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Trabalho de Conclusão de Curso

ACURÁCIA EM PRÓTESES TOTAIS REMOVÍVEIS POR IMPRESSÃO 3D: REVISÃO DE LITERATURA

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Trabalho de Conclusão de Curso apresentado ao Departamento de Odontologia da Faculdade de Ciências da Saúde da Universidade de Brasília, como requisito parcial para a conclusão do curso de Graduação em Odontologia.

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RESUMO

O objetivo deste trabalho foi analisar, por meio de uma revisão narrativa da literatura, a acurácia de próteses totais removíveis confeccionadas por impressão tridimensional (3D), destacando suas vantagens, limitações e comparações com os métodos convencionais e com a fresagem CAD/CAM. A busca bibliográfica foi realizada nas bases de dados PubMed, SciELO e Google Scholar, utilizando os descritores “Dentures, Complete”, “3D Printing”, “Accuracy”, “Removable Prosthesis” e “Digital Dentures”. Foram incluídos estudos publicados entre 2020 e 2025, em inglês, português e espanhol, que abordassem a precisão, adaptação ou veracidade dimensional de próteses totais removíveis impressas em 3D. Após a aplicação dos critérios de elegibilidade, onze estudos foram incluídos, sendo a maioria de natureza in vitro, complementados por pesquisas clínicas. Os resultados evidenciaram que os valores médios de fidelidade dimensional e precisão de adaptação variaram entre 65 µm e 500 µm, situando-se dentro dos limites clínicos aceitáveis. A fresagem apresentou melhor desempenho em acurácia dimensional e estabilidade do posicionamento dentário, enquanto a impressão 3D demonstrou resultados satisfatórios quando parâmetros como espessura de camada, ângulo de construção e tecnologia empregada (SLA ou DLP) foram adequadamente otimizados. Estudos clínicos recentes apontaram menor tempo de produção, menor necessidade de ajustes e boa adaptação das próteses impressas em relação à técnica analógica convencional. Entretanto, limitações persistem quanto à resistência mecânica das resinas fotopolimerizáveis e à escassez de ensaios clínicos de longo prazo. Conclui-se que a impressão 3D representa uma alternativa promissora e eficiente na confecção de próteses totais removíveis, com potencial para consolidar-se como técnica amplamente utilizada, à medida que houver avanços nos materiais e padronização dos fluxos digitais.

Palavras-chave: Prótese Total. Impressão 3D. Acurácia. Odontologia Digital. CAD/CAM.

ABSTRACT

The objective of this study was to analyze, through a narrative literature review, the accuracy of complete removable dentures manufactured by three-dimensional (3D) printing, highlighting their advantages, limitations, and comparisons with conventional and milled CAD/CAM methods. A bibliographic search was carried out in PubMed, SciELO, and Google Scholar databases using the descriptors “Dentures, Complete”, “3D Printing”, “Accuracy”, “Removable Prosthesis”, and “Digital Dentures”. Studies published between 2020 and 2025, in English, Portuguese, and Spanish, addressing the precision, adaptation, or dimensional trueness of 3D-printed complete dentures were included. After applying eligibility criteria, eleven studies were selected, most of which were in vitro, complemented by clinical investigations. The results showed that mean values of dimensional trueness and fitting accuracy ranged from 65 µm to 500 µm, remaining within clinically acceptable limits. Milled dentures exhibited superior dimensional accuracy and tooth positioning stability, whereas 3D-printed dentures showed satisfactory results when parameters such as layer thickness, build angle, and printing technology (SLA or DLP) were properly optimized. Recent clinical studies reported shorter production times, fewer adjustments, and satisfactory adaptation of printed dentures compared with the conventional analog technique. However, limitations remain regarding the mechanical resistance of photopolymer resins and the lack of long-term randomized clinical trials. It is concluded that 3D printing represents a promising and efficient alternative for the fabrication of complete removable dentures, with potential to become a widely used technique as material properties and digital workflows continue to advance.

Keywords: Complete Denture. 3D Printing. Accuracy. Digital Dentistry. CAD/CAM.

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3D Tridimensional

CAD/CAM Computer-Aided Design / Computer-Aided Manufacturing (Desenho e Fabricação Assistidos por Computador)

DLP Digital Light Processing (Processamento Digital por Luz)

FDM Fused Deposition Modeling (Modelagem por Deposição Fundida)

MeSH Medical Subject Headings (Descritores em Ciências da Saúde, em inglês)

PTR Prótese Total Removível

SLA Stereolithography (Estereolitografia)

UnB Universidade de Brasília

SUMÁRIO

1 INTRODUÇÃO

O edentulismo, caracterizado pela perda parcial ou total dos dentes permanentes, representa uma condição irreversível comumente associada à progressão da cárie dentária e da doença periodontal[1]. Além de suas repercussões funcionais e psicossociais, o edentulismo tem sido amplamente utilizado como importante indicador epidemiológico de saúde bucal, sendo monitorado em diversos países e em diferentes faixas etárias[2]. As próteses totais removíveis (PTRs) constituem dispositivos protéticos essenciais na reabilitação de pacientes totalmente desdentados, proporcionando a restauração das funções mastigatória, fonética e estética. Tradicionalmente, a confecção dessas próteses segue um protocolo analógico, que inclui uso de diversos materiais odontológicos e habilidade técnico-científico do profissional cirurgião-dentista, para a realização de moldagens, obtenção de modelos em gesso, montagem em articuladores, provas clínicas e prensagem com resina acrílica termopolimerizável. Apesar de amplamente utilizada e consolidada, essa técnica pode apresentar variações dimensionais e falhas humanas ao longo de suas etapas, o que potencialmente compromete a adaptação e a retenção da prótese[3].

Com os avanços na odontologia digital, novas abordagens têm sido desenvolvidas para a confecção de próteses totais removíveis (PTRs), utilizando tecnologia CAD/CAM e impressão tridimensional (3D). Nesse fluxo digital, os modelos são escaneados e projetados virtualmente, possibilitando a fabricação das próteses por dois principais métodos: fresagem (método subtrativo) e impressão 3D (método aditivo).

