disponibilizar informações suficientes que tornassem o diagnóstico confiável, como as imagens histológicas ou descrição apropriada dos aspectos histológicos, bem como descrevessem ou apresentassem imagens do painel imunoistoquímico realizado, permitindo determinar a natureza da doença apresentada e a confirmação diagnóstica. A disponibilização de exame radiográfico (radiografia periapical, panorâmica e/ou tomografia computadorizada) e a presença dos dados clínicos individualizados de cada paciente eram fundamentais.

Não foram considerados casos descritos com alterações em outros ossos diferentes de maxila e mandíbula ou que acometeram somente tecidos moles da região maxilo-facial sem alterações ósseas visíveis nos exames de imagem disponibilizados no artigo. Foram também excluídos aqueles casos em que a imagem não estava referenciada ao caso com suas características descritas individualmente. Revisões de literatura, resumos em congresso, pesquisas experimentais, revisões e cartas ao editor não foram consideradas e aqueles artigos cujo texto completo não pôde ser recuperado.

Casos descritos em animais, modelos animais ou cadáveres bem como em outro idioma que não português, inglês ou espanhol também não foram elegíveis para este estudo. Foram buscados artigos a partir de 2008, respeitando-se a data de publicação da quarta edição da classificação de neoplasias hematolinfoides da Organização Mundial da Saúde (SWERDLOW *et al.*, 2008). Um resumo de todos os critérios de inclusão e exclusão pode ser visto na Tabela 2.

Tabela 2 Critérios de inclusão e exclusão dos artigos

	Critérios de inclusão	Critérios de exclusão
Tipo de estudo	Relatos de casos, séries de casos	Cartas ao editor, resumo de congressos, atlas, comentários, revisões
Doença de interesse	Linfomas, infiltrados leucêmicos	Mieloma múltiplo/Plasmocitoma
Localização da doença	Ossos gnáticos (maxila e mandíbula)	Lesões somente em tecido mole, fora do complexo maxilo-facial
Diagnóstico	Painel imunoistoquímico/molecular descrito	-
Exame de imagem	Radiografia panorâmica, computadorizada	periapical, tomografia Somente Magnética, ultrassonografia
Linguagem	Inglês, Espanhol, Português	Outros idiomas
Data de publicação	A partir de 2008	Antes de 2008
Participantes	Humanos	Animais

Fonte: Elaborado pelo autor, 2022.

4.3 Seleção dos artigos

Após a remoção dos artigos duplicados, três avaliadores realizaram a leitura do título e resumo de cada artigo selecionado na busca eletrônica. Artigos que trataram do assunto abordado nesta revisão foram selecionados para leitura do texto na íntegra. Uma segunda triagem, avaliando o texto completo dos artigos e a presença de exame de imagem requerido e diagnóstico confirmado por imunoistoquímica foi realizada com a seleção final das publicações para extração de dados. Discordâncias entre os avaliadores durante as duas fases de seleção dos artigos foram resolvidas através de discussão entre os mesmos, até que se chegasse a um consenso. Nos casos em que um ou mais avaliadores discordassem, não havendo consenso entre os três, um quarto avaliador foi consultado.

4.4 Análise da qualidade dos exames radiográficos

Dos artigos com imagens radiográficas coletados, foi realizada uma nova análise e descrição desses exames, a partir da descrição e imagem fornecidas, baseada nos conhecimentos dos avaliadores. Para avaliação da qualidade das imagens disponibilizadas, foi utilizada a classificação descrita por Rodgers *et al.* (2011) que realiza uma modificação da classificação descrita em 1994 pelo *National Radiological Protection Board* (parte do *Health Protection Agency*) que também foi adotado pela *Faculty of General Dental Practice* do Reino Unido e atualizada por esse órgão em 2020 (BRITISH DENTAL ASSOCIATION, 2020; RODGERS *et al.*, 2011). Optou-se pelo uso desta classificação modificada pois ela inclui a categoria “Diagnosticamente comprometido”, que aceita imagens com pequenos erros, mas em que ainda é possível realizar o diagnóstico da área requerida, contribuindo com uma classificação mais objetiva das imagens disponibilizadas. A classificação da qualidade das imagens se encontra descrita na Tabela 3.

Tabela 3 Classificação da qualidade das imagens radiográficas

Classificação	Qualidade	Descrição
1	Excelente	Sem erros no posicionamento e preparação do paciente, exposição, processamento ou disponibilização da imagem.
2	Diagnosticamente aceitável	Alguns pequenos erros no posicionamento e preparação do paciente, exposição, processamento ou disponibilização da imagem, mas que não afetam na utilidade diagnóstica do exame.
3	Diagnosticamente comprometido	Erros mais graves estão presentes e podem comprometer a utilidade diagnóstica do exame, mas a radiografia ainda fornece algum dado diagnóstico, mesmo que limitado.
4	Inaceitável	Erros no posicionamento e preparação do paciente, exposição, processamento ou disponibilização da imagem que tornam o exame inaceitável para o diagnóstico ao qual foi realizado.

Fonte: Elaborado pelo autor, 2022.

4.5 Extração de dados dos artigos

Os dados foram extraídos por três avaliadores e anotados em planilha no Microsoft Excel (2019). As imagens de cada artigo, com seu respectivo diagnóstico, condensadas em um arquivo do Power Point (2019). Discrepâncias durante a extração de dados foram discutidas entre os três revisores até que se chegasse a um consenso e caso necessário, foram discutidos com um quarto avaliador. Foram extraídos dados bibliográficos (autores, ano de publicação, origem), dados demográficos (sexo, idade, localização da lesão), diagnóstico final, dados clínicos (dor, aumento de volume, coloração, necrose, parestesia, dentes acometidos, doença associada, exames imunohistoquímicos/moleculares e envolvimento de outros sítios), dados radiográficos (qualidade da imagem e descrição de cada imagem dos artigos, com densidade radiográfica, localização e alterações ósseas e dentárias).

Foi realizada uma análise descritiva dos dados, utilizando o programa IBM SPSS versão 22.0 e posteriormente uma avaliação analítica dos casos e imagens coletados.

5 ARTIGO

Os resultados foram escritos em forma de artigo na língua inglesa, submetido e aceito para publicação pelo periódico internacional *Journal of Oral Pathology and Medicine*. (Fator de impacto 2021: 3.539 e Qualis CAPES 2013-2016: A2).

De: JOP Editorial Office <onbehalf@manuscriptcentral.com>
Para: felipefonseca@hotmail.com <felipefonseca@hotmail.com>
Assunto: Journal of Oral Pathology and Medicine - Decision on Manuscript ID JOPM-09-22-INV-7688

Dear Dr Felipe Fonseca,

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Thank you for your fine contribution. We look forward to your continued contributions to the Journal.

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Editor-in-Chief, Journal of Oral Pathology and Medicine

RADIOLOGICAL ASPECTS OF LYMPHOMAS AND LEUKAEMIAS AFFECTING THE JAWS – A SYSTEMATIC REVIEW

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Abstract

Background: This systematic review aimed to investigate the radiological features of lymphomas and leukaemias affecting the jaws.

Methods: *A systematic literature review was conducted using the electronic databases of PubMed, Web of Science and Scopus.* Articles that contained sufficient radiographic examinations (periapical, panoramic or computed tomography (CT) images) for individual cases were included. Additionally, either immunohistochemical or molecular confirmation was required prior to inclusion. Three authors evaluated and described the image quality and radiological features.

Results: From an initial 1079 articles screened, 129 cases were included, containing 88 tomographic, 76 panoramic and 26 periapical examinations. The quality of the majority of images was sufficient for evaluation. Diffuse large B-cell lymphomas (DLBCL), Burkitt lymphoma, leukemic infiltration, plasmablastic lymphoma and extranodal NK/T-cell lymphoma, nasal type (ENKTL, NT) were the most common subtypes. Involved teeth presented with mobility in 37.2% of the cases and a provisional diagnosis of inflammatory/infectious dental disease was considered in 49.2% of cases. CT exams were available for 76% of the cases, with most presented with an osteolytic lesion with ill-defined borders. Periosteal reactions were uncommon.

Conclusion: *Lymphoma/leukaemia infiltrates of the jaw bones are usually of high-grade subtypes and rarely present with periosteal reactions.*

Keywords: lymphoma, leukaemia, jaw, mandible, maxilla, radiography.

Introduction

Haematolymphoid neoplasms are a heterogeneous group of malignancies that arise from lymphoid cells at different stages of differentiation, manifesting as various subtypes. Leukaemias have an increased number of altered cells in the circulating blood and bone marrow that may infiltrate other subsites. In contrast, lymphomas represent masses of altered lymphocytes in lymph nodes or extra-nodal regions. According to the Global Cancer Observatory (GLOBOCAN/WHO), leukaemia is the 11th highest cause of cancer-related deaths worldwide, with approximately 475,000 new cases registered in 2020. Lymphomas represent the second most common group of malignancies in the head and neck region with around 627,000 new cases registered in the same period.^{1,2} In the oral and maxillofacial (OMF) region, leukemic infiltrations and lymphomas also represent an important group of neoplasms that usually demand a complex diagnostic approach, including thorough clinical work-up, microscopic assessment, and immunohistochemical and molecular analyses.³⁻⁶ In this anatomical region, diffuse large B cell lymphoma, not otherwise specified (DLBCL, NOS) is the most commonly diagnosed haematolymphoid malignancy.³

Considering that from 29% to 48% of all OMF haematolymphoid malignancies demonstrate some form of bone involvement in either jaw bones, understanding the radiological characteristics of these neoplasms may represent useful auxiliary diagnostic tools for clinicians, maxillofacial radiologists, and ultimately oral and maxillofacial pathologists.^{7,8} Additionally, radiological features may be crucial in diagnostic investigation as hematolymphoid neoplasms may resemble a variety of other neoplastic and non-neoplastic conditions including inflammatory and infectious dental-associated diseases. Furthermore, any untimely delay in the recognition and diagnosis of these neoplasms may negatively impact the therapeutic management of affected patients.^{9,10}

Currently, the literature is scarce on describing the most common subtypes and radiological features of haematolymphoid malignancies affecting the OMF region. Therefore,

this study aimed to analyze the clinicoradiological features of malignant haematolymphoid neoplasms affecting the jaws by assessing individual case reports available in the literature following a systematic review approach.

Material and methods

This study followed the Preferred Report Items for Systematic reviews and Meta-Analyses (PRISMA) statement¹¹ intending to investigate the clinic-radiological features of malignant haematolymphoid neoplasms affecting the jaws currently available in the literature.

Search strategy

An electronic search was carried out in July 2021, limited to articles published after 2008, following the publication of the fourth edition of the World Health Organization Classification of Tumors of Hematopoietic and Lymphoid Tissues.⁵ The following electronic databases were assessed: PubMed/MEDLINE, Web of Science, and Scopus. The search strategy used in all databases comprised the following keywords: (lymphoma OR leukaemia OR leukemia) AND (mandible OR maxilla OR jaw OR gnathic OR gnathic bones). Plasma cell neoplasms such as multiple myeloma and plasmacytoma affecting the OMF region were excluded.

Eligibility criteria

Included cases comprised of lymphomas or leukaemias affecting the jaw bones with sufficient clinical, histologic, and immunohistochemical and/or molecular analysis data of each individual case to confirm their diagnoses according to the revised fourth edition of WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues.⁶ Moreover, radiographic examinations [periapical, panoramic, cone-beam computed tomography (CBCT) and/or

computed tomography (CT)] of included cases should be available for retrospective analysis and description. Randomized and controlled clinical trials, cohort studies, cross-sectional studies, case-control studies, case series and case reports published in English, Portuguese or Spanish languages were screened. Lymphoma or leukaemia cases occurring outside the jaws, cases only describing the jaw manifestations of oncologic treatments employed for the patients, publications with insufficient clinical, histologic, and immunohistochemical and/or molecular analysis to render a diagnosis of lymphoma or leukaemia, lesions affecting only soft tissues, and reports using animals, were excluded. Review publications were also excluded, unless they reported cases with sufficient information as part of the review process.

Study selection

Three authors independently screened the titles and abstracts of all articles yielded from the initial search. The studies that fulfilled the inclusion criteria, and those that did not present sufficient information in their title or abstract, were fully assessed. A cross-check assessment of articles was performed by a fourth author to ensure the correctness of included studies, as per the inclusion and exclusion criteria. Duplicate references were initially identified and removed using the EndNote program (EndNote®, Clarivate Analytics, Toronto, Canada), after which a manual review was done to remove other duplicates not initially recognized by the software.

Data extraction

Three authors independently extracted the following data from the included studies: study reference, patients' age, sex, anatomical location and diagnosis of the malignant haematolymphoid neoplasm. Information on clinical signs and symptoms, dental manifestations, initial clinical diagnosis, histopathologic and immunohistochemical/molecular

data for the correctness of final diagnosis were also collected. The same three authors jointly evaluated each of the available radiographic images of the included cases and performed a detailed description. The features analysed included: radiodensity (osteolytic or osteogenic), border definition, dental manifestations/alterations, periosteal reaction, soft tissue involvement and cortical integrity. A cross-check of the radiographic images was performed by a fourth author to ensure accurate and correct imaging descriptions for each examination.

Radiographic quality assessment

The radiographic images included were submitted to a quality assessment based on the modified classification described by Rodgers et al., itself based on the classification of 1994 from the National Radiological Protection Board and the Faculty of General Dental Practice (United Kingdom), updated in 2020.^{12,13} The images were classified into four categories according to their overall quality: excellent (no errors), diagnostically acceptable (minor errors in patient preparation, positioning, exposure, processing or digitalization that does not affect the diagnostic utility), diagnostically compromised (although more serious faults may compromise the diagnosis, the radiograph still yields some diagnostic information) and unacceptable (the image was not suitable for diagnosis). The modified classification includes the “diagnostically compromised” category, which was thought to be of importance in this study. The quality assessment of the images was performed jointly by three authors and cross-checked by a fourth author.

Analysis

Collected data was descriptively analysed using the Statistical Package for Social Sciences (SPSS) software, version 22.0 (IBM Corporation, New York, NY), and the results compiled in the following tables.

Results

Studies selection

The study selection process is summarized in **Figure 1**. The search strategy identified an initial total of 1,627 manuscripts, of which 548 were duplicated and subsequently removed. Of the 1,079 manuscripts screened, 693 were excluded for not being related to the topic, resulting in 386 articles available for full-text screening. Of those, 51 full-text articles could not be retrieved even after contacting the corresponding authors by email and 213 were excluded for not meeting the inclusion criteria. Some manuscripts (n=104) did not have radiography and/or CT/CBCT images available for analysis and 3 articles did not present the required data for individual cases (n=3). In 48 articles the neoplasm did not affect the jaw bones. Immunohistochemistry was not available in 46 cases to confirm the diagnoses. Finally, 12 manuscripts were excluded because they represented jaw bone manifestations of other diseases in lymphoma/leukemic patients, usually osteonecrosis of the jaw bones. Therefore, a total of 122 studies were included in this review, comprising a total of 129 cases.

Radiograph availability and quality assessment

From the 129 cases included in this study, more than one type of radiographic image (periapical, panoramic and CT/CBCT) was available for analysis in 53 cases. Computed tomography (CT or CBCT) images were available for 88 cases, panoramic radiographs for 77 cases and periapical radiographs for 26 cases. In addition to these imaging modalities, positron

emission tomography/CT (PET/CT) imaging was available in 22 cases, magnetic resonance imaging (MRI) in 19 cases, and a single case utilising ultrasonography. Regarding the different imaging modalities, quality assessment was performed for each image, with 54.6% of the examinations considered excellent, 33.8% were diagnostically acceptable, 11.5% as diagnostically compromised, and none considered unacceptable.