Na fresagem, a base da prótese é obtida pela remoção de material de um bloco sólido, geralmente de resina acrílica pré-polimerizada, por meio de máquinas usinadoras de alta precisão. Esse processo tende a gerar estruturas com excelente densidade e estabilidade dimensional, porém com maior desperdício de material e limitações no design interno da peça[4]. Já a impressão 3D realiza a construção camada a camada da prótese, depositando ou fotopolimerizando sucessivamente o material (como resinas fotocuráveis), em técnicas como a estereolitografia (SLA) ou o processamento digital por luz (DLP). Esse método apresenta vantagens como maior economia de material, velocidade de produção e possibilidade de personalização, embora a acurácia

dimensional — que engloba tanto a veracidade quanto a precisão de adaptação — ainda seja um dos principais desafios dessa tecnologia[5,6].

Apesar do crescente interesse da literatura na Odontologia Digital, ainda persistem lacunas quanto à comprovação da acurácia de próteses totais removíveis produzidas por impressão 3D, sobretudo, quando comparadas às técnicas convencionais. Diante desse contexto, o presente estudo tem como objetivo analisar, por meio de revisão narrativa da literatura, a acurácia de próteses totais removíveis confeccionadas por impressão 3D, destacando suas vantagens, limitações e comparações com os métodos tradicionais de confecção.

2 METODOLOGIA

Esta revisão narrativa foi conduzida seguindo algumas recomendações de protocolos de revisão sistemática, com o objetivo de orientar a busca por artigos e definir uma estratégia de pesquisa mais clara. As buscas foram realizadas nas bases de dados PubMed, e Scielo, além de uma busca adicional na literatura cinzenta, por meio do Google Scholar, limitadas às primeiras 50 referências recuperadas pela viabilidade e relevância.

A estratégia de busca foi estruturada com base no acrônimo PICOS: População (P), Intervenção (I), Comparação (C), Resultados (O) e Tipo de Estudo (S). A população incluiu pacientes desdentados usuários de próteses totais removíveis; a intervenção foi a confecção dessas próteses por impressão tridimensional (3D); a comparação, quando aplicável, envolveu métodos tradicionais de confecção; o desfecho investigado foi a acurácia das próteses; e os tipos de estudo considerados incluíram relatos de caso, séries de casos, estudos transversais, caso-controle, coortes, ensaios clínicos e estudos in vitro.

Em cada base de dados, foram elaboradas estratégias de busca específicas, adaptadas à sua sintaxe e filtros disponíveis. Utilizaram-se descritores controlados (MeSH e DeCS) e palavras-chave livres combinadas pelos operadores booleanos AND e OR**.** Os principais termos empregados foram *“Dentures, Complete”*, *“3D Printing”*,

“Accuracy”, *“Removable Prosthesis”* e *“Digital Dentures”*, bem como suas correspondentes em português e espanhol. Para garantir a reprodutibilidade, as estratégias exatas utilizadas em cada base de dados estão apresentadas no Quadro 1. No Google Scholar, a pesquisa foi simplificada, restringindo-se às 50 primeiras referências recuperadas. Também foi realizada busca manual nas referências dos artigos incluídos, de acordo com a relevância temática. Todos os registros foram organizados em planilha eletrônica e as duplicatas removidas antes da seleção final.

Quadro 1 – Estratégias de busca utilizadas nas bases de dados

Base de Dados	Estratégia de Busca
PubMed (MEDLINE)	("Dentures, Complete"[MeSH Terms]) AND ("3D Printing"[MeSH Terms] OR "Additive Manufacturing"[MeSH Terms]) AND ("Accuracy"[All Fields] OR "Trueness"[All Fields])
SciELO	("Prótese total" OR "Prótese removível") AND ("impressão 3D" OR "fabricação aditiva") AND ("precisão" OR "adaptação" OR "exatidão")
Google Scholar	"3D printed complete dentures" AND "accuracy" AND "digital workflow"

Fonte: Elaborado pelo autor (2025).

Foram incluídos estudos que atenderam aos seguintes critérios: a) publicações em inglês, português ou espanhol; b) publicados nos últimos cinco anos (2020 a 2025); c) relatos de caso, séries de casos, estudos transversais, caso-controle, coortes, estudos in vitro ou ensaios clínicos sobre a acurácia de próteses totais removíveis obtidas por impressão 3D; d) trabalhos de conclusão de curso de graduação e pós-graduação relacionados ao tema. Foram excluídos: a) estudos sobre características diferentes da acurácia; b) cartas, capítulos de livros, resumos de conferências e revisões; c) estudos com informações incompletas; d) artigos sem acesso ao texto completo.

A seleção de artigos ocorreu em duas fases: inicialmente, pela leitura de títulos e resumos, aplicando os critérios de inclusão e exclusão; em seguida, pela leitura integral

dos textos selecionados. Os dados dos estudos incluídos foram coletados em um quadro contendo autor(es), ano de publicação, país, desenho do estudo e resultados relacionados à acurácia das próteses totais removíveis por impressão 3D. A síntese dos dados foi realizada de forma descritiva.

3 RESULTADOS

A estratégia de busca resultou na identificação de 114 estudos, sendo 50 provenientes da base PubMed, 50 da SciELO e 14 do Google Scholar. No caso do PubMed e SciELO, as buscas foram deliberadamente limitadas a 50 registros mais relevantes, conforme descrito na metodologia, de modo a garantir a viabilidade da triagem e evitar duplicações extensas. Já na base Google Scholar, embora a estratégia de busca tenha sido inicialmente configurada para abranger até os 50 primeiros resultados, apenas 14 artigos atenderam aos critérios de inclusão, após a aplicação imediata dos critérios de exclusão (idioma, duplicidade e ausência de texto completo).

Após a remoção das duplicatas, 50 estudos permaneceram para leitura de títulos e resumos. Desses, 11 foram considerados elegíveis para leitura do texto completo e, posteriormente, todos foram incluídos na revisão.

Foram incluídos 11 estudos publicados entre 2020 e 2025, conduzidos em diferentes países, como Estados Unidos, Alemanha, Japão, China e Suíça. A maioria foi composta por pesquisas in vitro, complementadas por ensaios clínicos e estudos comparativos. A Tabela 1 apresenta a síntese dos principais dados coletados, incluindo tipo de estudo, método de fabricação, variáveis analisadas e resultados principais.

Tabela 1. Características dos estudos incluídos na revisão, segundo autor, ano, país, tipo de estudo, método de fabricação e principais resultados

Autor / Ano	País	Tipo de estudo	Método de fabricação	Equipamento / Tecnologia utilizada	Variável principal	Principais resultados
AlHelal et al. (2023) [7]	Arábia Saudita	In vitro	Fresagem × Impressão 3D	Impressora de esteriolitografia - SLA (NextDent 5100, 3D Systems); fresadora CAD/CAM (Ceramill Motion 2, Amann Girrbach)	Posicionamento dentário	Desvios lineares médios: 0,15 mm (fresada) × 0,27 mm (impressa)
Charoenphol et al. (2021) [8]	EUA / Multicêntrico	In vitro	Fresagem × Impressão 3D	Impressora DLP (Asiga Max UV); fresadora (DWX-52D, Roland)	Adaptação da base	Fresagem mais precisa nas áreas de suporte; impressão adequada na selagem posterior
Faur et al. (2024)[9]	Romênia	Clínico	Convencional × Fresagem × Impressão 3D	Impressora SLA (Formlabs Form 3B); CAD/CAM exocad	Veracidade da superfície intaglio	Impressão: 176,9 µm; Convencional: 342 µm
Kim et al. (2022)[10]	Coreia do Sul	In vitro	Impressão 3D (variação de parâmetros)	Impressora DLP (NextDent 5100); software 3Shape Dental System	Veracidade / tempo / material	Ângulos de 45° e 225° apresentaram menor desvio dimensional
Lee et al. (2023)[11]	Coreia do Sul	In vitro	Fresagem × Impressão 3D	Impressora SLA (Zenith U, Dentis); fresadora (Arum 5X-200)	Precisão de ajuste	Fresagem mais precisa ($p < 0,05$)
Mühlemann et al. (2023)[12]	Suíça	In vitro multicêntrico	Fresagem × Impressão 3D	Impressora DLP (Asiga Max UV); fresadora (Ceramill Motion 2)	Posicionamento dentário	Fresagem mais estável em dentes posteriores
Papaspyridon et al. (2025)[13]	Reino Unido	In vitro	Convencional × Digital	Impressora SLA (Form 3B, Formlabs)	Acurácia e estabilidade dimensional	Bases digitais mais estáveis após 6 meses
Yoshidome et al. (2021)[14]	Japão	In vitro	Fresagem × Impressão 3D (SLA/DLP)	Impressoras SLA e DLP (NextDent 5100 / Asiga Max UV)	Veracidade e precisão de ajuste	SLA em 45° e 225°: menores desvios dimensionais
Zhang et al. (2020)[15]	China	In vitro	Três tecnologias de impressão 3D	SLA, DLP e FDM (variadas marcas)	Precisão dimensional	SLA mais precisa que FDM e DLP
Müller et al. (2021)[16]	Alemanha	In vitro	Fresagem × Impressão 3D	Impressora DLP (Asiga Pro 2); fresadora (Ceramill Motion 2)	Acurácia dimensional	Valores dentro dos limites clínicos
Lee et al. (2024)[17]	Coreia	Clínico	Impressão 3D	Impressora DLP (NextDent 5100)	Adaptação clínica	Ajustes mínimos necessários

Fonte: Elaborado pelo autor (2025)

De modo geral, os estudos analisados relataram valores médios de fidelidade dimensional (trueness) e precisão de adaptação (fitting accuracy) dentro dos limites clínicos aceitáveis, variando de 65 µm a 500 µm. Valores de adaptação entre 100 µm e 300 µm são amplamente considerados clinicamente aceitáveis, pois não comprometem a estabilidade nem a retenção das próteses totais removíveis [7-10]. A maioria dos trabalhos indicou melhor adaptação nas próteses fresadas, atribuída à maior homogeneidade do material e à estabilidade dimensional da resina acrílica pré-polimerizada utilizada nesse método[9,11,12]. Por outro lado, a impressão 3D demonstrou desempenho satisfatório quando os parâmetros de fabricação — como espessura de camada, ângulo de construção e tipo de tecnologia (SLA ou DLP) — foram otimizados[10,14,15]. Em especial, as tecnologias SLA e os ângulos de 45° a 225° resultaram em menores desvios dimensionais, indicando maior precisão e estabilidade dimensional[10,14]. Em relação ao posicionamento dentário, os desvios lineares médios variaram de 0,15 mm a 0,27 mm, sendo menores nas próteses fresadas [7,11,12]. Os estudos clínicos corroboraram os achados laboratoriais, demonstrando que ambos os métodos digitais são clinicamente viáveis, com menor tempo de produção e necessidade reduzida de ajustes durante a instalação quando comparados à técnica analógica convencional[9,13,17].

4. DISCUSSÃO

Os resultados desta revisão indicam um cenário de evolução tecnológica significativa na confecção de próteses totais removíveis digitais, destacando a impressão 3D como uma alternativa promissora às técnicas convencionais e à fresagem CAD/CAM. Embora a fresagem ainda seja considerada o padrão de referência em termos de acurácia dimensional, diversos estudos demonstraram que a impressão 3D tem alcançado níveis de precisão clinicamente aceitáveis, especialmente quando parâmetros de fabricação são otimizados [7–10].

É importante destacar que a análise da fidelidade dimensional (*trueness*) e da precisão de adaptação (*fitting accuracy*) não se restringiu a um único estudo, daqueles incluídos neste trabalho. Diversos trabalhos incluídos nesta revisão avaliaram essas

variáveis sob diferentes perspectivas experimentais, como os de Charoenphol et al.[8], Faur et al.[9], Kim et al.[10], Lee et al.[11], Mühlemann et al.[12] e Y oshidome et al.[14]. Em conjunto, esses estudos demonstraram que, embora as próteses fresadas apresentem desempenho superior em precisão dimensional, as próteses impressas em 3D alcançam valores dentro dos limites clínicos aceitáveis (≤ 500 µm), desde que os parâmetros de fabricação, como tecnologia, orientação de impressão e espessura de camada, sejam adequadamente controlados.

O estudo de Lee et al.[11] foi o que estabeleceu numericamente a faixa de tolerância clínica de 375 µm a 500 µm, referência utilizada para contextualizar os achados dos demais autores. Esse conjunto de evidências reforça que, apesar das diferenças técnicas, as próteses impressas podem apresentar desempenho funcional adequado para uso clínico, sobretudo quando empregadas em fluxos digitais bem controlados.