Data description

Demographic data collected from all haematolymphoid neoplasms included in this study are described in **Table 1**. DLBCL was the most common diagnosis (42 cases; 32.6%), followed by Burkitt lymphoma (22 cases; 17.1%), leukaemic infiltrate (19 cases; 14.7%), plasmablastic lymphoma (10 cases; 7.8%) and extranodal NK/T-cell lymphoma, nasal type (ENKTL, NT) (7 cases; 5.4%). There was a male predominance in each subgroup as well as a total male preponderance (82 cases; 64.0%), especially in cases of plasmablastic lymphoma (9:1). The mean age at presentation was significantly lower in Burkitt lymphoma (21 years) compared to the other categories and overall mean age (42 years). Most cases affected adults (98 cases; 77.2%), while infants and adolescents were affected in 22.8% of the cases. There was a similar distribution regarding maxilla (44.2%) and mandible (47.3%), while few cases affected both jaws simultaneously (9 cases; 7.0%). While all subtypes had a similar mandibular/maxillary distribution, ENKTL NT affected only the maxilla. The involvement of other sites, such as bone marrow dissemination or other solid organs, was reported in 38.6% of cases, occurring in more than half of the Burkitt lymphoma and leukaemia cases reported.

Clinical manifestations, dental manifestations and dental treatment reported are described in **Table 2**. The presence of local swelling was the most common manifestation (117 cases; 90.7%), followed by pain in 53.5% of the cases and erythema in 56 cases (43.4%). Paresthesia was reported in 33 cases (25.6%), with three cases defined clinically as presenting

with “numb chin syndrome”. The occurrence of B symptoms, such as fever, night sweats and unintentional weight loss, was present in 22.5% of the cases.

Most of the publications did not report any dental manifestation (58 cases; 45.0%), whereas others reported one or more dental alterations, in most instances tooth mobility (48 cases; 37.2%). Some form of dental pain or tooth/teeth sensitivity on percussion was described in 26 cases (20.2%). Tooth displacement or unerupted teeth related to the lesion were less common (7 cases; 5.4%). Regarding dental treatment, most cases were not treated (66 cases; 52.4%). Tooth extraction (36 cases; 28.6%) and the use of medications (19 cases; 15.1%) were also reported, as well as endodontic therapy (14 cases; 11.1%) or drainage (6 cases; 4.8%) and periodontal treatment (4 cases; 3.2%).

A summary of radiological features of included cases are described in **Table 3**. Regarding the three-dimensional exams, 76.1% of the CT exams included in this study represented multi-slice acquisitions, while 23.9% represented images attained from CBCT imaging. In four of the panoramic examinations, there was no evidence of a lesion. Jaw lymphomas and leukaemias most frequently presented as osteolytic lesions (86.0%) with ill-defined borders (79.1%). Only DLBCL and leukaemic infiltrate presented with an osteogenic appearance. Approximately a third of Burkitt lymphomas and other lymphomas presented with well-defined borders. Effects on the surrounding teeth were uncommon, with 52 cases (40.3%) showing no evidence of tooth alteration, occurring especially in cases of ENKTL, NT and plasmablastic lymphoma.

The most commonly described effect on surrounding teeth included a loss of lamina dura (17.1%), floating tooth/teeth (14.0%) and periodontal space enlargement (12.4%). A periapical lesion appeared in 11.6% of the cases analyzed and some degree of bone loss (9.3%), root resorption (3.9%) and tooth displacement (7.0%) were also reported. Enlargement of the periodontal space and periapical lesions were more common in leukaemic infiltrate, whereas

the so-called floating tooth was more commonly seen in cases of BL. There was no evidence of periosteal reactions seen on any of the available panoramic radiographs. Six cases (4.7%) showed signs of periosteal reactions on CT/CBCT imaging. On CT/CBCT imaging, most cases had some form of soft tissue involvement (81.8%). The disruption of cortical plates was seen in 86.2% of the cases, highlighting the occurrence in all cases of plasmablastic lymphoma analyzed.

Authors of case reports usually provide feedback on the diagnostic work-up of the case, often providing provisional initial diagnoses. Most cases were initially thought to be of inflammatory or infectious origin (63 cases; 49.2%), whereas in 13 cases (10.2%) the clinician considered the lesion to be a malignant process. Four cases (3.1%) were thought to represent an odontogenic cyst or tumour, whereas two cases (1.6%) were described as a reactive hyperplastic lesion. Six cases (4.7%) were described as other diseases on initial clinical examination.

TABLE 1. Summary of demographic data of the lymphoma/leukaemia cases included in this study

Demographic variables N (%)	DLBCL	BL	LI	PL	ENKTL, NT	OL	All cases
Diagnosis N (%)	42 (32.6)	22 (17.1)	19 (14.7)	10 (7.8)	7 (5.4)	29 (22.5)	129 (100)
Sex (M/F) ¹	23/19	14/8	12/6	9/1	4/3	20/9	82/46
Mean age (years) ²	56	21	34	46	48	39	42
Child and adolescent (0-18)	2 (4.8)	12 (54.5)	7 (38.9)	0	0	8 (27.6)	29 (22.8)
Adult (>19)	40 (95.2)	10 (45.5)	11 (61.1)	9 (100)	7 (100)	21 (72.4)	98 (77.2)
Location							
Maxilla	17 (40.5)	9 (40.9)	6 (31.6)	5 (50.0)	7 (100.0)	13 (44.8)	57 (44.2)
Mandible	25 (59.5)	10 (45.5)	9 (47.4)	4 (40.0)	0	13 (44.8)	61 (47.3)
Maxilla and Mandible	0	3 (13.6)	3 (15.8)	1 (10.0)	0	2 (6.9)	9 (7.0)
TMJ	0	0	1 (5.3)	0	0	1 (3.4)	2 (1.6)
Other sites involvement ²	11 (26.2)	12 (54.5)	9 (52.9)	3 (30.0)	3 (42.9)	11 (37.9)	49 (38.6)

DLBCL: Diffuse large B-cell lymphoma. BL: Burkitt lymphoma. LI: Leukaemic infiltrate. PL: Plasmablastic lymphoma. ENKTL, NT: Extranodal NK/T-cell lymphoma, nasal type. OL: Other lymphomas.

¹Not described in 1 case.

²Not described in 2 cases.

TABLE 2. Summary of clinical data of the lymphoma/leukaemia cases included in this study

Clinical data N (%)	DLBCL	BL	LI	PL	ENKTL, NT	OL	All cases
Clinical manifestations							
Pain	24 (57.1)	14 (63.6)	10 (52.6)	5 (50.0)	3 (42.9)	13 (44.8)	69 (53.5)
Swelling	39 (92.9)	21 (95.5)	17 (89.5)	9 (90.0)	6 (85.7)	25 (86.2)	117 (90.7)
Erythema	16 (38.1)	10 (45.5)	6 (31.6)	7 (70.0)	5 (71.4)	12 (41.4)	56 (43.4)
Necrosis/Ulceration	16 (38.1)	9 (40.9)	4 (21.1)	6 (60.0)	6 (85.7)	10 (34.5)	51 (39.5)
Paraesthesia	11 (26.2)	7 (31.8)	4 (21.1)	2 (20.0)	1 (14.3)	8 (27.6)	33 (25.6)
B symptoms	6 (14.3)	6 (27.3)	7 (36.8)	3 (30.0)	3 (42.9)	4 (13.8)	29 (22.5)
Dental manifestations N (%)¹							
None	15 (36.6)	8 (36.4)	5 (26.3)	5 (50.0)	6 (85.7)	18 (62.1)	58 (45.0)
Mobility	15 (36.6)	10 (45.5)	12 (63.2)	4 (40.0)	0	7 (24.1)	48 (37.2)
Sensitivity/dental pain	13 (31.7)	4 (18.2)	3 (15.8)	2 (20.0)	1 (14.3)	3 (10.3)	26 (20.2)
Tooth displacement	4 (9.8)	0	1 (5.3)	0	0	2 (6.9)	7 (5.4)
Dental treatment N (%)²							
None	16 (39.0)	13 (59.1)	10 (58.8)	5 (50.0)	3 (42.9)	17 (58.6)	66 (52.4)
Tooth extraction	11 (26.8)	6 (27.3)	5 (29.4)	5 (50.0)	2 (28.6)	7 (24.1)	36 (28.6)
Medication	5 (12.2)	2 (9.1)	2 (11.8)	1 (10.0)	2 (28.6)	7 (24.1)	19 (15.1)
Endodontic treatment	9 (22.0)	1 (4.5)	0	0	0	4 (13.8)	14 (11.1)
Drainage	4 (9.8)	1 (4.5)	0	0	0	1 (3.4)	6 (4.8)
Periodontal treatment	2 (4.9)	1 (4.5)	0	0	0	1 (3.4)	4 (3.2)

DLBCL: Diffuse large B-cell lymphoma. BL: Burkitt lymphoma. LI: Leukaemic infiltrate. PL: Plasmablastic lymphoma. ENKTL, NT: Extranodal NK/T-cell lymphoma, nasal type. OL: Other lymphomas.

¹Not described in 2 cases.

²Not described in 3 cases.

TABLE 3. Radiographic aspects of the lymphoma/leukaemia cases observed in periapical, panoramic and CT/CBCT imaging studies.

RADIOGRAPHIC ASPECTS N (valid %)	DLBCL	BL	LI	PL	ENKTL, NT	OL	All cases
Radiodensity							
Osteolytic ¹	36 (85.7)	20 (90.9)	15 (78.9)	10 (100)	5 (71.4)	25 (86.2)	111 (86.0)
Osteogenic ²	4 (9.5)	0	2 (10.5)	0	0	0	6 (4.7)
Mixed	2 (4.8)	0	2 (10.5)	0	1 (14.3)	3 (10.3)	8 (6.2)
No evidence of lesion	0	2 (9.1)	0	0	1 (14.3)	1 (3.4)	4 (3.1)
Border definition							
Ill-defined	36 (85.7)	15 (68.2)	16 (84.2)	8 (80.0)	6 (85.7)	21 (72.4)	102 (79.1)
Well defined	6 (14.3)	7 (31.8)	3 (15.8)	2 (20.0)	1 (14.3)	8 (32.0)	27 (20.9)
Effect on surrounding teeth							
Periodontal space enlargement	6 (14.3)	3 (13.6)	4 (21.1)	1 (10.0)	0	2 (6.9)	16 (12.4)
Loss of lamina dura	8 (19.0)	6 (27.3)	3 (15.8)	0	0	5 (17.2)	22 (17.1)
Floating tooth	7 (16.7)	5 (22.7)	2 (10.5)	1 (10.0)	0	3 (10.3)	18 (14.0)
Root resorption	1 (2.4)	2 (9.1)	2 (10.5)	0	0	0	5 (3.9)
Bone loss	5 (11.9)	3 (13.6)	2 (10.5)	0	0	2 (6.9)	12 (9.3)
Periapical lesion	3 (7.1)	2 (9.1)	4 (21.1)	1 (10.0)	0	5 (17.2)	15 (11.6)
Tooth displacement	3 (7.1)	1 (4.5)	3 (15.8)	0	1 (14.3)	1 (3.4)	9 (7.0)
No tooth alteration	15 (35.7)	7 (31.8)	4 (21.1)	7 (70.0)	6 (85.7)	13 (44.8)	52 (40.3)
Effect on surrounding bone							
With periosteal reaction	1 (2.4)	0	4 (21.1)	0	0	1 (3.4)	6 (4.7)
Cortical disruption	27 (87.1)	11 (84.6)	8 (80.0)	8 (100)	4 (66.7)	17 (89.5)	75 (86.2)
Provisional diagnosis							
Same as final diagnosis	10 (23.8)	6 (28.6)	8 (42.1)	6 (60.0)	1 (14.3)	9 (31.0)	40 (31.3)
Inflammatory/infectious disease	22 (52.4)	9 (42.9)	8 (42.1)	2 (20.0)	5 (71.4)	17 (58.6)	63 (49.2)
Malignant disease	4 (9.5)	4 (19.0)	2 (10.5)	2 (20.0)	0	1 (3.4)	13 (10.2)
Odontogenic cyst/tumour	2 (4.8)	2 (9.5)	0	0	0	0	4 (3.1)
Reactive hyperplastic lesion	2 (4.8)	0	0	0	0	0	2 (1.6)
Other	2 (4.8)	0	1 (5.3)	0	1 (5.3)	2 (6.9)	6 (4.7)

DLBCL: Diffuse large B-cell lymphoma. BL: Burkitt lymphoma. LI: Leukaemic infiltrate. PL: Plasmablastic lymphoma. ENKTL, NT: Extranodal NK/T-cell lymphoma, nasal type. OL: Other lymphomas.

¹Osteolytic describes radiolucent on periapical or panoramic radiographs and hypodense on CT/CBCT imaging.

²Osteogenic describes radiopaque on periapical or panoramic radiographs and hyperdense on CT/CBCT imaging.

Discussion

Lymphomas and leukaemic infiltration affecting the oral cavity and jaw bones represent an important group of malignant neoplasms usually observed in the gingiva and palate. Although these neoplasms are rare in the jaws, their radiological features may contribute to a final diagnosis.^{3,4} In this study DLBCL was the most common lymphoma affecting the jaws, while Burkitt lymphoma also represented another frequent subtype. Patients affected by this subtype were younger than those affected by DLBCL, consistent with the general epidemiological distribution of lymphomas subtypes in the head and neck region.^{3,14} Leukaemic infiltrations were also reported, mostly in the form of myeloid sarcomas.

We observed that the mandible and maxilla are frequently involved by high-grade lymphoma subtypes, with both being equally affected, as previously reported in the literature (**Figures 2 and 3**).^{3,4,15} Most lymphomas involving the jaws are frequently associated with teeth, either causing tooth displacement, mobility or pain.^{9,16} This presentation can lead to inappropriate dental treatment due to inflammatory conditions, especially when the lesion was located at the tooth root apex. Consequently, dental extractions, endodontic treatments, periodontal therapy and the use of different medications were some of the initial treatment options in these patients, with a resultant negative impact on patients. Therefore, appropriate clinicoradiological correlation with subsequent histopathologic evaluation of lesions that do not follow the expected clinical behaviour are mandatory.

Quality radiographs and CT imaging are mandatory to perform accurate interpretations of the lesions and identify subtle characteristics useful in formulating a differential diagnosis. The study attempted to evaluate if images available in the literature were satisfactory for the readers to perform their own interpretation. The availability, accuracy and detailed description of radiographic examinations in cases of lymphoma/leukaemia in the jaw bones are scarce.¹⁰ We observed that most images available in the literature were considered excellent, but a large

number of articles still presented acceptable or diagnostically compromised images. The most common limitations included image distortions (in acquisition or availability), poor digitalization and resolution, alterations in balance and contrast, and inadequate field of view. With the use of digital imaging modalities, some quality limitations are minimized. However, authors should still be cognizant of the overall quality of images submitted for publication. The radiographic presentation of lymphomas and leukaemias affecting the jaws often varies with many cases resembling reactive/inflammatory dental processes, which may ultimately lead to a misdiagnosis.