A acurácia dimensional mostrou-se influenciada por múltiplos fatores, incluindo o tipo de tecnologia de impressão empregada (SLA, DLP ou FDM), a orientação de construção, a espessura de camada e o pós-processamento. Yoshidome et al.[8] observaram que impressões realizadas com tecnologia SLA em ângulos de construção de 45° e 225° apresentaram menores desvios dimensionais, superando inclusive métodos convencionais em algumas regiões da base protética. Esses resultados se explicam pelo melhor controle geométrico proporcionado por determinadas orientações de impressão, que reduzem deformações associadas à polimerização em camadas. Em contrapartida, a fresagem parte de blocos estáveis e pré-polimerizados, conferindo maior estabilidade dimensional ao longo do processo[12]. Essa diferença metodológica justifica, em parte, a superioridade da fresagem observada em regiões críticas de suporte, como rebordos alveolares e áreas de selagem posterior[8].

No que se refere ao posicionamento dentário, os estudos analisados demonstraram que as próteses fresadas mantêm maior precisão linear e angular em comparação com as impressas. AlHelal et al.[7] observaram desvios lineares médios de 0,15 mm nas próteses fresadas contra 0,27 mm nas impressas, diferenças estatisticamente significativas. Mühlemann et al.[12] também relataram melhor

estabilidade posicional em dentes posteriores em próteses fresadas, ressaltando que pequenos desvios nessa região podem alterar relações cêntricas e impactar a oclusão funcional. No entanto, a magnitude desses desvios permaneceu dentro de limites clínicos aceitáveis em todos os estudos, indicando que a impressão 3D, quando bem controlada, é capaz de produzir próteses com posicionamento dentário funcionalmente satisfatório[8,9,11]. Tecnologias de maior resolução, como SLA, e a correta definição de parâmetros de impressão podem reduzir significativamente esses desvios[14].

Outro aspecto relevante identificado nos estudos revisados refere-se ao tempo de produção, custo e aplicabilidade clínica. A impressão 3D mostrou-se consistentemente mais rápida e economicamente vantajosa em comparação à fresagem, uma vez que permite a produção simultânea de múltiplas bases em um único ciclo, além de reduzir o consumo de material e a necessidade de acabamento manual[12,14]. O custo unitário das próteses impressas tende a ser inferior, especialmente em fluxos laboratoriais otimizados, enquanto a fresagem, apesar de mais precisa, implica maior tempo de execução e desperdício de material[7,11]. Do ponto de vista clínico, Faur et al.[9] demonstraram que as próteses impressas necessitam de poucos ajustes durante a instalação, apresentando adaptação e estabilidade satisfatórias, o que reforça sua viabilidade prática para uso clínico. Esses fatores tornam a impressão 3D particularmente atrativa em cenários que demandam agilidade e padronização, como clínicas universitárias, casos provisórios ou laboratórios com alta produção.

Entre os estudos analisados, apenas Faur et al.[9] e Papaspyridon et al.[13] incluíram grupos confeccionados por técnicas convencionais (analógicas), possibilitando a comparação direta com métodos digitais. Ambos indicaram desempenho superior das próteses digitais quanto à adaptação e estabilidade, especialmente nas bases fresadas, embora os valores obtidos pela impressão 3D também se mantivessem dentro de limites clínicos aceitáveis. Os demais estudos avaliaram exclusivamente métodos digitais, focando em parâmetros de fabricação e desempenho dimensional.

Apesar das vantagens, é importante reconhecer as limitações atuais da impressão 3D. A resistência mecânica das resinas fotopolimerizáveis ainda pode ser inferior à dos blocos acrílicos pré-polimerizados utilizados na fresagem, o que pode

afetar a longevidade clínica e a resistência ao desgaste das próteses totais[11,15]. Além disso, variações na orientação de impressão, na espessura de camada e no pós-processamento podem gerar desvios dimensionais cumulativos, exigindo controle rigoroso dos parâmetros operacionais[10,14].

A maioria dos estudos incluídos nesta revisão é de natureza in vitro, o que limita a extrapolação direta dos resultados para a prática clínica de longo prazo. Há ainda escassez de ensaios clínicos randomizados com acompanhamento prolongado, capazes de avaliar aspectos como estabilidade dimensional, resistência ao desgaste, retenção e manutenção das próteses impressas após meses ou anos de uso[13,17]. No entanto, alguns autores relatam avanços importantes em direção à eliminação parcial das etapas convencionais. Estudos recentes demonstraram a possibilidade de substituir as moldagens físicas por escaneamentos intraorais ou extraorais de modelos de prova, embora a captura de áreas extensas e tecidos moles ainda represente um desafio técnico significativo[9,11]. O uso de articuladores digitais e softwares de oclusão virtual também tem permitido reduzir ou até dispensar o articulador mecânico tradicional em determinadas etapas, mas a maioria dos protocolos clínicos ainda realiza uma validação final em articulador convencional, principalmente para confirmar a relação maxilomandibular[9,11,17].

Em relação ao tempo clínico, os fluxos digitais — tanto por fresagem quanto por impressão 3D — têm demonstrado redução média de 30% a 50% no tempo total de produção quando comparados à técnica analógica convencional[9,17]. Essa economia resulta da eliminação de múltiplas etapas laboratoriais, como prensagem e acabamento, e da possibilidade de ajustes digitais diretos, o que reforça a tendência de uma odontologia cada vez mais integrada e eficiente.

As perspectivas futuras, entretanto, são promissoras. O desenvolvimento de novas resinas com maior resistência mecânica e menor contração de polimerização, aliado ao aprimoramento contínuo das tecnologias de impressão e dos softwares de design digital, tende a reduzir ainda mais as diferenças em relação à fresagem[10,14]. A integração com escâneres intraorais e fluxos clínicos totalmente digitais pode simplificar o processo de confecção, reduzir o número de consultas e aumentar o conforto do

paciente[3,6]. Nesse contexto, a impressão 3D apresenta-se não apenas como uma ferramenta auxiliar ou alternativa provisória, mas como uma tecnologia com potencial para se tornar dominante na confecção de próteses totais removíveis nos próximos anos.

5. CONSIDERAÇÕES FINAIS

Em síntese, a literatura consultada demonstrou que a impressão 3D, embora ainda apresente limitações, é uma tecnologia em franca evolução, capaz de oferecer resultados clínicos previsíveis, precisão adequada e vantagens operacionais significativas. A consolidação do seu uso dependerá do amadurecimento dos materiais, da padronização dos protocolos e da expansão de evidências clínicas de longo prazo, especialmente no que diz respeito à durabilidade e estabilidade em ambiente intraoral.