In our study, a radiolucent image predominated, with rare examples containing radiopaque foci, likely representing a reactive osseous process or soft tissue enlargement. The only true mixed (radiopaque and radiolucent) lesion present in a periapical image represented a myeloid sarcoma in which the mandibular trabeculae were more radiopaque with areas of patchy radiolucencies.¹⁷ Cases described as radiopaque or mixed in panoramic images represented maxillary sinus opacification.¹⁸⁻²² Radiographic imaging typically revealed a locally destructive pattern, with ill-defined borders and tumour extension to adjacent structures in many instances. This tumour extension often resulted in difficulty establishing the primary location of the neoplasm.²³

The occurrence of periodontal ligament space enlargement is frequently reported in cases of osteosarcoma but may also be observed in cases of lymphoma. Therefore, periodontal ligament space involvement, with or without effacement of the lamina dura, should prompt the clinician to include a haematolymphoid neoplasm in the differential diagnosis. On the contrary, root resorption was uncommon in this study, suggesting that haematolymphoid neoplastic cells likely permeate dental structures rather than causing outright root resorption.^{9,24} Periosteal reactions were also uncommon,²³ and from the six cases in the current study, four represented leukemic infiltrates. The periosteal reactions included a spiculated (or “sunburst”) pattern, with

one case showing a so-called Codman triangle periosteal reaction. These alterations were better demonstrated using CT imaging; however, if CBCT imaging were more used in more studies, the incidence of periosteal reactions may be more prevalent, as it represents a more sensitive technique for dental and jaw bone evaluations. Furthermore, the characteristic floating tooth/teeth pattern usually described in cases of Burkitt lymphoma were also found in other lymphoma subtypes.^{25,26} This feature however was still most commonly seen in BL. Another noteworthy finding was the presence of bone involvement in cases of plasmablastic lymphoma, as recently described by Nel et al.²⁷ who showed a predilection for the posterior region of the maxilla.²⁸ Plasmablastic lymphoma bone involvement presented radiologically with poorly demarcated borders, loss of cortical integrity and cortical erosion or destruction, rather than cortical expansion. These features may be important to differentiate from cases of multiple myeloma, which more commonly manifest as intrabony lesions.²⁹

We found that radiological features alone could not reliably differentiate the lymphoma subtypes. Additionally, literature almost always reported high-grade variants of lymphoma affecting the jawbones. Very rare low-grade lymphoma was reported to involve either the mandible or the maxilla, which paired with other clinical information could assist clinicians in formulating a differential diagnosis. For instance, extranodal NK/T cell lymphoma, nasal type usually presents with mid-palate destruction that cannot be easily observed using a conventional panoramic radiograph. However, this palatine bony destruction is well illustrated using CT imaging and together with its clinical manifestation, may lead to correct clinical diagnosis.¹⁵

In conclusion, it was not possible to find specific radiographic features to differentiate lymphoma subtypes when affecting the jaw bones. We demonstrated that when the jaws are involved by these haematolymphoid malignancies, they usually represent high-grade subtypes, predominantly representing DLBCL, Burkitt lymphoma, T/NK-cells lymphomas, plasmablastic lymphomas, and leukemic infiltrates. Clinicians must be aware that although

uncommon, lymphomas/leukemic infiltrates involving the jaws may also cause periodontal space enlargement and periosteal reactions, and that when closely associated with teeth, radiographic imaging may frequently lead to misdiagnoses. The most common radiological features include an ill-defined osteolytic lesion with frequent reports of cortical disruption. These features are however non-specific which resulted in the presumptive diagnosis simulating an inflammatory process in almost half the cases.

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Figures legends

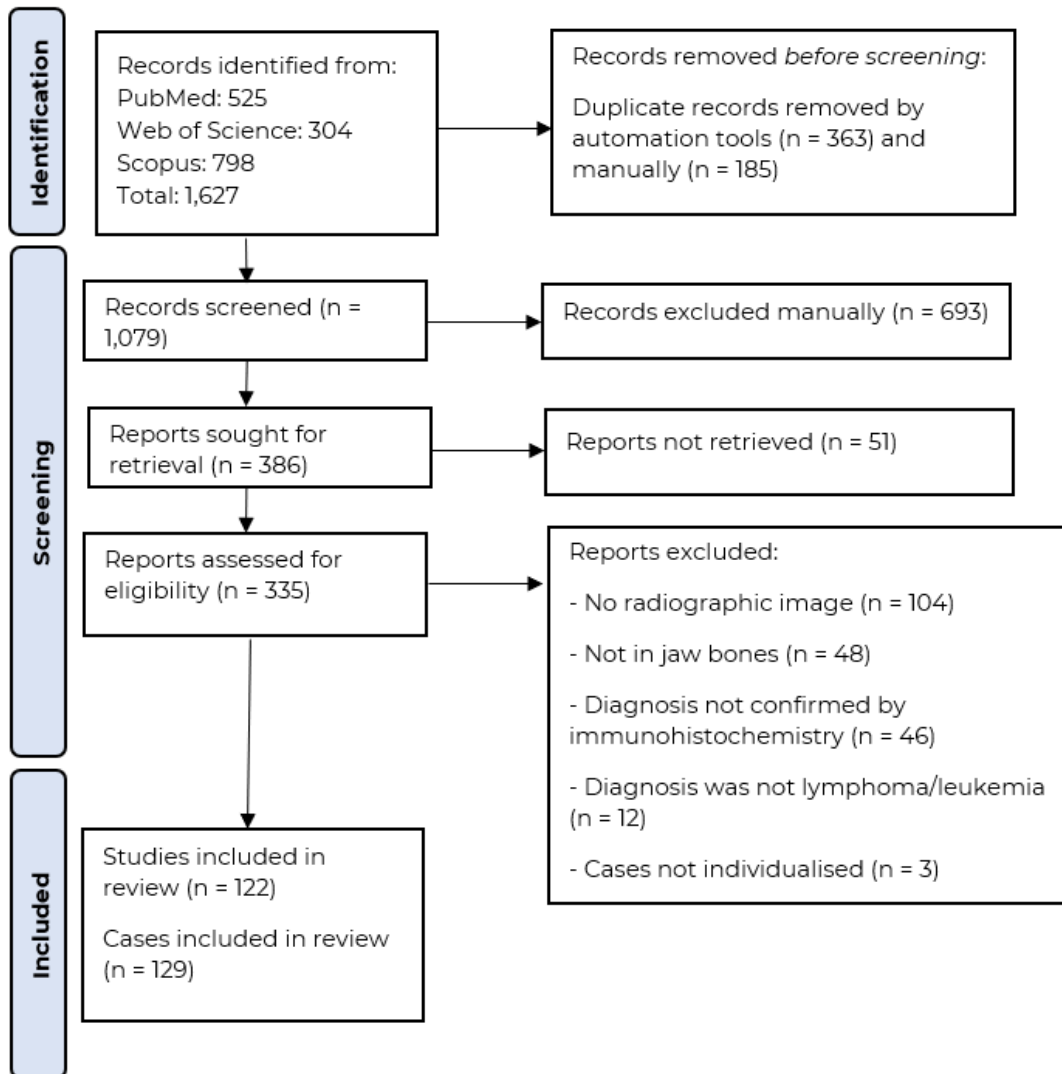


Figure 1. Screening process applied for the current study.

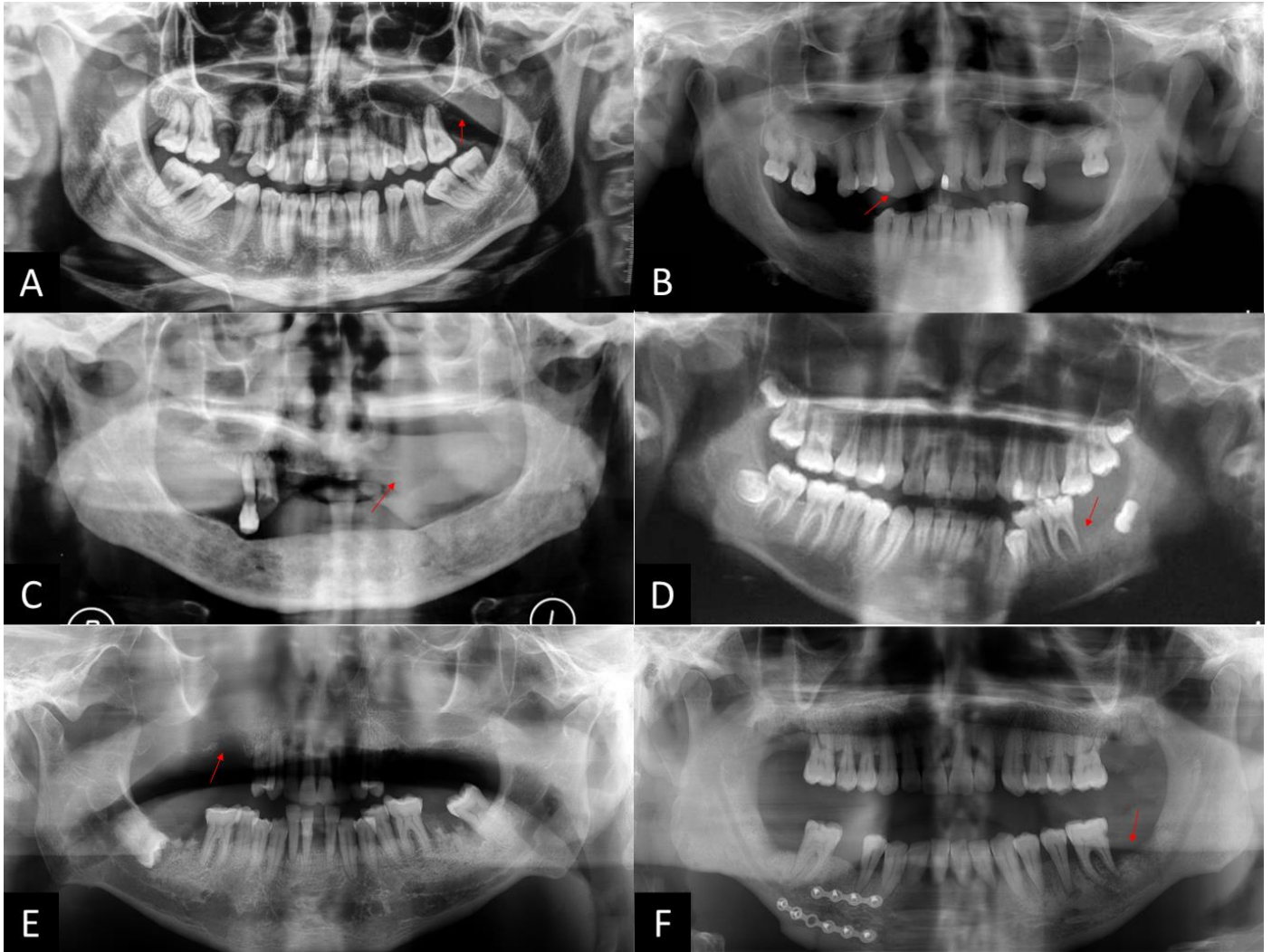


Figure 2. Radiographic findings of lymphomas affecting the jaws observed in panoramic images. **A)** Case diagnosed as plasmablastic lymphoma with a radiolucent destruction in the posterior region, left side of the maxilla (red arrow). **B)** Case diagnosed as DLBCL, NOS affecting the maxilla leading to a floating tooth aspect of the tooth 12 (red arrow). **C)** Case diagnosed as DLBCL, NOS with radiolucency and destruction of the anterior and posterior left edentulous maxilla, with radiopacity in the left maxillary sinus (red arrow). **D)** Case diagnosed as a Burkitt lymphoma with a radiolucent ill-defined destruction of the alveolar bone in the left side of the mandible leading to a floating tooth aspect (red arrow). **E)** Case diagnosed as plasmablastic lymphoma affecting the posterior right maxilla (red arrow), resulting in encroachment and opacification of the right maxillary sinus and destruction of the orbital floor and lateral nasal border. **F)** Case diagnosed as plasmablastic lymphoma affecting the left side

of the mandible (red arrow). The lesion had a distinct soft tissue outline with erosion of the underlying bone and enlargement of the periodontal space of tooth 36.

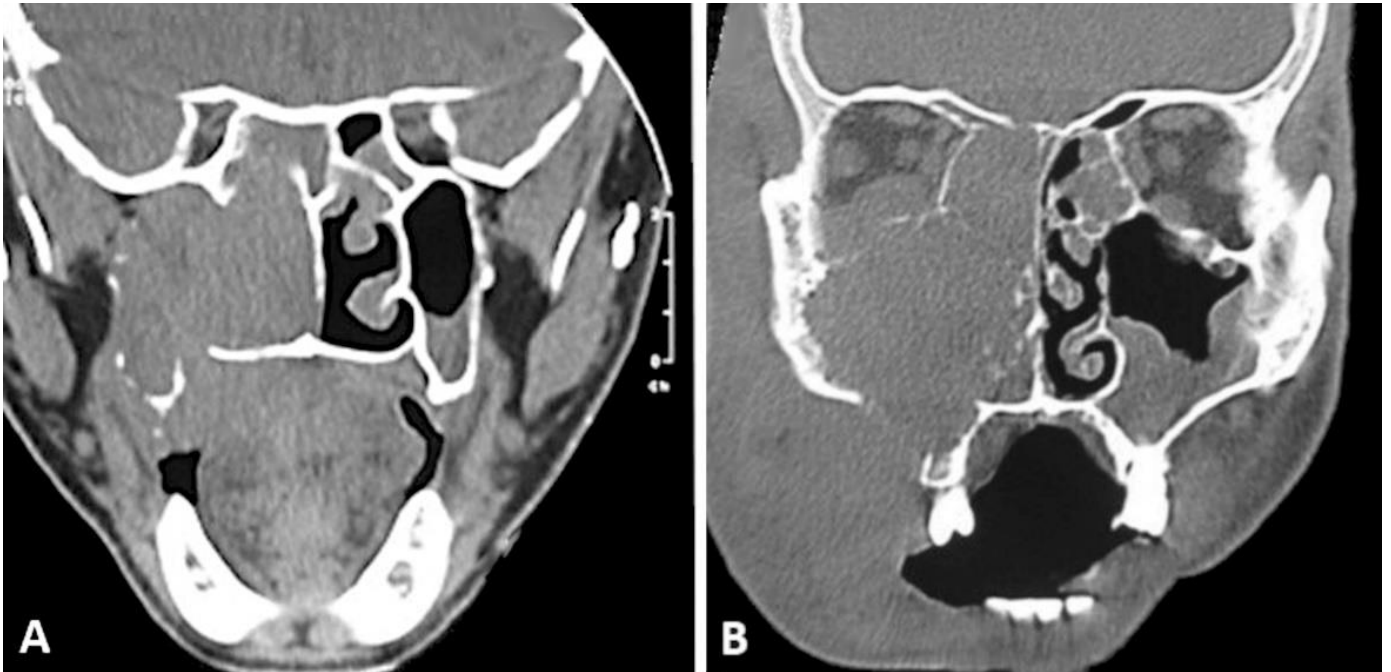


Figure 3. Coronal view of multislice computed tomography. **A)** Case of DLBCL, NOS with hypodensity and disruption of right maxillary sinus walls, with opacification with soft tissue density in right maxillary sinus and nasal cavity extending towards the palate. **B)** Case of plasmablastic lymphoma with hypodensity and disruption of right maxillary sinus walls, inferior orbital wall, with opacification with soft tissue density in right maxillary sinus, ethmoid cells and nasal cavity. The tumor extended to the oral cavity through destruction of maxillary bone.

Supplementary file 1. Full data obtained from the studies included in the current systematic review. (ANEXO A)

Supplementary file 2. PRISMA 2020 checklist. (ANEXO B)

Data availability statement

Full data obtained for this review is available as Supplementary file 1.

Author contribution statement

All authors substantially contributed with the conception and design, or acquisition of data, or analysis and interpretation of data, have been involved in drafting the manuscript or revising it critically for important intellectual content. All authors have given final approval of the version to be published and each author participated sufficiently in the work to take public responsibility for appropriate portions of the content; and all authors agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

5 CONSIDERAÇÕES FINAIS

Os linfomas e leucemias representam um importante grupo de neoplasias malignas que afetam a cavidade oral. Apesar de seu acometimento ósseo ser menos comum, suas características imaginológicas e dados clínicos, podem auxiliar o processo diagnóstico. Neste estudo foi observado que o envolvimento da maxila e mandíbula é mais comum nos subtipos de linfoma de alto grau, podendo se assemelhar a processos de origem dentária, inflamatório ou odontogênico, e levar a um diagnóstico inicial impreciso.