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ANEXO A - Normas da revista para publicação

Brazilian Dental Science

Author Guidelines

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SCOPE AND POLICY

The Journal BRAZILIAN DENTAL SCIENCE is a continuous scientific publication of the Institute of Science and Technology of São José dos Campos - Unesp. All articles published by BDS are open access and have undergone double-blind peer review and after acceptance are quickly available for everyone to read and download.

MISSION - To disseminate and promote rapid communication and interchange high-quality scientific information amongst the national and international academy, industry, and the dental practitioner, through basic and applied research.

POLICY - Editorial policy of Brazilian Dental Science (BDS) is to welcome submissions from academics throughout the world, rather than just publish research from Brazilian institutions or Brazilian academics, in the categories of Clinical Research, Laboratory Research, Short communications, Reviews, Clinical Techniques/Case Presentations and Invited Papers, as well as Editorials, Letters and Abstracts.

Online submission and editorial system available at **http://bds.ict.unesp.br**.

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Orofacial research scientists, materials scientists, clinicians, students of dentistry, and dental and medical device manufacturers.

IMPACT FACTOR

CiteScore (updated in June 2022) **Annual 2021: 1.5**

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1 - General Information

The Brazilian Dental Science (2178-6011) is a continuation of the **Pos-Graduação em Revista** (1516-1501) and **Ciência Odontológica Brasileira** (1678-2046).

The **Pos-Graduação em Revista** was published between 1998-2002, continued from 2002 to 2012 as **Ciência Odontológica Brasileira**, and then, since 2013, **as Brazilian Dental Science**.

Its abbreviated title is **Braz. Dent. Sci.**, and it should be used in bibliographies, footnotes, references, and bibliographic strips.

The Journal BRAZILIAN DENTAL SCIENCE is a trimonthly scientific internationally peer-reviewed open access publication of the Sao Paulo State University – UNESP- Institute of Science and Technology of São José dos Campos, with a strong motto to promote advance research applications in Dentistry.

Brazilian Dental Science (BDS) publishes original scientific articles, invited reviews, reviews in general (systematic, meta-analysis, critical review, state of the art reviews, etc), short communications, editorials, letter to the editor, series of cases and case reports, which provide an international readership with up-to-date results of basic and clinical studies in the field of oral and maxillofacial science and aims to clarify the relevance of these results for a modern practice.

Manuscript submission and evaluation process at BDS are free of charge

There are no fees for submission and evaluation of articles.

The Publication Fee is R$ 600,00 Reais Brasileiros (for Brazilian authors) or U$ 250.00 American dollars (for foreign authors) and will be charged to the corresponding author.

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To submit a manuscript for BDS, it is necessary to **register** in the website, providing a login and password. **Important:** Before concluding the registration form, please certify that the option **author** of the "Register as" item is checked. Once registered as author, enter 'User Home' (third link at the top menu), then enter 'author' and 'start a new submission.' The manuscripts should be written in concise and clear English for a proper comprehension. There is no limit for authors in the paper. However, all activities of the co-authors must be clarified in the **title page.**

Research in humans must provide the protocol number of the Institutional Review Board in the "Material and Methods" session of the manuscript. The original document must be attached in a separate file to guarantee a blind revision.

Editors and reviewers spend many hours reading manuscripts, and therefore they appreciate receiving material that has been carefully prepared in accordance with these Instructions to Authors.

The Editor and Publisher reserve the right to make minimal literary corrections for the sake of clarity. Authors for whom English is not the first language should have their manuscripts read by colleagues fluent in English. If extensive English corrections are needed, authors may be charged for the cost of editing or an English certificate revision will be request.

Manuscripts which are not written in fluent English will be rejected automatically without refereeing.

A plagiarism detection will be performed in the beginning of the process by the assistant editors of BDS team. A match percentage of less than 25% is recommended.

Authors are required to suggest **two** potential reviewers for their submitted article (name and email address are required). Reviewers must have no conflict of interest with manuscript. Authors must pay attention in this recommendation. Find potential reviewers from a country different from yours.

Authors' responsibilities:

Authors are responsible for the content originality of manuscripts;

Manuscripts should not be submitted to other journals until a final decision is issued;

Authors are individuals who effectively contributed to the study, being familiar with its contents;

Authors should declare they have read the final version of the manuscript and assume the responsibility for its contents (**copyright** transfer with original signature).

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2 - Manuscript preparation

To facilitate the editing of your manuscript, and lessen the time for publication, please adhere to the following simple general guidelines and advices:

1. Use double spacing throughout, with margins of 2 cm on each side, and Arial justified paragraph (size 12).
2. The article should not contain any author identification.
3. Be especially careful to use full stop as decimal point, not comma. As spell checker, use American English.
4. Number the pages consecutively beginning with the Abstract. Do not number lines.
5. Be consistent: use the same form of units, etc., and key these elements in exactly the same way throughout the manuscript. Put a space between the digits and the unit, e.g. 5.2 mm.
6. When emphasizing words (seldom necessary), use the italics feature of your text processor software rather than the underline feature
7. Do not use the uppercase l for 1 (one) or the uppercase O for 0 (zero), use the proper numerals instead.
8. Use the space bar only as a word separator, not as a tabulator.
9. Format tables using the table functions of your text processor.

General structure of the manuscripts

Laboratory or Clinical Research Manuscripts (in full and "Short Communication") must include:

- Title (English) and (Portuguese - only for Brazilian native speakers authors)
- Abstract (English) and (Portuguese - only for Brazilian native speakers authors)
- Introduction, Material & Methods, Results, Discussion and Conclusion
- References

Case Report / Clinical Technique Manuscripts must include:

- Title (English) and (Portuguese - only for Brazilian native speakers authors)
- Abstract (English) and (Portuguese - only for Brazilian native speakers authors)
- Introduction, Case report description, Discussion and Conclusion
- References

Literature Review Manuscripts must include:

- Title (English) and (Portuguese - only for Brazilian native speakers authors)
- Abstract (English) and (Portuguese - only for Brazilian native speakers authors)
- Critical Review
- Discussion, final analysis or considerations
- References

Title Page

A title page should be submitted as supplemental material containing the article's title, name of authors and affiliations (degree, department, university, city, and country), and the corresponding author's address.