Em geral, as lesões apresentaram um padrão destrutivo, com bordas mal definidas. Não foram identificadas características imaginológicas que permitissem diferenciar os subtipos de linfoma de forma precisa. Os dentes flutuantes (“floating tooth”) considerados característicos do linfoma de Burkitt foram encontrados também em outros subtipos. Os linfomas de células NK/T extranodais tipo nasais são caracterizados pela destruição nasopalatina, que pode ser melhor observada em exames de TC em detrimento às radiografias panorâmicas.

Quando acometem a região das raízes dentárias, os linfomas/leucemias podem se assemelhar à lesões periapicais, doença periodontal ou infecções odontogênicas, causando dor ou mobilidade dental. Estes sinais levam ao tratamento preconizado para essas doenças, que se mostra inapropriado e não responsivo, levando ao atraso no diagnóstico da neoplasia. O aspecto radiopaco é raro, geralmente visto como uma opacificação dos seios maxilares ao exame panorâmico, bem como a reação periosteal, melhor visualizada na TCFC. A qualidade dos exames radiográficos para publicações deve ser criteriosamente observada, assim como sua adequada descrição.

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WATSON, E., WOOD, R.E., MAXYMIW, W.G. AND SCHIMMER, A.D. **Prevalence of oral lesions in and dental needs of patients with newly diagnosed acute leukemia.** Journal of the American Dental Association, v. 149, n. 6, p. 470–480, 1 jun. 2018.

ANEXO A – Supplementary table 1

CASE REFERENCE	CASE NUMBER	DEMOGRAPHIC				
		DIAGNOSIS	SEX	AGE	LOCATION	OTHER SITES INVOLVEMENT
Benites BM, Miranda-Silva W, Rocha AC, Passos UL, Fonseca FP, da Silva CAR, Fregnani ER. Late recurrence of Burkitt's lymphoma in the jaw: numb chin syndrome as the only symptom. <i>Autops Case Rep.</i> 2020 Dec 8;11:e2020218.	1	BURKITT LYMPHOMA	FEMALE	58	MANDIBLE	NO
De Coninck W, Govaerts D, Bila M, Vansteenkiste G, Uyttebroeck A, Tousseyn T, Politis C. Burkitt lymphoma in children causing an osteolytic lesion in the mandible: A case report. <i>Clin Case Rep.</i> 2020 Dec 25;9(2):938-943.	2	BURKITT LYMPHOMA	FEMALE	7	MANDIBLE	YES
de Freitas Filho SA, Moura LL, de Souza MC, Rubira CM, Oliveira DT. Bilateral jaws involvement of Burkitt's lymphoma in a pediatric patient. <i>J Clin Exp Dent.</i> 2021 Mar 1;13(3):e323-e327. doi: 10.4317/jced.57740.	3	BURKITT LYMPHOMA	MALE	5	MAXILA AND MANDIBLE	NO
Nosrat A, Verma P, Glass S, Vigliante CE, Price JB. Non-Hodgkin Lymphoma Mimicking Endodontic Lesion: A Case Report with 3-dimensional Analysis, Segmentation, and Printing. <i>J Endod.</i> 2021 Apr;47(4):671-676.	4	DLBCL	FEMALE	40	MAXILA	NO
Ohashi N, Iwai T, Nakamori Y, Iida M, Osawa K, Sugiyama S, Kitajima H, Minamiyama S, Yamanaka S, Shiba N, Mitsudo K. Sporadic Burkitt lymphoma initially presented as orofacial manifestations in an 8-year-old boy: A case report and mini-review. <i>Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology.</i> 2021 Mar 1;33(2):204-10.	5	BURKITT LYMPHOMA	MALE	8	MAXILA	YES
Parker WD, Jones K. Burkitt's lymphoma: an unexpected cause of dental pain. <i>J Surg Case Rep.</i> 2021 Feb 15;2021(2):rjaa557.	6	BURKITT LYMPHOMA	FEMALE	37	MANDIBLE	NO
Yılmaz B, Somay E, Hasbay B. A Rare Case of Burkitt Lymphoma in a 13-year-girl. <i>J Pediatr Res</i> 2021;8(2):202-5.	7	BURKITT LYMPHOMA	FEMALE	13	MAXILA AND MANDIBLE	YES
Coskunes FM, Cilasun Ü, Tokuc B. Primary diffuse large B-cell lymphoma of the mandible: A case report. <i>Gerodontology.</i> 2020 Sep 1;37(3):307-11.	8	DLBCL	FEMALE	82	MANDIBLE	YES
Deliverska E, Hadjiev E, Stefanov L, Tsvetkova G, Bekirova E, Parusheva S. Primary Extranodal Non-Hodgkin's Lymphoma Involving Right Maxilla. <i>Journal of IMAB—Annual Proceeding Scientific Papers.</i> 2020 Jun 11;26(2):3187-93.	9	DLBCL	FEMALE	58	MAXILA	NO
Goutzanis L, Apostolidis J, Giatra C, Chrysomali E, Deskos D. A case of systemic precursor T-cell lymphoblastic lymphoma presenting with single tooth mobility. <i>SAGE Open Medical Case Reports.</i> 2020 Jun;8:2050313X20927961.	10	OTHER LYMPHOMA	MALE	20	MANDIBLE	YES

Karadwal A, Chatterjee S, Pathak K, Sabharwal R. Diffused mixed B-cell non-Hodgkin lymphoma of mandible. Journal of Oral and Maxillofacial Pathology: JOMFP. 2020 Feb;24(Suppl 1):S77.	11	DLBCL	MALE	50	MANDIBLE	NO
Musbah T, Omami G. Ill-defined lytic mandibular lesion. The Journal of the American Dental Association. 2020 Sep 1;151(9):692-5.	12	DLBCL	FEMALE	69	MANDIBLE	YES
Oueslati Y, Chebil RB, Abidi I, Sriha B, Khochtali H, Oualha L, Douki N. Mandibular non-Hodgkin's lymphoma: two observations of a challenging disease. The Pan African Medical Journal. 2020;37. (case 1)	13	DLBCL	FEMALE	72	MANDIBLE	YES
Oueslati Y, Chebil RB, Abidi I, Sriha B, Khochtali H, Oualha L, Douki N. Mandibular non-Hodgkin's lymphoma: two observations of a challenging disease. The Pan African Medical Journal. 2020;37. (case 2)	14	BURKITT LYMPHOMA	MALE	16	MANDIBLE	YES
Shilkofski JA, Khan OA, Salib NK. Non-Hodgkin's lymphoma of the anterior maxilla mimicking a chronic apical abscess. Journal of Endodontics. 2020 Sep 1;46(9):1330-6.	15	DLBCL	MALE	72	MAXILA	NO
Silveira HA, Sousa LM, Silva EV, Almeida LK, Sverzut CE, Trivellato AE, León JE. Primary intraosseous CD9-positive B-cell lymphoblastic lymphoma of the maxilla affecting a pediatric patient: Immunohistochemical and in situ hybridization analysis. Oral Oncology. 2020 Sep 1;108:104910.	16	OTHER LYMPHOMA	FEMALE	14	MAXILA	NO
Singh AK, Agrawal R, Janani T, Kumar K. Extranodal diffuse large B cell Non-Hodgkin's lymphoma of maxilla: An immunohistochemical study based diagnostic approach. Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology. 2020 Mar 1;32(2):167-70.	17	DLBCL	MALE	80	MAXILA	NO
Sundaresan PD, Foo M. Incidental finding of monoclonal B-cell lymphocytosis in the mandible. BMJ Case Reports CP. 2020 Sep 1;13(9):e232339.	18	LEUKAEMIA INFILTRATE	MALE	78	MANDIBLE	NO
Alvarez W, Lai LH, Grant SJ, Sabath DE, Dillon J. Burkitt lymphoma of the maxilla in a HIV positive male—Presentation and review of diagnostic laboratory tests. Oral and maxillofacial surgery cases. 2019 Sep 1;5(3):100113.	19	BURKITT LYMPHOMA	MALE	31	MAXILA	YES
Janardhanan M, Suresh R, Savithri V, Veeraraghavan R. Extranodal diffuse large B cell lymphoma of maxillary sinus presenting as a palatal ulcer. BMJ Case Reports CP. 2019 Feb 1;12(2):bcr-2018.	20	DLBCL	FEMALE	32	MAXILA	NO
Lapthanasupkul P, Songkapol K, Boonsiriseth K, Kitkumthorn N. Anaplastic large cell lymphoma of the palate: A case report. Journal of Stomatology, Oral and Maxillofacial Surgery. 2019 Apr 1;120(2):172-5.	21	OTHER LYMPHOMA	FEMALE	55	MAXILA	YES
Ma L, Xing Z, Yang L, Xiao T, Wang Z, Al-Moraissi EA. Primary extranodal non-Hodgkin's lymphoma of the mandibular	22	OTHER LYMPHOMA	MALE	19	ATM	NO

condyle: A case report and literature review. Oral and Maxillofacial Surgery Cases. 2019 Dec 1;5(4):100130.						
Silva RN, Mendonça EF, Batista AC, Alencar RD, Mesquita RA, Costa NL. T-cell/histiocyte-rich large B-cell lymphoma: report of the first case in the mandible. Head and Neck Pathology. 2019 Dec;13(4):711-7.	23	OTHER LYMPHOMA	FEMALE	29	MANDIBLE	YES
Siqueira JM, Fernandes PM, de Oliveira AC, Vassallo J, de Abreu Alves F, Jaguar GC. Primary diffuse large B-cell lymphoma of the mandible. Autopsy & Case Reports. 2019 Jul;9(3).	24	DLBCL	MALE	51	MANDIBLE	NO
Abdelwahed Hussein MR. Non-Hodgkin's lymphoma of the oral cavity and maxillofacial region: a pathologist viewpoint. Expert Review of Hematology. 2018 Sep 2;11(9):737-48.	25	EN NK/T-CELL LYMPHOMA	MALE	40	MAXILA	NO
Cabras M, Arduino PG, Chiusa L, Broccoletti R, Carbone M. Case report: Sporadic Burkitt Lymphoma misdiagnosed as dental abscess in a 15-year-old girl. F1000Research. 2018;7.	26	BURKITT LYMPHOMA	FEMALE	15	MAXILA	YES
Cho BH, Shin DH, Jung YH, Park HR. Widely disseminated sporadic Burkitt lymphoma initially presented as oral manifestations in a 6-year-old boy. Journal of oral biology and craniofacial research. 2018 May 1;8(2):140-2.	27	BURKITT LYMPHOMA	MALE	6	MANDIBLE	YES
de Castro MS, Ribeiro CM, de Carli ML, Pereira AA, Sperandio FF, de Almeida OP, Hanemann JA. Fatal primary diffuse large B-cell lymphoma of the maxillary sinus initially treated as an infectious disease in an elderly patient: A clinicopathologic report. Gerodontology. 2018 Mar 1;35(1):59-62.	28	DLBCL	FEMALE	82	MAXILA	NO
Donaduzzi LC, Reinheimer A, da Silva MA, de Noronha L, Johann AC, Franco A, Couto SD, Souza PH. Primary diffuse large B cell lymphoma mimicking hyperplastic reactive lesion (lymphoma of the oral cavity). Case reports in pathology. 2018 Feb 7;2018.	29	DLBCL	MALE	72	MANDIBLE	NO
Fuessinger MA, Voss P, Metzger MC, Zegpi C, Semper-Hogg W. Numb chin as signal for malignancy-primary intraosseous diffuse large B-Cell lymphoma of the mandible. Annals of Maxillofacial Surgery. 2018 Jan;8(1):143.	30	DLBCL	FEMALE	40	MANDIBLE	NO
Gaal A, Chisholm KM, Egbert M. How rare is an oral presentation of myeloid sarcoma in the infant?. Journal of Oral and Maxillofacial Surgery. 2018 Mar 1;76(3):561-8.	31	LEUKAEMIA INFILTRATE	FEMALE	1	MAXILA	YES
Lanzel E, Syrbu SI, Hellstein JW, Stein KM, Welander S, Melo SL. Destructive soft tissue mass in the maxilla/maxillary sinus. Oral surgery, oral medicine, oral pathology and oral radiology. 2018 Jun 1;125(6):510-5.	32	EN NK/T-CELL LYMPHOMA	MALE	59	MAXILA	YES
Sánchez-Romero C, Pontes HA, Pontes FS, Rocha AC, Carlos R, Rendón JC, de Almeida OP, Fonseca FP. Acute lymphoblastic leukemia/lymphoma of the oral and maxillofacial region. Oral Surgery,	33	LEUKAEMIA INFILTRATE	MALE	37	MANDIBLE	YES

Oral Medicine, Oral Pathology and Oral Radiology. 2018 Aug (case 1) 1;126(2):152-64.						
Sánchez-Romero C, Pontes HA, Pontes FS, Rocha AC, Carlos R, Rendón JC, de Almeida OP, Fonseca FP. Acute lymphoblastic leukemia/lymphoma of the oral and maxillofacial region. Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology. 2018 Aug (case 2) 1;126(2):152-64.	34	LEUKAEMIA INFILTRATE	MALE	22	MANDIBLE	-
Yucesoy T, Kilic E, Ocak H, Alkan A, Deniz K. Gastrointestinal tract metastasis of mandibular diffuse large B-cell lymphoma. Clinical Case Reports. 2018 Sep;6(9):1713.	35	DLBCL	MALE	72	MANDIBLE	YES
Zou H, Yang H, Zou Y, Lei L, Song L. Primary diffuse large B-cell lymphoma in the maxilla: a case report. Medicine. 2018 May;97(20).	36	DLBCL	FEMALE	67	MAXILA	NO
Bezinelli LM, de Paula Eduardo F, da Graça Lopes RM, da Cunha Pasqualin D, Hamerschlak N, Corrêa L. Tumor mass in the palate after bone marrow transplantation. Oral surgery, oral medicine, oral pathology and oral radiology. 2017 Aug 1;124(2):107-13.	37	DLBCL	MALE	38	MAXILA	YES
Dolan JM, DeGraft-Johnson A, McDonald N, Ward BB, Phillips TJ, Munz SM. Maxillary and mandibular non-Hodgkin lymphoma with concurrent periapical endodontic disease: diagnosis and management. Journal of Endodontics. 2017 Oct 1;43(10):1744-9.	38	OTHER LYMPHOMA	MALE	68	MAXILA	NO
Draz A, Elias W, El-Sissi A, Liu ML. Pediatric unilateral facial swelling. Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology. 2017 May 1;123(5):519-23.	39	BURKITT LYMPHOMA	FEMALE	10	MAXILA	NO
Hassona Y, Almuhausen G, Almansour A, Scully C. Lymphoma presenting as a toothache: a wolf in sheep's clothing. Case Reports. 2017 Jan 24;2017:bcr2016218686.	40	DLBCL	MALE	75	MANDIBLE	YES
Kuo YS, Wu YH, Sun A, Chiang CP. Burkitt's lymphoma of the mandible. Journal of Dental Sciences. 2017 Dec;12(4):421.	41	BURKITT LYMPHOMA	MALE	29	MANDIBLE	NO
Lam PD, Kuribayashi A, Sakamoto J, Nakamura S, Harada H, Kurabayashi T. Imaging findings of childhood B-cell lymphoblastic lymphoma in the mental region: a case report. Dentomaxillofacial Radiology. 2017 Mar;46(3):20160313.	42	OTHER LYMPHOMA	FEMALE	9	MANDIBLE	YES
Pelletier-Galarneau M, Martineau P, Lambert R, Turpin S. False Negative ¹⁸ F-fluorodeoxyglucose Positron Emission Tomography/Computed Tomography in Primary B-cell Lymphoma of the Bone. World J Nucl Med. 2017 Apr-Jun;16(2):166-168.	43	OTHER LYMPHOMA	MALE	15	MANDIBLE	NO
Shah SP, Chetri ST, Paudyal P, Lavaju P, Sah BP, Misra S, Amatya PR. Lymphoma maxilla mimicking orbital cellulitis; case report and review of literature. Nepalese Journal of Ophthalmology. 2017;9(2):180-6.	44	OTHER LYMPHOMA	MALE	77	MAXILA	NO

Shimizu R, Ohga N, Miyakoshi M, Asaka T, Sato J, Kitagawa Y. Unusual maxillary osteoblastic and osteolytic lesions presenting as an initial manifestation of childhood acute myeloid leukemia: A case report. Quintessence Int. 2017 Feb 1;48(2):149-53.	45	LEUKAEMIA INFILTRATE	MALE	12	MAXILA	NO
Varun BR, Varghese NO, Sivakumar TT, Joseph AP. Extranodal non-Hodgkin's lymphoma of the oral cavity: a case report. Iranian Journal of Medical Sciences. 2017 Jul;42(4):407.	46	OTHER LYMPHOMA	MALE	65	MANDIBLE	YES
Basavaraj A, Kadam M, Kadam DB. Primary Maxillary Sinus Plasmablastic Lymphoma in HIV/AIDS. The Journal of the Association of Physicians of India. 2016 May 1;64(5):71-2.	47	PLAMABLASTIC LYMPHOMA	MALE	42	MAXILA	NO
Dineshkumar T, Suresh V, Ramya R, Rajkumar K. Primary intraoral granulocytic sarcoma: a rare case presenting as generalized gingival enlargement. Journal of Oral and Maxillofacial Pathology: JOMFP. 2016 Sep;20(3):523.	48	LEUKAEMIA INFILTRATE	FEMALE	62	MAXILA AND MANDIBLE	-
Goto M, Saito T, Kuroyanagi N, Sato H, Watanabe H, Kamiya N, Kurita K, Shimozato K. Intraosseous lymphoma of the oral and maxillofacial regions: report of our experiences, involving some difficult cases to be diagnosed. Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology. 2016 Jan 1;28(1):41-6. (case 1)	49	OTHER LYMPHOMA	FEMALE	27	MANDIBLE	YES
Goto M, Saito T, Kuroyanagi N, Sato H, Watanabe H, Kamiya N, Kurita K, Shimozato K. Intraosseous lymphoma of the oral and maxillofacial regions: report of our experiences, involving some difficult cases to be diagnosed. Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology. 2016 Jan 1;28(1):41-6. (case 2)	50	DLBCL	MALE	81	MANDIBLE	YES
Jayapalan CS, Pynadath MK, Mangalath U, George A, Aslam S, Hafiz A. Clinical diagnostic dilemma in an uncharacteristic rapidly enlarging swelling of the anterior maxilla: extranodal diffuse large B cell lymphoma. Case Reports. 2016 Mar 30;2016:bcr2015213141.	51	DLBCL	MALE	60	MAXILA	YES
Kichenbrand C, Egloff C, Guillet J, Delaitre B, Bastien C, Leroux A, Dolivet G, Phulpin B. Plasmablastic lymphoma: oral presentation in patient suffering from osteradionecrosis of the jaw. International journal of surgery case reports. 2016 Jan 1;29:94-7.	52	PLAMABLASTIC LYMPHOMA	MALE	64	MAXILA	NO
Kumar MS, Gannepalli A, Chandragiri A, Amarnath K. Diffuse large B-cell lymphoma of maxilla—A case report of late relapse. Journal of Clinical and Diagnostic Research: JCDR. 2016 Apr;10(4):ZD12.	53	DLBCL	FEMALE	41	MAXILA	YES
Sengupta M, Das I, Chatterjee U, Majumdar B. De novo myeloid sarcoma involving mandible in a child: Report of a rare occurrence. Journal of Oral and Maxillofacial Pathology: JOMFP. 2016 May;20(2):304.	54	LEUKAEMIA INFILTRATE	MALE	2	MANDIBLE	NO

Sharma D, Khurana N, Narula V. Plasmablastic lymphoma presenting as gingival growth in a HIV positive patient: A case report. Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology. 2016 Jul 1;28(4):366-9.	55	PLAMABLASTIC LYMPHOMA	MALE	55	MANDIBLE	NO
Srikant N, Yinti SR, Baliga M, Kini H. A rare spindle-cell variant of non-Hodgkin's lymphoma of the mandible. Journal of Oral and Maxillofacial Pathology: JOMFP. 2016 Jan;20(1):129.	56	OTHER LYMPHOMA	MALE	64	MANDIBLE	YES
Vasudevan V, Kumar YR, Chavva P, Naina S. Intraoral plasmablastic non-hodgkin's lymphoma associated with human immunodeficiency virus. Indian Journal of Dental Research. 2016 May 1;27(3):334.	57	PLAMABLASTIC LYMPHOMA	FEMALE	19	MANDIBLE	YES
Yoshioka Y, Yamachika E, Matsubara M, Iida S. Stage IV sporadic Burkitt's leukaemia with osteolysis in the maxillary sinuses. Journal of Surgical Case Reports. 2016 Feb 1;2016(2).	58	BURKITT LYMPHOMA	MALE	8	MAXILA	YES
Abdolkarimi B, Zareifar S, Mokhtari M. Face Bones Involvement And Relapse In A Case Of Childhood Acute Leukemia (Case Report). Iranian Journal of Blood And Cancer. 2015; 7(2): 105-109.	59	LEUKAEMIA INFILTRATE	MALE	9	MAXILA	YES
Alshahrani FA, Aljabab AS, Motabi IH, Alrashed A, Anil S. Primary Diffuse Large B-cell Lymphoma involving the Mandible. The Journal of Contemporary Dental Practice. 2015 Oct 1;16(10):840-4.	60	DLBCL	MALE	18	MANDIBLE	NO
Buchanan A, Kalathingal S, Capes J, Kurago Z. Unusual presentation of extranodal diffuse large B-cell lymphoma in the head and neck: description of a case with emphasis on radiographic features and review of the literature. Dentomaxillofacial Radiology. 2015 Mar;44(3):20140288.	61	DLBCL	MALE	35	MAXILA	NO
Bugshan A, Kassolis J, Basile J. Primary diffuse large B-cell lymphoma of the mandible: case report and review of the literature. Case reports in oncology. 2015;8(3):451-5.	62	OTHER LYMPHOMA	MALE	54	MANDIBLE	NO
Dalirsani Z, Bolouri AJ, Delavarian Z, Bidad S, Sanatkhan M, Amirchaghmaghi M. Human T-lymphotropic virus-1 associated with adult T-cell lymphoma/leukemia and generalized expansion of palatal and jaw bones: a rare case report. Journal of Dentistry. 2015 Sep;16(3):214.	63	LEUKAEMIA INFILTRATE	MALE	45	MAXILA AND MANDIBLE	YES
Dalirsani Z, Ghazi A. T-cell lymphoblastic lymphoma in the maxilla and mandible of a child: a rare case report. Journal of Clinical and Diagnostic Research: JCDR. 2015 Jun;9(6):ZD22.	64	OTHER LYMPHOMA	MALE	10	MAXILA AND MANDIBLE	NO
Kaibuchi N, Okamoto T, Kataoka T, Kumasaka A, Ando T. A case of spontaneous regression of lymphoma in the mandibular gingiva after biopsy. Oral and Maxillofacial Surgery Cases. 2015 Sep 1;1(3):33-7.	65	DLBCL	MALE	87	MANDIBLE	NO

Mittal M, Puri A, Nangia R, Sachdeva A. Follicular lymphoma transforming into anaplastic diffuse large B-cell lymphoma of oral cavity: A case report with review of literature. <i>Journal of Oral and Maxillofacial Pathology: JOMFP</i> . 2015 Sep;19(3):379.	66	OTHER LYMPHOMA	MALE	50	MANDIBLE	NO
Pereira DL, Fernandes DT, Santos-Silva AR, Vargas PA, de Almeida OP, Lopes MA. Intraosseous non-Hodgkin lymphoma mimicking a periapical lesion. <i>Journal of Endodontics</i> . 2015 Oct 1;41(10):1738-42.	67	DLBCL	MALE	48	MANDIBLE	NO
Ramprakash CH, Padmashree S, Rema J. Primary intraosseous lymphoma of the maxilla—A case report and review of the literature. <i>Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology</i> . 2015 Sep 1;27(5):712-21.	68	DLBCL	FEMALE	32	MAXILA	NO
Sivolella S, Rizzo G, Valente M, Lumachi F. Sporadic Burkitt lymphoma mimicking osteomyelitis of the mandible revealing clinically unsuspected HIV infection. <i>Anticancer Research</i> . 2015 Sep 1;35(9):4837-9.	69	BURKITT LYMPHOMA	MALE	52	MANDIBLE	YES
Tabbenor O, Halai T, Bailey E, Coulthard P. Plasmablastic lymphoma of the oral cavity in an undiagnosed HIV-positive patient. <i>Oral Surgery</i> . 2015 Nov;8(4):232-7.	70	PLAMABLASTIC LYMPHOMA	MALE	38	MAXILA	NO
Tavares MD, Magalhães TC, de Moraes FM, Piñeiro-Maceira J, Ramos-e-Silva M. Plasmablastic lymphoma: a rare and exuberant cutaneous emergence in an immunocompetent patient. <i>International Journal of Dermatology</i> . 2015 May;54(5):e175-8.	71	PLAMABLASTIC LYMPHOMA	MALE	72	MAXILA AND MANDIBLE	YES
Webber B, Webber M, Keinan D. Extranodal large B cell lymphoma of the anterior maxilla. Case report and review of literature. <i>The New York state dental journal</i> . 2015 Jan 1;81(1):34-8.	72	OTHER LYMPHOMA	MALE	55	MAXILA	NO
Yang W, Zuo Y, Yang Y, Tao J, Hong J, Wu Z, Chen F, Dang R, Liang Y, Li Y, Liu D. Pediatric anaplastic large cell lymphoma misdiagnosed as multiple organ abscesses: a case report and literature review. <i>International Journal of Clinical and Experimental Medicine</i> . 2015;8(10):19509.	73	OTHER LYMPHOMA	MALE	6	MAXILA	YES
Corti M, Minué G, Campitelli A, Narbaitz M, Gilardi L. An aggressive plasmablastic lymphoma of the oral cavity as primary manifestation of acquired immunodeficiency syndrome: case report and literature review. <i>International Archives of Otorhinolaryngology</i> . 2015 Oct;19:354-8.	74	PLAMABLASTIC LYMPHOMA	MALE	39	MAXILA	NO
Manne RK, Madu CS, Talla HV. Maxillary sporadic Burkitt's lymphoma associated with neuro-orbital involvement in an Indian male. <i>Contemporary Clinical Dentistry</i> . 2014 Apr;5(2):231.	75	BURKITT LYMPHOMA	MALE	21	MAXILA	YES
Milenović A, Vučićević Boras V, Ilić I, Dotlić S, Aurer I, Bašić Kinda S, Mayer M, Mikulić M, Tomasović-Lončarić Č, Škrinjar I. Simultaneous presentation of oral and skin	76	OTHER LYMPHOMA	FEMALE	68	MANDIBLE	YES

anaplastic large T-cell lymphoma. Acta clinica Croatica. 2014 Jul 1;53(2.):246-50.						
Okahata R, Shimamoto H, Marutani K, Tomita S, Nakatani A, Kishino M, Kakimoto N, Murakami S, Furukawa S. Diffuse large B-cell lymphoma of the mandible with periosteal reaction: a case report. Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology. 2014 Feb 1;117(2):e228-32.	77	DLBCL	MALE	63	MANDIBLE	NO
Yap M, Hewson I, McLean C, Ciciulla J. Oral myeloid sarcoma: two case reports. Australian dental journal. 2014 Dec;59(4):511-5. (case 2)	78	LEUKAEMIA INFILTRATE	MALE	65	MAXILA	NO
Barboza CA, Ginani F, Lima HC, De Sousa SO, Shinohara EH. Burkitt's lymphoma presenting as a maxillary swelling in a HIV-negative adult. Acta Stomatologica Croatica. 2013 Dec 1;47(4):336-42.	79	BURKITT LYMPHOMA	MALE	35	MAXILA	NO
Jain A, Alam K, Maheshwari V, Khan R, Nobin H, Narula V. Primary bone lymphomas—clinical cases and review of literature. Journal of Bone Oncology. 2013 Sep 1;2(3):132-6. (case 4)	80	DLBCL	MALE	65	MANDIBLE	NO
Jessri M, Majeed AA, Matias MA, Farah CS. A case of primary diffuse large B-cell non-Hodgkin's lymphoma misdiagnosed as chronic periapical periodontitis. Australian dental journal. 2013 Jun;58(2):250-5.	81	DLBCL	MALE	32	MANDIBLE	NO
Koivisto T, Bowles WR, Magajna WA, Rohrer M. Malignant lymphoma in maxilla with cystic involvement: a case report. Journal of Endodontics. 2013 Jul 1;39(7):935-8.	82	DLBCL	FEMALE	56	MAXILA	NO
Mendonça EF, Sousa TO, Estrela C. Non-Hodgkin lymphoma in the periapical region of a mandibular canine. Journal of Endodontics. 2013 Jun 1;39(6):839-42.	83	DLBCL	FEMALE	38	MANDIBLE	NO
Nayak PB, Desai D, Pandit S, Rai N. Centroblastic variant of diffuse large B-cell lymphoma: Case report and review of literature. Journal of Oral and Maxillofacial Pathology: JOMFP. 2013 May;17(2):261.	84	DLBCL	MALE	55	MANDIBLE	NO
Sokołowska-Wojdyło M, Florek A, Barańska-Rybak W, Sikorska M, Starzyńska A, Drogozewska B, Włodarkiewicz A. Natural killer/T-cell lymphoma, nasal type, masquerading as recalcitrant periodontitis in a patient with a diagnosis of Wegener's granulomatosis. The American Journal of the Medical Sciences. 2013 Feb 1;345(2):163-7.	85	EN NK/T-CELL LYMPHOMA	FEMALE	49	MAXILA	NO
Yamashita Y, Isomura N, Hamasaki Y, Goto M. Case of pediatric acute promyelocytic leukemia presenting as extramedullary tumor of the mandible. Head & Neck. 2013 Oct;35(10):E310-3.	86	LEUKAEMIA INFILTRATE	MALE	1	MANDIBLE	NO
Younis RH, Gold R, Reich RF. Clinical pathologic conference case 3: painful, mobile mandibular molar. Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology. 2013 May 1;115(5):e40-4.	87	LEUKAEMIA INFILTRATE	MALE	73	MANDIBLE	YES