The ORCID and contribution of each author must be included in the title page.

Authors are required to suggest **two** potential reviewers for their submitted article. Reviewers' information (name, telephone, email address and affiliation) should be provided. Reviewers should declare any conflict of interest with the manuscript.

The role and contribution of each author should be stated in the title page.

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All manuscripts should be accompanied by a **letter of transmittal**, signed by each author, and stating that the manuscript is not concurrently under consideration for publication in another journal, that all of the named authors were involved in the work leading to the publication of the paper, and that all the named authors have read the paper before it is submitted for publication.

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We hereby attest the study is original and does not present manipulated data, fraud or plagiarism. We made significant scientific contribution to the study and we are aware of the

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This text must be printed and signed by all authors. The scanned version should be submitted as supplemental file during the submission process.

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The names and email addresses entered in this journal site will be used exclusively for the stated purposes of this journal and will not be made available for any other purpose or to any other party.

Types of Manuscripts

A. Original Research Manuscripts

(These formatting instructions are valid for both clinical- and laboratory-based research, as well as for manuscripts “in full” and for “short communications”)

Abstract

Abstract MUST be limited to 250 words. The abstract should briefly state the manuscript objective(s), material and methods, main results, and most important conclusions, and therefore must present the following headings: Objective, Material and Methods, Results, and Conclusions. Abbreviations should be avoided (except for well-known acronyms like WHO, AIDS, etc.). Do NOT include references. The abstract should be formatted into a single paragraph.

Keywords

Give not more than five keywords in alphabetical order after the abstract. Use terms from the medical subject headings list, which you can find at **https://meshb.nlm.nih.gov/search**. These keywords will be used for indexing purposes.

Abstract and keywords should be included in the main document file, followed by the main text containing the headings described below.

Introduction

Provide the context or background for the study (i.e. the nature of the problem and its significance). Only pertinent references should be used. Do NOT include data or conclusions

from the work being reported. In the last paragraph of the Introduction section, authors MUST concisely state the aim of the study and, if applicable, present the study hypothesis.

Material and Methods

In this section, describe all methods, materials and sample so that other researchers would be able to reproduce the reported methodology. Use appropriate subheadings for the different segments of the Material and Methods section, when doing so could improve objectiveness. For well-known methods, a brief description and a reference to another paper may be enough. However, if you deviate from the well-knows methods, you MUST provide a more complete description of the methodology. Authors MUST present materials' name, number and batch, and manufacturers' name, city, and country. Both materials and manufacturers information should be in parenthesis. Quantitative estimates of the validity and reliability of the methods are desirable. Report length, height, weight, and volume in metric units (meters, kilograms, or liters), or their decimal multiples. Provide temperatures using Celsius. The use of the International System of Units (SI) is recommended. Correct unit abbreviations should be used (e.g. ''yr'', ''wk'', ''d'', ''h'', ''min'', ''s'' and ''µm''). Scientific names of bacteria, binomials in italics, MUST be given in full when first mentioned. Subsequent mention may abbreviate genus, taking care that this abbreviation is unambiguous (Staph. or Strep. instead of S.).

Authors MUST provide information regarding to the Institutional Review Board (IRB) approval for studies involving humans or animals, including **IRB approval number**. The submission of the IRB approval memorandum as supplementary material is mandatory.

Results

Present your results in a logical sequence giving the main or most important findings first, usually in past tense, WITHOUT subjective comments and comparison with other studies. For clarity, the Results section might have subheadings.

Data that can be easily found in the tables or illustrations MUST NOT be repeated in the text. Restrict tables and figures to those needed to explain the argument of the paper and to assess its support. Use graphs as an alternative to tables with many entries. Do NOT duplicate data in graphs and tables.

Discussion

The Discussion section should present the interpretation of the findings. This section is the appropriate section for subjective comments and comparison with other studies. Authors MUST NOT repeat what has already been reported in the Results section.

Conclusion

The conclusion MUST be restricted to the main outcomes of the manuscript (results) and whether these data confirm or reject the study hypothesis. It MUST NOT contain over-generalizations or recommendations.

Acknowledgments

Collate acknowledgments in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).

Example: The authors are grateful to XXXXXXXXXXXXXX for content contributions, XXXXXXXXXXXXX for their critical review of the manuscript and the XXXXXXXXXXXXXXXXXX for support during the development and writing of these manuscript.

Funding

This study was partially or totally supported by XXXXXXXXXXXXX [grant numbers xxxx, yyyy].

If no funding has been provided for the research, please include the following sentence: “This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.”

Conflict of Interest

The authors have no proprietary, financial, or other personal interest of any nature or kind in any product, service, and/or company that is presented in this article.

Regulatory Statement

This study was conducted in accordance with all the provisions of the local human subjects oversight committee guidelines and policies of: XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX. The approval code for this study is: XXXXXXXXXXXXXXXXXXXXX.

References

B. Short Communications

Short communication is a section dedicated to short papers addressing new ideas, controversial opinions, "Negative" results for example. As short Communications are short papers, they will receive priority and rapid publication, and each paper will begin with "Short Communication" followed by the title.

Short Communications are limited to 3000 words. The structure of the main file must follow the same guide for original manuscripts above, however with minimal quantity of figures and tables. Please, go to **Figures and Legends** topic to observe the requirements for the files.

C. Review articles

C.1 Systematic Review and Meta-analysis: gather as much evidence as possible on a specific question and present the pooled findings together

C.2 Narrative Literature Review: succinct summary of some literature. This type of manuscript needs invitation or approval by the editor-in-chief before submission. Authors interested in submitting to this section must contact the Editor-in-chief of Brazilian Dental Science, Dr. Sergio Gonçalves, at **sergio.e.goncalves@unesp.br** for submission approval and instructions.

C.3 Critical Review: These manuscripts should summarize information that is well known and emphasize recent developments over the last five years with a prominent focus on critical issues and concepts that add a sense of excitement to the topic being discussed.

C.4 State of the Art: update on new, reemerging, or in vogue topic.