Frei M, Dubach P, Reichart PA, Schmitt AM, Mueller-Garamvölgyi E, Bornstein MM. Diffuse swelling of the buccal mucosa and palate as first and only manifestation of an extranodal non-Hodgkin 'double-hit' lymphoma: report of a case. Oral and maxillofacial surgery. 2012 Mar;16(1):69-74.	88	DLBCL	MALE	76	MAXILA	YES
Goto M, Onizawa K, Yanagawa T, Yamagata K, Shinozuka K, Nishikii H, Koganemaru H, Chiba S, Bukawa H. Human Immunodeficiency Virus-Associated Burkitt's Lymphoma in Oral Cavity of Japanese Patient. Journal of oral and maxillofacial surgery. 2012 Aug 1;70(8):1885-90.	89	BURKITT LYMPHOMA	FEMALE	45	MANDIBLE	YES
Padmanabhan MY, Pandey RK, Kumar A, Radhakrishnan A. Dental management of a pediatric patient with Burkitt lymphoma: a case report. Special Care in Dentistry. 2012 Jun;32(3):118-23.	90	BURKITT LYMPHOMA	MALE	8	MAXILA AND MANDIBLE	NO
Rullo R, Addabbo F, Festa VM. Painless, rapidly increasing maxillary swelling and erythematous mucosa: differential diagnosis and therapy. J Can Dent Assoc. 2012 Jan 1;78:c50.	91	OTHER LYMPHOMA	MALE	48	MAXILA	NO
Tsachouridou O, Christoforidou A, Metallidis S, Papaioannou M, Kollaras P, Kolokotronis A, Chrysanthidis T, Pilalas D, Markou K. Plasmablastic lymphoma of the oral cavity, a B cell-derived lymphoma associated with HIV infection: a case series. European Archives of Oto-Rhino-Laryngology. 2012 Jun;269(6):1713-9. (case 1)	92	PLAMABLASTIC LYMPHOMA	MALE	42	MAXILA	NO
Tsachouridou O, Christoforidou A, Metallidis S, Papaioannou M, Kollaras P, Kolokotronis A, Chrysanthidis T, Pilalas D, Markou K. Plasmablastic lymphoma of the oral cavity, a B cell-derived lymphoma associated with HIV infection: a case series. European Archives of Oto-Rhino-Laryngology. 2012 Jun;269(6):1713-9. (case 2)	93	PLAMABLASTIC LYMPHOMA	MALE	50	MANDIBLE	YES
Vinoth PN, Selvan SM, Sahni L, Krishnaratnam K, Rajendiran S, Anand CV, Scott JX. Primary extra nodal non-Hodgkin's lymphoma of the oral cavity in a young girl. National Journal of Maxillofacial Surgery. 2012 Jul;3(2):187.	94	DLBCL	FEMALE	14	MANDIBLE	NO
Zadik Y, Lehman H, Neuman T, Benoliel R. Primary lymphoma of the mandible masquerading as bisphosphonate-related osteonecrosis of jaws. Quintessence International. 2012 Oct 1;43(9).	95	DLBCL	FEMALE	66	MANDIBLE	NO
Agrawal MG, Agrawal SM, Kambalimath DH. Non-Hodgkins lymphoma of maxilla: A rare entity. National journal of maxillofacial surgery. 2011 Jul;2(2):210.	96	OTHER LYMPHOMA	FEMALE	30	MAXILA	NO
Bhatt VR, Koirala B, Terjanian T. Extranodal natural killer/T cell lymphoma, nasal type presenting as a palatal perforation and naso-oral fistula. Case Reports. 2011 Jan 1;2011:bcr1120103511.	97	EN NK/T-CELL LYMPHOMA	MALE	21	MAXILA	NO

Burns FM, Parks S, Marley JJ. Primary non-Hodgkin's lymphoma of the mandible manifesting as a dentigerous cyst. Oral Surgery. 2011 May;4(2):73-6.	98	DLBCL	FEMALE	70	MANDIBLE	NO
Hewson I. Oral plasmablastic lymphoma: a case report. Australian dental journal. 2011 Sep;56(3):328-30.	99	PLAMABLASTIC LYMPHOMA	MALE	-	MANDIBLE	NO
Matsuzaki H, Katase N, Hara M, Asaumi JI, Yanagi Y, Unetsubo T, Hisatomi M, Konouchi H, Takenobu T, Nagatsuka H. Primary extranodal lymphoma of the maxilla: a case report with imaging features and dynamic data analysis of magnetic resonance imaging. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology. 2011 Sep 1;112(3):e59-69.	100	DLBCL	FEMALE	68	MAXILA	NO
Velez I, Hogge M. Primary maxillofacial large B-cell lymphoma in immunocompetent patients: report of 5 cases. Case Reports in Radiology. 2011 Aug 24;2011. (case 1)	101	DLBCL	MALE	58	MANDIBLE	NO
Velez I, Hogge M. Primary maxillofacial large B-cell lymphoma in immunocompetent patients: report of 5 cases. Case Reports in Radiology. 2011 Aug 24;2011. (case 3)	102	DLBCL	FEMALE	47	MANDIBLE	NO
Velez I, Hogge M. Primary maxillofacial large B-cell lymphoma in immunocompetent patients: report of 5 cases. Case Reports in Radiology. 2011 Aug 24;2011. (case 4)	103	DLBCL	FEMALE	48	MAXILA	NO
Burić N, Jovanović G, Radovanović Z, Burić M, Tjanić M. Radiographic enlargement of mandibular canal as first feature of non-Hodgkin's lymphoma. Dentomaxillofacial Radiology. 2010 Sep;39(6):383-8.	104	OTHER LYMPHOMA	MALE	57	MANDIBLE	NO
Dalirsani Z, Mohtasham N. T-cell lymphoma of palate with nose and maxillary sinus involvement: a case report. Iran J Med Sci. 2010 Sep; 35(3):254-58.	105	EN NK/T-CELL LYMPHOMA	MALE	75	MAXILA	YES
Fasanmade A, Pring M, Pawade J, Guest P, Bell C. Rapidly progressing mass of anterior mandible following a dental extraction. Oral surgery, oral medicine, oral pathology, oral radiology, and endodontics. 2010;109(3):330-4.	106	LEUKAEMIA INFILTRATE	FEMALE	75	MANDIBLE	NO
Franco A, Lewis KN, Blackmon JM, Manaloor EJ. Hyperostosis-an unusual radiographic presentation of Myelodysplastic Syndrome transformed to Acute Myeloid Leukemia. Journal of Radiology Case Reports. 2010;4(11):18.	107	OTHER LYMPHOMA	MALE	1	MAXILA AND MANDIBLE	YES
Kanitsap N, Warnissorn N. NK/T cell lymphoma, nasal type with sinonasal mass and palatal ulcer: a clinical case report and review of treatment. Journal of the Medical Association of Thailand. 2011 Nov 23;93(12):294.	108	EN NK/T-CELL LYMPHOMA	FEMALE	45	MAXILA	NO
Liapis K, Apostolidis I, Karmiris T, Harhalakis N. Numb chin syndrome as the initial manifestation of acute	109	LEUKAEMIA INFILTRATE	MALE	52	MANDIBLE	YES

megakaryoblastic leukemia. <i>Leukemia & lymphoma</i> . 2010 Dec 1;51(12):2310-1.						
Ojha J, Gupta A, Aziz N. Intraoral Diffuse Large B-Cell Lymphoma With Burkitt-like Morphology in an HIV-Positive Patient—A Diagnostic Dilemma. <i>Journal of oral and maxillofacial surgery</i> . 2010 Oct 1;68(10):2632-8.	110	DLBCL	MALE	51	MAXILA	YES
Pau M, Beham-Schmid C, Zemann W, Kahr H, Kärcher H. Intraoral granulocytic sarcoma: a case report and review of the literature. <i>Journal of oral and maxillofacial surgery</i> . 2010 Oct 1;68(10):2569-74.	111	LEUKAEMIA INFILTRATE	-	-	MAXILA	NO
Pereira CM, Lopes AP, Meneghini AJ, Silva GB, Monteiro MC, Botelho TD. Burkitt's lymphoma in a young Brazilian boy. <i>Malays J Pathol</i> . 2010 Jun 1;32(1):59-64.	112	BURKITT LYMPHOMA	MALE	4	MANDIBLE	NO
Qiu YT, Yang C, Zhang XH. Primary granulocytic sarcoma of the mandibular condyle presenting with the characteristic green color. <i>Journal of oral and maxillofacial surgery</i> . 2010 Oct 1;68(10):2575-9.	113	LEUKAEMIA INFILTRATE	FEMALE	16	ATM	YES
Salas BV, Ferrer AD, Granados FA. Burkitt's lymphoma: a child's case presenting in the maxilla. Clinical and radiological aspects. <i>Medicina oral, patología oral y cirugía bucal</i> . Ed. inglesa. 2010;15(3):13.	114	BURKITT LYMPHOMA	MALE	5	MAXILA	NO
Werder P, Altermatt HJ, Zbären P, Mueller-Garamvölgyi E, Bornstein MM. Palatal swelling as the first and only manifestation of extranodal follicular non-Hodgkin lymphoma: a case presentation. <i>Quintessence international</i> . 2010 Feb 1;41(2).	115	OTHER LYMPHOMA	MALE	75	MAXILA	NO
Yamada T, Mishima K, Ota A, Moritani N, Matsumura T, Katase N, Yamamoto T. A case of ATLL (adult T-cell leukemia/lymphoma) mimicking odontogenic infection. <i>Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology</i> . 2010 Jun 1;109(6):e51-5.	116	LEUKAEMIA INFILTRATE	MALE	44	MAXILA	YES
Bakathir AA, Al-Hamdani AS. Relapse of acute lymphoblastic leukemia in the jaw. <i>Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology</i> . 2009 May 1;107(5):e14-6.	117	LEUKAEMIA INFILTRATE	FEMALE	19	MAXILA AND MANDIBLE	YES
Balasubramaniam R, Goradia A, Turner LN, Stoopler ET, Alawi F, Frank DM, Greenberg MS. Burkitt lymphoma of the oral cavity: an atypical presentation. <i>Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology</i> . 2009 Feb 1;107(2):240-5.	118	BURKITT LYMPHOMA	FEMALE	36	MANDIBLE	YES
Cavalcante AS, Anbinder AL, Pontes EM, Carvalho YR. B-cell lymphoblastic lymphoma in the maxilla of a child: a rare case report. <i>International journal of oral and maxillofacial surgery</i> . 2009 Dec 1;38(12):1326-30.	119	OTHER LYMPHOMA	FEMALE	6	MAXILA	NO

Jaguar GC, da Cruz Perez DE, de Lima VC, Campos AH, Alves FA. Palatal ulcerations and midfacial swelling. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology. 2009 Oct 1;108(4):483-7.	120	EN NK/T-CELL LYMPHOMA	FEMALE	50	MAXILA	YES
Kim K, Velez I, Rubin D. A rare case of granulocytic sarcoma in the mandible of a 4-year-old child: a case report and review of the literature. Journal of oral and maxillofacial surgery. 2009 Feb 1;67(2):410-6.	121	LEUKAEMIA INFILTRATE	FEMALE	4	MANDIBLE	NO
Kini R, Saha A, Naik V. Diffuse large B-cell lymphoma of mandible: a case report. Med Oral Patol Oral Cir Bucal. 2009 Sep 1;14(9):e421-4.	122	DLBCL	MALE	55	MANDIBLE	NO
Nikgoo A, Mirafshariyeh SA, Kazeminajad B, Eshkevari PS, Fatemitabar SA. Burkitt's lymphoma of maxillary sinuses: review of literature and report of bilateral case. Journal of oral and maxillofacial surgery. 2009 Aug 1;67(8):1755-63.	123	BURKITT LYMPHOMA	MALE	31	MAXILA	NO
Pingarrón Martín L, Arias Gallo J, Mirada E, Morán MJ, Palacios E, Burgueño M. Linfoma no-hodgkin de alto grado primario mandibular. Revista Española de Cirugía Oral y Maxilofacial. 2009 Aug;31(4):271-5.	124	OTHER LYMPHOMA	MALE	82	MANDIBLE	NO
Adouani A, Bouguila J, Jebblaoui Y, Aicha MB, Abdelali MA, Hellali M, Zitouni K, Amani L, Issam Z. B-cell lymphoma of the mandible: a case report. Clinical medicine. Oncology. 2008 Jan;2:CMO-S366.	125	OTHER LYMPHOMA	MALE	53	MANDIBLE	NO
Chen RF, Chen CT, Liao HT, Chen CH, Chen YR. Primary cutaneous anaplastic large cell lymphoma of the face presenting as posttraumatic maxillary sinusitis. Journal of Craniofacial Surgery. 2008 Nov 1;19(6):1597-9.	126	OTHER LYMPHOMA	MALE	12	MAXILA	NO
Navarro CM, Shibli JA, Ferrari RB, d'Avila S, Sposto MR. Gingival primary extranodal non-Hodgkin's lymphoma as the first manifestation of acquired immunodeficiency syndrome. Journal of periodontology. 2008 Mar;79(3):562-6. (case 1)	127	DLBCL	MALE	43	MANDIBLE	NO
Navarro CM, Shibli JA, Ferrari RB, d'Avila S, Sposto MR. Gingival primary extranodal non-Hodgkin's lymphoma as the first manifestation of acquired immunodeficiency syndrome. Journal of periodontology. 2008 Mar;79(3):562-6. (case 2)	128	OTHER LYMPHOMA	MALE	52	MAXILA	NO
Shanti RM, Torres-Cabala CA, Jaffe ES, Wilson WH, Brahim JS. Lymphomatoid granulomatosis with involvement of the hard palate: a case report. Journal of oral and maxillofacial surgery. 2008 Oct 1;66(10):2161-3.	129	OTHER LYMPHOMA	FEMALE	32	MAXILA	YES

CASE NUMBER	CLINICAL DATA						DENTAL MANIFESTATIONS			
	PAIN	SWELLING	ERYTHEMA	NECROSIS/ ULCERATION	PARESTHESIA	B SYMPTOMS	DENTAL MANIFESTATIONS (Y/N)	MOBILITY	SENSITIVITY/ DENTAL PAIN	TOOTH DISPLACEMENT/ UNERUPTED
1	YES	NO	NO	NO	YES	NO	NO	NO	NO	NO
2	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
3	YES	YES	YES	YES	NO	NO	YES	YES	NO	NO
4	YES	YES	NO	NO	NO	NO	YES	NO	YES	NO
5	YES	YES	YES	NO	NO	NO	YES	YES	NO	NO
6	YES	YES	YES	YES	YES	YES	NO	NO	NO	NO
7	YES	YES	NO	NO	YES	NO	YES	YES	NO	NO
8	YES	YES	NO	NO	NO	NO	YES	NO	YES	NO
9	NO	YES	NO	NO	NO	NO	YES	YES	YES	NO
10	NO	YES	NO	NO	NO	NO	YES	YES	NO	NO
11	YES	YES	YES	YES	NO	NO	YES	NO	YES	NO
12	YES	YES	NO	NO	YES	NO	YES	YES	YES	NO
13	YES	NO	NO	YES	YES	NO	YES	YES	NO	NO
14	NO	YES	NO	NO	YES	YES	YES	YES	NO	NO
15	YES	YES	YES	YES	NO	NO	YES	YES	YES	NO
16	NO	YES	YES	NO	NO	NO	NO	NO	NO	NO
17	NO	YES	YES	YES	NO	NO	YES	YES	NO	NO
18	NO	NO	NO	NO	NO	NO	YES	YES	NO	NO
19	YES	YES	NO	NO	YES	NO	YES	YES	NO	NO
20	YES	YES	YES	YES	NO	NO	YES	YES	NO	NO
21	NO	YES	YES	YES	NO	NO	YES	NO	NO	YES
22	YES	YES	NO	NO	NO	NO	YES	NO	YES	NO
23	YES	YES	NO	NO	YES	YES	YES	YES	NO	NO
24	NO	YES	NO	NO	YES	NO	YES	YES	NO	NO
25	NO	YES	YES	YES	NO	YES	NO	NO	NO	NO
26	YES	YES	NO	NO	YES	NO	YES	NO	YES	NO
27	NO	YES	NO	NO	NO	NO	YES	YES	NO	NO
28	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
29	NO	YES	YES	NO	NO	NO	YES	YES	NO	NO
30	YES	NO	NO	NO	YES	NO	YES	YES	NO	NO
31	YES	YES	NO	NO	NO	NO	YES	YES	NO	NO
32	YES	YES	YES	YES	NO	NO	YES	NO	YES	NO
33	YES	YES	YES	YES	NO	YES	YES	YES	NO	NO
34	NO	YES	YES	YES	NO	YES	YES	YES	NO	NO
35	YES	YES	NO	NO	NO	YES	YES	NO	NO	YES
36	YES	YES	NO	NO	NO	NO	YES	YES	YES	NO
37	NO	YES	YES	NO	NO	NO	NO	NO	NO	NO
38	NO	YES	NO	NO	YES	NO	NO	NO	NO	NO
39	YES	YES	YES	NO	NO	NO	YES	YES	NO	NO
40	YES	YES	NO	NO	YES	YES	YES	NO	YES	NO