The author is advised to develop a systematic review in the Prisma style and format. For more information on systematic reviews, please see **https://www.equator-network.org/reporting-guidelines/prisma-scr.**

The systematic review consists of:

- An Abstract using a structured format (Statement of Problem, Purpose, Material and Methods, Results, Conclusions).
- Text of the review consisting of an introduction (background and objective), methods (selection criteria, search methods, data collection and data analysis), results (description of studies, methodological quality, and results of analyses), discussion, authors' conclusions, acknowledgments, funding, and conflicts of interest. References should be peer reviewed.
- Tables and figures, if necessary, showing characteristics of the included studies, specification of the interventions that were compared, the results of the included studies, a log of the studies that were excluded, and additional tables and figures relevant to the review.
- Statistical methods (meta-analysis) may or may not be used to analyze and summarize the results of included studies.

- Must be thorough and reproducible.
- Ideally include a hand-search and gray-literature search.
- The review should cover the topic completely and be thoroughly referenced and maximum length 10 printed pages, approximately 33 typescript pages, including illustrations and tables.
- An example of a Journal systematic review:

dos Santos, SHB.; Poletto-Neto, V.; de Queiroz, ABL.; Sarkis-Onofre, R.; & Pereira-Cenci, T. Failure of miniscrews installed in maxilla and mandible: a systematic review and meta-analysis. Brazilian Dental Science, 2020, 23(3), 7-p.

https://bds.ict.unesp.br/index.php/cob/article/view/2049/1534

D. Case Report Preparation

Case Reports: Case reports will only be considered if they document new knowledge with unique, clinically relevant, challenging characteristics and illustrating unusual observations, showing potential non-obvious solutions to the clinical challenge. Exclusive diagnostic findings or diagnostic challenge of rare conditions.

When describing a patient's case, accurate pre- and post-treatment records are needed that demonstrate excellence in their results, including a complete diagnostic evaluation, development and follow-up.

Informed consent and approval from the ethics committee, properly documented in the article, is required so that the author can include details of the case, information or images of the patient in the publication.

- Title
- Abstract: (limited to 250 words. Next to the abstract, put a maximum of 5 keywords in alphabetical order, these must be in accordance with **https://www.ncbi.nlm.nih.gov/mesh**)
- Main text: Introduction, Case report, Discussion and Conclusion
- Acknowledgment, Funding, Regulatory Statement, Conflict of Interest
- References

For Brazilian authors, submission of abstract files in English and Portuguese is required.

We encourage authors to consult and follow the guidelines:

https://www.equator-network.org/reporting-guidelines/care

Patient Consent and Ethics: Must be performed according to the Declaration of the World Medical Association of Helsinki.

For all kind of manuscript (A to D)

A. Figures and Legends

- The figures, tables and illustrations are embedded in the text, and also provided in separate files with the requested resolution.
- Upload the figures as **Supplemental Material** (step 4 of the submission process).
- The tables must be in word format (including titles, description, footnotes).
- The figures must be in electronic file format **JPG** or **TIFF**.
- The size of the file must be **over 300 DPI**, with **minimum of 1200 pixels**.
- dimension of the figures should be close to the desired dimensions of the published version.
- The dimensions must be **17 X 11 cm** or **8 X 5 cm**.

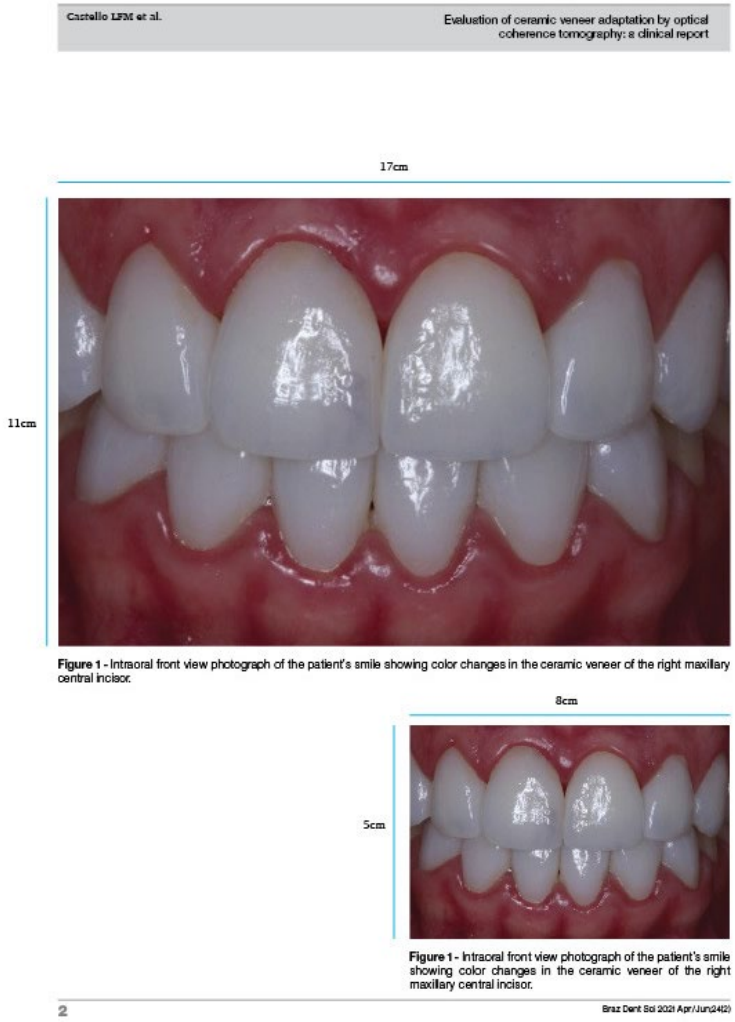

Figure 1 - Examples of recommended dimensions.

- Number the figures according to their sequence in the text, use Arabic numerals.

- Aim to use the following fonts in your figures: Arial, Courier, Times New Roman, Symbol, or use fonts that look similar.
- Make sure that letters, numbers, and symbols added to figures are clear, in proportion to each other, and large enough to be legible in the publication.
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- Give each figure a legend containing sufficient information to make it intelligible without reference to the text.
- Type all the legends together, double-spaced, on separate page(s) at the end of the main manuscript file.

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Articles published in peer-reviewed journals are preferably accepted as references. Manuscripts being in the writing process, master dissertations or doctorate thesis, and abstracts presented at conferences are not acceptable as references. Book references should be kept at the indispensable minimum as they show the opinions of the respective authors and/or editors. References to the most recent books with international access will only be accepted.