41	NO	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO
42	NO	YES	YES	NO	NO	NO	YES	YES	NO	NO	NO
43	NO	YES	NO	YES	NO	NO	NO	NO	NO	NO	NO
44	YES	YES	NO	YES	NO	NO	NO	NO	NO	NO	NO
45	YES	YES	YES	NO	NO	YES	YES	YES	NO	NO	NO
46	NO	YES	YES	YES	NO	NO	YES	NO	NO	NO	YES
47	NO	YES	NO	NO	NO	YES	NO	NO	NO	NO	NO
48	NO	YES	NO	NO	NO	NO	YES	YES	YES	YES	NO
49	YES	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO
50	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
51	YES	YES	YES	YES	NO	NO	YES	YES	NO	NO	NO
52	NO	NO	YES	YES	NO	NO	YES	NO	YES	YES	NO
53	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO
54	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO
55	YES	YES	NO	NO	NO	NO	YES	YES	NO	NO	NO
56	NO	YES	NO	NO	YES	NO	NO	NO	NO	NO	NO
57	YES	YES	NO	YES	YES	YES	YES	YES	NO	NO	NO
58	YES	YES	NO	NO	NO	YES	NO	NO	NO	NO	NO
59	YES	YES	NO	NO	NO	YES	YES	NO	YES	YES	NO
60	YES	YES	NO	NO	YES	NO	NO	NO	NO	NO	NO
61	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO
62	NO	YES	NO	NO	YES	NO	YES	YES	NO	NO	NO
63	YES	YES	NO	NO	NO	YES	YES	YES	NO	NO	NO
64	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO
65	NO	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO
66	NO	YES	YES	YES	NO	YES	-	-	-	-	-
67	NO	YES	NO	NO	YES	NO	YES	NO	YES	YES	NO
68	YES	YES	NO	NO	NO	NO	YES	YES	NO	NO	NO
69	YES	YES	NO	NO	YES	YES	YES	NO	YES	YES	NO
70	YES	YES	YES	YES	NO	NO	YES	YES	NO	NO	NO
71	NO	YES	YES	NO	YES	NO	NO	NO	NO	NO	NO
72	YES	NO	NO	NO	NO	NO	YES	NO	YES	YES	NO
73	NO	YES	NO	NO	NO	YES	YES	YES	NO	NO	NO
74	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO	NO
75	NO	YES	NO	NO	NO	NO	YES	NO	YES	YES	NO
76	YES	NO	YES	YES	NO	NO	NO	NO	NO	NO	NO
77	NO	YES	NO	YES	YES	NO	YES	NO	YES	YES	NO
78	NO	YES	NO	NO	NO	NO	YES	YES	YES	YES	NO
79	NO	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO
80	YES	YES	NO	YES	NO	YES	NO	NO	NO	NO	NO
81	YES	YES	YES	YES	NO	NO	YES	YES	YES	YES	YES
82	YES	YES	NO	NO	NO	NO	YES	NO	YES	YES	NO
83	YES	YES	NO	NO	NO	YES	YES	NO	YES	YES	NO
84	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO
85	YES	YES	NO	YES	YES	YES	NO	NO	NO	NO	NO

86	NO	YES	NO	NO	NO	YES	NO	NO	NO	NO
87	YES	YES	YES	NO	NO	NO	YES	YES	NO	NO
88	NO	YES	YES	NO	YES	NO	-	-	-	-
89	NO	YES	YES	YES	NO	YES	YES	YES	NO	NO
90	NO	YES	YES	YES	NO	NO	YES	YES	NO	NO
91	NO	YES	YES	NO	NO	NO	NO	NO	NO	NO
92	NO	YES	YES	YES	NO	NO	NO	NO	NO	NO
93	NO	YES	YES	YES	NO	NO	NO	NO	NO	NO
94	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
95	YES	YES	NO	YES	YES	NO	NO	NO	NO	NO
96	YES	YES	YES	NO	NO	NO	YES	YES	YES	NO
97	YES	NO	YES	YES	NO	YES	NO	NO	NO	NO
98	YES	YES	NO	NO	NO	NO	YES	NO	NO	YES
99	YES	YES	YES	NO	NO	NO	YES	YES	YES	NO
100	NO	YES	NO	NO	NO	YES	NO	NO	NO	NO
101	NO	YES	NO	NO	NO	NO	YES	NO	NO	YES
102	NO	YES	YES	YES	NO	NO	YES	YES	NO	NO
103	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO
104	YES	YES	YES	NO	YES	NO	YES	YES	NO	NO
105	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
106	YES	YES	YES	YES	NO	NO	YES	YES	NO	NO
107	YES	YES	NO	NO	NO	YES	NO	NO	NO	NO
108	NO	YES	YES	YES	NO	NO	NO	NO	NO	NO
109	NO	NO	NO	NO	YES	NO	NO	NO	NO	NO
110	YES	YES	NO	YES	NO	YES	NO	NO	NO	NO
111	YES	YES	YES	YES	NO	NO	YES	YES	NO	NO
112	YES	YES	NO	NO	NO	NO	YES	NO	YES	NO
113	YES	YES	NO	NO	YES	YES	NO	NO	NO	NO
114	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO
115	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
116	NO	YES	NO	NO	YES	NO	YES	NO	NO	YES
117	NO	YES	NO	NO	YES	NO	YES	YES	NO	NO
118	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO
119	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO
120	NO	YES	YES	YES	NO	NO	NO	NO	NO	NO
121	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
122	NO	YES	NO	NO	NO	NO	NO	NO	NO	NO
123	NO	YES	NO	YES	NO	NO	YES	YES	NO	NO
124	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO
125	YES	YES	NO	NO	YES	NO	NO	NO	NO	NO
126	YES	YES	NO	YES	NO	NO	NO	NO	NO	NO
127	NO	YES	YES	YES	NO	NO	NO	NO	NO	NO
128	NO	YES	YES	YES	NO	NO	NO	NO	NO	NO
129	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO

CASE NUMBER	DENTAL TREATMENT						RADIOGRAPHIC ASPECTS			
	DENTAL TREATMENT (Y/N)	TOOTH EXTRACTION	MEDICATION	ENDODONTIC TREATMENT	DRAINAGE	PERIODONTAL TREATMENT	PERIAPICAL	PANORAMIC	CT	CBCT
1	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES
2	NO	NO	NO	NO	NO	NO	NO	YES	YES	NO
3	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
4	YES	YES	NO	YES	NO	NO	YES	NO	NO	YES
5	NO	NO	NO	NO	NO	NO	NO	YES	YES	NO
6	YES	YES	NO	NO	NO	NO	YES	YES	-	-
7	YES	NO	YES	NO	YES	NO	YES	YES	-	-
8	YES	YES	NO	NO	NO	NO	YES	YES	-	-
9	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
10	YES	YES	NO	NO	NO	NO	NO	YES	NO	YES
11	YES	YES	NO	NO	NO	NO	NO	YES	-	-
12	YES	NO	YES	NO	NO	NO	YES	NO	NO	YES
13	YES	YES	NO	NO	NO	NO	NO	NO	YES	NO
14	NO	NO	NO	NO	NO	NO	NO	YES	-	-
15	YES	NO	NO	YES	NO	NO	YES	NO	NO	YES
16	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES
17	YES	YES	NO	NO	NO	NO	NO	YES	YES	NO
18	NO	NO	NO	NO	NO	NO	NO	YES	YES	NO
19	YES	YES	NO	NO	NO	NO	NO	YES	YES	NO
20	YES	YES	NO	NO	NO	NO	NO	NO	NO	YES
21	NO	NO	NO	NO	NO	NO	NO	YES	-	-
22	NO	NO	NO	NO	NO	NO	NO	YES	NO	YES
23	NO	NO	NO	NO	NO	NO	NO	YES	YES	NO
24	YES	YES	NO	NO	NO	NO	NO	YES	YES	NO
25	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
26	YES	NO	NO	YES	NO	NO	NO	YES	YES	NO
27	NO	NO	NO	NO	NO	NO	NO	YES	NO	YES
28	YES	NO	YES	NO	NO	NO	NO	YES	NO	YES
29	NO	NO	NO	NO	NO	NO	NO	YES	-	-
30	YES	NO	NO	NO	NO	YES	NO	YES	NO	YES
31	YES	YES	NO	NO	NO	NO	NO	NO	YES	NO
32	YES	YES	NO	NO	NO	NO	NO	YES	YES	NO
33	-	-	-	-	-	-	NO	YES	-	-
34	-	-	-	-	-	-	NO	YES	-	-
35	YES	YES	NO	NO	NO	NO	NO	YES	-	-
36	YES	YES	NO	NO	NO	NO	NO	NO	YES	NO
37	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
38	YES	NO	NO	YES	NO	NO	NO	YES	YES	NO
39	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES
40	YES	NO	YES	YES	NO	NO	NO	YES	YES	NO

41	NO	NO	NO	NO	NO	NO	NO	YES	YES	-	-
42	YES	YES	NO	NO	NO	NO	NO	NO	YES	YES	NO
43	YES	NO	YES	NO	NO	NO	NO	NO	NO	YES	NO
44	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
45	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	NO
46	YES	YES	NO	NO	NO	NO	NO	NO	YES	-	-
47	YES	YES	YES	NO	NO	NO	NO	NO	NO	YES	NO
48	NO	NO	NO	NO	NO	NO	NO	NO	YES	-	-
49	NO	NO	NO	NO	NO	NO	NO	NO	YES	-	-
50	YES	NO	NO	NO	YES	NO	NO	NO	YES	YES	NO
51	NO	NO	NO	NO	NO	NO	NO	NO	YES	-	-
52	YES	YES	NO	NO	NO	NO	NO	NO	YES	NO	YES
53	YES	NO	NO	YES	NO	NO	NO	YES	YES	-	-
54	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
55	YES	YES	NO	NO	NO	NO	NO	NO	YES	YES	NO
56	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES
57	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	NO
58	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
59	YES	NO	YES	NO	NO	NO	NO	NO	NO	YES	NO
60	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
61	YES	NO	YES	NO	YES	NO	NO	NO	NO	NO	YES
62	YES	YES	NO	YES	NO	NO	NO	YES	NO	-	-
63	NO	NO	NO	NO	NO	NO	NO	YES	YES	-	-
64	YES	NO	YES	NO	NO	NO	NO	NO	YES	NO	YES
65	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	NO
66	YES	YES	NO	NO	NO	NO	NO	NO	YES	-	-
67	YES	NO	NO	YES	NO	NO	NO	NO	YES	NO	YES
68	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	NO
69	YES	YES	NO	NO	NO	NO	NO	NO	NO	YES	NO
70	YES	YES	NO	NO	NO	NO	NO	NO	YES	-	-
71	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
72	YES	NO	NO	YES	NO	NO	NO	YES	NO	-	-
73	YES	NO	NO	YES	NO	NO	NO	NO	YES	YES	NO
74	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
75	NO	NO	NO	NO	NO	NO	NO	YES	YES	-	-
76	NO	NO	NO	NO	NO	NO	NO	NO	YES	-	-
77	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES	NO
78	NO	NO	NO	NO	NO	NO	NO	YES	YES	-	-
79	NO	NO	NO	NO	NO	NO	NO	YES	NO	-	-
80	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
81	YES	NO	NO	YES	NO	NO	NO	NO	YES	NO	YES
82	YES	NO	NO	YES	YES	NO	NO	YES	NO	-	-
83	YES	NO	NO	YES	NO	NO	NO	NO	YES	NO	YES
84	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
85	YES	YES	YES	NO	NO	NO	NO	NO	NO	YES	NO

86	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
87	YES	YES	NO	NO	NO	NO	YES	NO	-	-
88	-	-	-	-	-	-	NO	NO	NO	YES
89	NO	NO	NO	NO	NO	NO	NO	YES	-	-
90	YES	NO	NO	NO	NO	YES	NO	YES	YES	NO
91	NO	NO	NO	NO	NO	NO	NO	YES	-	-
92	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
93	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
94	YES	NO	NO	NO	NO	YES	NO	NO	YES	NO
95	YES	YES	NO	YES	NO	NO	NO	YES	YES	NO
96	YES	YES	NO	NO	NO	NO	NO	NO	YES	NO
97	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
98	YES	NO	YES	NO	NO	NO	NO	YES	YES	NO
99	YES	YES	NO	NO	NO	NO	NO	YES	-	-
100	NO	NO	NO	NO	NO	NO	NO	YES	YES	NO
101	NO	NO	NO	NO	NO	NO	NO	YES	-	-
102	NO	NO	NO	NO	NO	NO	NO	YES	-	-
103	NO	NO	NO	NO	NO	NO	NO	YES	-	-
104	YES	NO	YES	NO	NO	YES	NO	YES	YES	NO
105	NO	NO	NO	NO	NO	NO	NO	YES	-	-
106	YES	YES	NO	NO	NO	NO	YES	NO	-	-
107	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
108	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
109	NO	NO	NO	NO	NO	NO	NO	YES	-	-
110	YES	YES	NO	NO	YES	NO	NO	YES	YES	NO
111	YES	YES	NO	NO	NO	NO	NO	NO	YES	NO
112	YES	YES	NO	NO	NO	NO	NO	YES	-	-
113	YES	NO	YES	NO	NO	NO	NO	NO	YES	NO
114	NO	NO	NO	NO	NO	NO	NO	YES	YES	NO
115	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES
116	NO	NO	NO	NO	NO	NO	NO	YES	YES	NO
117	YES	YES	NO	NO	NO	NO	NO	YES	-	-
118	YES	YES	YES	NO	NO	NO	NO	YES	-	-
119	YES	YES	NO	NO	YES	NO	NO	NO	YES	NO
120	YES	NO	YES	NO	NO	NO	NO	YES	YES	NO
121	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
122	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO
123	YES	YES	NO	NO	NO	NO	NO	YES	YES	NO
124	YES	NO	YES	NO	NO	NO	NO	YES	YES	NO
125	YES	NO	YES	NO	NO	NO	NO	YES	YES	NO
126	YES	NO	YES	NO	NO	NO	NO	NO	YES	NO
127	NO	NO	NO	NO	NO	NO	YES	NO	-	-
128	NO	NO	NO	NO	NO	NO	NO	YES	-	-
129	YES	NO	YES	NO	NO	NO	NO	NO	YES	NO

RADIOGRAPHIC ASPECTS							
CASE NUMBER	RADIODENSITY	BORDER DEFINITION	PERIODONTAL SPACE ENLARGEMENT	LOSS OF LAMINA DURA	FLOATING TOOTH	ROOT RESORPTION	BONE LOSS
1	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
2	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
3	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
4	OSTEOLYTIC	ILL-DEFINED	YES	NO	NO	NO	NO
5	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
6	OSTEOLYTIC	WELL-DEFINED	YES	NO	NO	NO	NO
7	OSTEOLYTIC	ILL-DEFINED	YES	YES	NO	YES	NO
8	OSTEOLYTIC	ILL-DEFINED	YES	YES	NO	NO	NO
9	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
10	OSTEOLYTIC	ILL-DEFINED	NO	YES	NO	NO	NO
11	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	YES
12	OSTEOLYTIC	ILL-DEFINED	NO	YES	NO	NO	NO
13	OSTEOLYTIC	ILL-DEFINED	NO	NO	YES	NO	NO
14	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	YES
15	OSTEOLYTIC	WELL-DEFINED	NO	YES	NO	NO	NO
16	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
17	OSTEOLYTIC	WELL-DEFINED	NO	NO	YES	NO	NO
18	OSTEOLYTIC	WELL-DEFINED	NO	YES	NO	NO	NO
19	OSTEOLYTIC	WELL-DEFINED	NO	YES	NO	NO	NO
20	OSTEOLYTIC	WELL-DEFINED	NO	NO	NO	NO	NO
21	OSTEOLYTIC	ILL-DEFINED	NO	NO	YES	NO	NO
22	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
23	OSTEOLYTIC	WELL-DEFINED	NO	YES	NO	NO	NO
24	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
25	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
26	NO	ILL-DEFINED	NO	NO	NO	NO	NO
27	OSTEOLYTIC	WELL-DEFINED	NO	YES	YES	NO	NO
28	OSTEOGENIC	WELL-DEFINED	NO	NO	NO	NO	NO
29	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	YES
30	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
31	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
32	OSTEOLYTIC	WELL-DEFINED	NO	NO	NO	NO	NO
33	OSTEOLYTIC	ILL-DEFINED	YES	NO	NO	NO	NO
34	OSTEOLYTIC	ILL-DEFINED	YES	NO	NO	NO	NO
35	OSTEOLYTIC	ILL-DEFINED	NO	YES	NO	NO	NO
36	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
37	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
38	OSTEOLYTIC	WELL-DEFINED	NO	NO	NO	NO	YES
39	OSTEOLYTIC	WELL-DEFINED	NO	NO	NO	NO	NO
40	OSTEOLYTIC	ILL-DEFINED	NO	YES	NO	NO	NO

41	OSTEOLYTIC	WELL-DEFINED	NO	YES	NO	YES	NO
42	OSTEOLYTIC	WELL-DEFINED	NO	NO	NO	NO	NO
43	MIXED	ILL-DEFINED	NO	NO	NO	NO	NO
44	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
45	OSTEOGENIC	ILL-DEFINED	NO	NO	NO	NO	NO
46	OSTEOLYTIC	WELL-DEFINED	NO	NO	NO	NO	YES
47	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
48	OSTEOLYTIC	ILL-DEFINED	NO	NO	YES	NO	NO
49	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
50	MIXED	ILL-DEFINED	NO	NO	NO	NO	NO
51	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	YES
52	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
53	OSTEOLYTIC	ILL-DEFINED	NO	YES	NO	NO	NO
54	OSTEOLYTIC	WELL-DEFINED	NO	NO	NO	NO	NO
55	OSTEOLYTIC	WELL-DEFINED	NO	NO	NO	NO	NO
56	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
57	OSTEOLYTIC	ILL-DEFINED	YES	NO	NO	NO	NO
58	OSTEOLYTIC	ILL-DEFINED	NO	NO	YES	NO	NO
59	OSTEOLYTIC	ILL-DEFINED	YES	NO	NO	NO	NO
60	OSTEOLYTIC	ILL-DEFINED	NO	NO	YES	NO	NO
61	OSTEOGENIC	ILL-DEFINED	YES	NO	NO	NO	NO
62	OSTEOLYTIC	ILL-DEFINED	YES	NO	NO	NO	NO
63	MIXED	ILL-DEFINED	NO	YES	NO	NO	NO
64	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
65	OSTEOGENIC	ILL-DEFINED	NO	NO	NO	NO	NO
66	OSTEOLYTIC	WELL-DEFINED	NO	NO	YES	NO	NO
67	OSTEOLYTIC	ILL-DEFINED	YES	NO	NO	YES	NO
68	MIXED	ILL-DEFINED	YES	NO	NO	NO	NO
69	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
70	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
71	OSTEOLYTIC	WELL-DEFINED	NO	NO	NO	NO	NO
72	OSTEOLYTIC	WELL-DEFINED	NO	NO	NO	NO	NO
73	OSTEOLYTIC	WELL-DEFINED	YES	NO	NO	NO	NO
74	OSTEOLYTIC	ILL-DEFINED	NO	NO	YES	NO	NO
75	NO	WELL-DEFINED	NO	YES	NO	NO	NO
76	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
77	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
78	OSTEOLYTIC	ILL-DEFINED	YES	NO	NO	NO	NO
79	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	YES
80	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
81	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	YES
82	OSTEOLYTIC	ILL-DEFINED	NO	YES	NO	NO	NO
83	OSTEOLYTIC	ILL-DEFINED	NO	YES	NO	NO	NO
84	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
85	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO

86	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	YES	NO
87	MIXED	ILL-DEFINED	NO	NO	NO	YES	YES
88	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
89	OSTEOLYTIC	ILL-DEFINED	NO	NO	YES	NO	NO
90	OSTEOLYTIC	WELL-DEFINED	NO	NO	YES	NO	NO
91	OSTEOLYTIC	ILL-DEFINED	NO	YES	NO	NO	NO
92	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
93	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
94	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
95	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
96	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
97	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
98	OSTEOLYTIC	WELL-DEFINED	NO	NO	NO	NO	NO
99	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
100	OSTEOGENIC	ILL-DEFINED	NO	NO	NO	NO	NO
101	OSTEOLYTIC	WELL-DEFINED	NO	NO	YES	NO	NO
102	OSTEOLYTIC	ILL-DEFINED	NO	NO	YES	NO	NO
103	OSTEOLYTIC	ILL-DEFINED	NO	NO	YES	NO	NO
104	OSTEOLYTIC	WELL-DEFINED	NO	NO	NO	NO	NO
105	MIXED	ILL-DEFINED	NO	NO	NO	NO	NO
106	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	YES
107	MIXED	ILL-DEFINED	NO	NO	NO	NO	NO
108	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
109	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
110	OSTEOLYTIC	ILL-DEFINED	NO	NO	YES	NO	NO
111	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
112	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
113	OSTEOGENIC	WELL-DEFINED	NO	NO	NO	NO	NO
114	OSTEOLYTIC	ILL-DEFINED	NO	NO	YES	NO	NO
115	NO	ILL-DEFINED	NO	NO	NO	NO	NO
116	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
117	OSTEOLYTIC	ILL-DEFINED	NO	YES	NO	NO	NO
118	OSTEOLYTIC	ILL-DEFINED	YES	NO	NO	NO	NO
119	OSTEOLYTIC	ILL-DEFINED	NO	NO	YES	NO	NO
120	NO	ILL-DEFINED	NO	NO	NO	NO	NO
121	OSTEOLYTIC	ILL-DEFINED	NO	NO	YES	NO	NO
122	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
123	OSTEOLYTIC	ILL-DEFINED	NO	YES	NO	NO	YES
124	MIXED	ILL-DEFINED	NO	YES	NO	NO	NO
125	OSTEOLYTIC	ILL-DEFINED	NO	YES	NO	NO	NO
126	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
127	OSTEOLYTIC	ILL-DEFINED	YES	NO	NO	NO	YES
128	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO
129	OSTEOLYTIC	ILL-DEFINED	NO	NO	NO	NO	NO

CASE NUMBER	RADIOGRAPHIC ASPECTS				PROVISIONAL DIAGNOSIS
	PERIAPICAL LESION	TOOTH DISPLACEMENT	TOOTH ALTERATION	PERIOSTEAL REACTION	
1	NO	NO	NO	NO	same as final
2	NO	NO	NO	NO	inflammatory/infectious disease
3	NO	NO	NO	NO	inflammatory/infectious disease
4	NO	NO	YES	NO	inflammatory/infectious disease
5	NO	NO	NO	NO	same as final
6	YES	NO	YES	NO	inflammatory/infectious disease
7	YES	NO	YES	NO	inflammatory/infectious disease
8	NO	NO	YES	NO	inflammatory/infectious disease
9	NO	NO	NO	NO	same as final
10	NO	NO	YES	NO	inflammatory/infectious disease
11	NO	NO	YES	NO	same as final
12	NO	NO	YES	NO	inflammatory/infectious disease
13	NO	NO	YES	NO	same as final
14	NO	NO	YES	NO	same as final
15	NO	NO	YES	NO	inflammatory/infectious disease
16	NO	NO	NO	NO	same as final
17	NO	NO	YES	NO	same as final
18	NO	NO	YES	NO	inflammatory/infectious disease
19	NO	NO	YES	NO	inflammatory/infectious disease
20	NO	NO	NO	NO	inflammatory/infectious disease
21	NO	NO	YES	NO	malignant disease
22	NO	NO	NO	NO	same as final
23	NO	NO	YES	NO	same as final
24	NO	NO	NO	NO	inflammatory/infectious disease
25	NO	NO	NO	NO	inflammatory/infectious disease
26	NO	NO	NO	NO	inflammatory/infectious disease
27	NO	NO	YES	NO	same as final
28	NO	NO	NO	NO	inflammatory/infectious disease
29	NO	NO	YES	NO	reactive hyperplastic lesion
30	NO	NO	NO	NO	inflammatory/infectious disease
31	NO	YES	YES	NO	other
32	NO	YES	YES	NO	inflammatory/infectious disease
33	YES	NO	YES	NO	same as final
34	YES	NO	YES	NO	same as final
35	NO	NO	YES	NO	reactive hyperplastic lesion
36	NO	NO	NO	NO	same as final
37	NO	NO	NO	NO	same as final
38	YES	NO	YES	NO	other
39	NO	NO	NO	NO	malignant disease
40	NO	NO	YES	NO	inflammatory/infectious disease
41	NO	NO	YES	NO	-

42	NO	NO	NO	NO	inflammatory/infectious disease
43	NO	NO	NO	YES	inflammatory/infectious disease
44	NO	NO	NO	NO	inflammatory/infectious disease
45	NO	NO	NO	YES	inflammatory/infectious disease,malignant disease
46	NO	NO	YES	NO	same as final
47	NO	NO	NO	NO	same as final
48	NO	NO	YES	NO	same as final
49	NO	NO	NO	NO	same as final
50	NO	NO	NO	NO	inflammatory/infectious disease
51	NO	NO	YES	NO	same as final
52	NO	NO	NO	NO	inflammatory/infectious disease
53	NO	YES	YES	NO	inflammatory/infectious disease
54	NO	NO	NO	NO	same as final
55	NO	NO	NO	NO	malignant disease
56	YES	NO	YES	NO	other
57	NO	NO	YES	NO	malignant disease
58	NO	NO	YES	NO	odontogenic cyst/tumour
59	NO	NO	YES	NO	inflammatory/infectious disease
60	NO	NO	YES	NO	same as final
61	NO	NO	YES	NO	inflammatory/infectious disease
62	NO	NO	YES	NO	inflammatory/infectious disease,malignant disease
63	NO	YES	YES	NO	malignant disease
64	NO	YES	YES	NO	inflammatory/infectious disease
65	YES	NO	YES	NO	malignant disease
66	NO	NO	YES	NO	inflammatory/infectious disease
67	NO	NO	YES	NO	inflammatory/infectious disease
68	NO	NO	YES	NO	odontogenic cyst/tumour
69	NO	NO	NO	NO	inflammatory/infectious disease
70	NO	NO	NO	NO	inflammatory/infectious disease
71	NO	NO	NO	NO	same as final
72	NO	NO	NO	NO	inflammatory/infectious disease
73	NO	NO	YES	NO	inflammatory/infectious disease
74	NO	NO	YES	NO	same as final
75	NO	NO	YES	NO	malignant disease
76	NO	NO	NO	NO	same as final
77	NO	NO	NO	YES	other
78	YES	NO	YES	NO	same as final
79	NO	NO	YES	NO	malignant disease
80	NO	NO	NO	NO	inflammatory/infectious disease
81	NO	YES	YES	NO	inflammatory/infectious disease
82	NO	NO	YES	NO	inflammatory/infectious disease
83	YES	NO	YES	NO	inflammatory/infectious disease
84	NO	NO	NO	NO	same as final
85	NO	NO	NO	NO	inflammatory/infectious disease
86	NO	NO	YES	YES	malignant disease

87	NO	NO	YES	NO	inflammatory/infectious disease
88	NO	NO	NO	NO	malignant disease
89	NO	NO	YES	NO	malignant disease
90	NO	NO	YES	NO	inflammatory/infectious disease
91	NO	NO	YES	NO	inflammatory/infectious disease,malignant disease
92	NO	NO	NO	NO	same as final
93	NO	NO	NO	NO	same as final
94	NO	NO	NO	NO	inflammatory/infectious disease
95	YES	NO	YES	NO	inflammatory/infectious disease
96	NO	NO	NO	NO	inflammatory/infectious disease,malignant disease
97	NO	NO	NO	NO	inflammatory/infectious disease
98	NO	YES	YES	NO	other
99	YES	NO	YES	NO	same as final
100	NO	NO	NO	NO	inflammatory/infectious disease,odontogenic cyst/tumour
101	NO	NO	YES	NO	odontogenic cyst/tumour
102	NO	NO	YES	NO	malignant disease
103	NO	NO	YES	NO	malignant disease
104	YES	NO	YES	NO	inflammatory/infectious disease
105	NO	NO	NO	NO	same as final
106	NO	NO	YES	NO	inflammatory/infectious disease
107	NO	NO	NO	NO	inflammatory/infectious disease
108	NO	NO	NO	NO	other
109	NO	NO	NO	NO	same as final
110	NO	NO	YES	NO	inflammatory/infectious disease
111	YES	NO	YES	NO	inflammatory/infectious disease
112	NO	YES	YES	NO	odontogenic cyst/tumour
113	NO	NO	NO	YES	inflammatory/infectious disease
114	NO	NO	YES	NO	same as final
115	NO	NO	NO	NO	same as final
116	NO	YES	YES	NO	inflammatory/infectious disease
117	NO	NO	YES	NO	same as final
118	NO	NO	YES	NO	inflammatory/infectious disease
119	NO	NO	YES	NO	inflammatory/infectious disease
120	NO	NO	NO	NO	inflammatory/infectious disease
121	NO	NO	YES	YES	same as final
122	NO	NO	NO	NO	inflammatory/infectious disease
123	NO	NO	YES	NO	same as final
124	NO	NO	YES	NO	inflammatory/infectious disease
125	YES	NO	YES	NO	inflammatory/infectious disease
126	NO	NO	NO	NO	inflammatory/infectious disease
127	NO	NO	YES	NO	same as final
128	YES	NO	YES	NO	same as final
129	NO	NO	NO	NO	same as final

ANEXO B – PRISMA checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Page 1
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Page 3
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Page 4
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Pages 4 and 5
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Pages 5 and 6
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Page 5
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Page 5
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Page 6
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Pages 6, 7 and figure 1
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Pages 6 and 7
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Pages 6 and 7
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Page 7
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Pages 6 and 7
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Pages 6, 7 and supplementary file 1
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Page 7

Section and Topic	Item #	Checklist item	Location where item is reported
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Pages 6, 7 and supplementary file 1
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Page 7
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	N/A
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	N/A
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	Page 7
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Page 7
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Page 8 and figure 1
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Page 8 and figure 1
Study characteristics	17	Cite each included study and present its characteristics.	Supplementary file 1
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Page 8
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Supplementary file 1 and tables 1, 2 and 3
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Pages 9, 10, 11 and tables 1, 2 and 3
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	N/A
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	Pages 10 and 11
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	N/A
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Page 8

Section and Topic	Item #	Checklist item	Location where item is reported
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Page 8
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Pages 11, 12 and 13
	23b	Discuss any limitations of the evidence included in the review.	Page 12
	23c	Discuss any limitations of the review processes used.	Pages 13 and 14
	23d	Discuss implications of the results for practice, policy, and future research.	Pages 13 and 14
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Not registered
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Available in the manuscript
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/A
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Page 2
Competing interests	26	Declare any competing interests of review authors.	Page 2
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Supplementary file 1

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