References must be numbered (numbers between squared brackets - eg: [12]) as they appear in the text and must follow the Vancouver Reference System (details may be found at **http://www.icmje.org/index.html#reference**)

Examples as follows: (Abbreviations of the titles of international journals cited should follow MEDLINE. If there is the doi, add in the reference)

Costa TR, Ferreira SQ, Klein-Junior CA, Loguercio AD, Reis A. Durability of surface treatments and intermediate agents used for repair of a polished composite. Oper Dent. 2011 Mar-Apr;35(2):231-7. doi: 10.2341/09-216-L.

Knorst JK, Barriquello GS, Villetti MA, Santos RCV, Kantorski KZ. Antimicrobial effect of methylene blue formulations with oxygen carrier at different pHs: preliminary study. Braz Dent Sci. 2019;22(1):39-45. doi: 10.14295/bds.2018.v22i1.1635.

Fimple JL, Fontana CR, Foschi F, Ruggiero K, Song X, Pagonis TC, et al. Photodynamic treatment of endodontic polymicrobial infection in vitro. J Endod. 2008 Jun;34(6):728-34. doi: 10.1016/j.joen.2008.03.011.

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Submission Preparation Checklist

As part of the submission process, authors are required to check off their submission's compliance with all of the following items, and submissions may be returned to authors that do not adhere to these guidelines. Please check the relevant section in this Guide for Authors for more details.

Ensure that the following items are present:

- ✓ One author has been designated as the corresponding author with contact details:
  - E-mail address
  - Full postal address

All necessary files have been uploaded:

Manuscript:

- ✓ Include keywords.
- ✓ The manuscript is original and has not been published previously, nor is under consideration elsewhere.
- ✓ The submission file is in Microsoft Word (.doc or .docx) format.
- ✓ The text adheres to the stylistic and bibliographic requirements outlined in the **Submission Guidelines**, which is found in About the Journal.
- ✓ If submitting to a peer-reviewed section of the journal, the instructions in Ensuring a Blind Review have been followed.
- ✓ **Ensuring a Blind Review:** Research in humans must provide the protocol number of the Institutional Review Board in the "Material and Methods" session of the manuscript. The original document must be attached in a separate file to guarantee a blind revision.
- ✓ The main file of the manuscript should not contain any author identification to ensure a blind revision.
- ✓ Funding, conflict of interest, regulatory statement and acknowledgment must be descripted in the end of the main text, before references.

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- ✓ Authors have read and agreed with the publication ethics and malpractices of the journal.
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- ✓ All tables (including titles, description, footnotes).
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- ✓ Authors have signed and uploaded the Copyright notice.
- ✓ Native Portuguese speakers must provide an abstract written in Portuguese

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PUBLICATIONS ETHICS AND MALPRACTICES – BDS

Ethical standards for publication exist to ensure high-quality scientific publications, public trust in scientific findings, and that people receive credit for their work and ideas.

All manuscripts are subject to peer review and are expected to meet standards of academic excellence. If approved by the editor, submissions will be considered by peer reviewers, whose identities will remain anonymous to the authors.

Our Research Integrity team will occasionally seek advice outside standard peer review, for example, on submissions with serious ethical, security, biosecurity, or societal implications. We may consult experts and the **academic** editor before deciding on appropriate actions, including but not limited to recruiting reviewers with specific expertise, assessment by additional editors, and declining to further consider a submission.

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The editor-in-chief will work with a team of section editors. They will confirm the roles and responsibilities of all editors and editorial staff (assistant editors), so that everybody is clear about who does what.

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Changes in the direction of the journal to redefine its scope must be undertaken in agreement with the other editors and the publisher; otherwise editorial decisions may be inconsistent. New aims and scope need to be agreed on and clearly published in whatever medium the journal uses to communicate with authors, reviewers, and editors.

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Authors must not use the words, figures, or ideas of others without attribution. All sources must be cited at the point they are used, and reuse of wording must be limited and be attributed or quoted in the text.

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Conflicts of interest (COIs, also known as 'competing interests') occur when issues outside research could be reasonably perceived to affect the neutrality or objectivity of the work or its assessment. This can happen at any stage in the research cycle, including during the experimentation phase, while a manuscript is being written, or during the process of turning a manuscript into a published article.

If unsure, declare a potential interest or discuss with the editorial office. Submissions with undeclared conflicts that are later revealed may be rejected.

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Authors must declare all potential interests in a 'Conflicts of interest' section, which should explain why the interest may be a conflict. If there are none, the authors should state "The author(s) declare(s) that there are no conflicts of interest regarding the publication of this paper." Submitting authors are responsible for coauthors declaring their interests.

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Work with the journal publisher/editorial office to determine processes for handling submissions that are the most efficient and appropriate for the journal. The electronic submission system aids authors in providing all required information (e.g., authorship declarations, funding information). All elements must be completed before a manuscript is sent for peer review (chasing details at a later stage can delay publication and upset schedules). BDS will consider checking for the following elements (as appropriate):

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Guidance on ethical approval for studies in humans is available from COPE (Guidance for Editors: Research, Audit and Service Evaluations: http://publicationethics.org/resources/guidelines).

C. Editors and Reviewers

Editors and reviewers should decline to be involved with a submission when they

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If the work involves the use of human subjects, the author should ensure that the work described has been carried out in accordance with **The Code of Ethics of the World Medical Association** (Declaration of Helsinki) for experiments involving humans.

Authors should include a statement in the manuscript that informed consent was obtained for experimentation with human subjects. The privacy rights of human subjects must always be observed.

All animal experiments should comply with the **ARRIVE guidelines** and should be carried out in accordance with the U.K. Animals (Scientific Procedures) Act, 1986 and associated guidelines, **EU Directive 2010/63/EU for animal experiments**, or the National Institutes of Health guide for the care and use of Laboratory animals (NIH Publications No. 8023, revised 1978) and the authors should clearly indicate in the manuscript that such guidelines have been followed. The sex of animals must be indicated, and where appropriate, the influence (or association) of sex on the results of the study.

Institutional review board and written informed consent

For protocols involving the use of human subjects, authors should indicate in their Methods section that subjects' rights have been protected by an appropriate Institutional Review Board and written informed consent was granted from all subjects. When laboratory animals are used, indicate the level of institutional review and assurance that the protocol ensured humane practices.

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Brazilian Dental Science asks that authors submitting manuscripts reporting from a clinical trial to register the trial a priori in any clinical trials registries that takes part of **WHO network (International Clinical Trials Registry Platform (ICTRP))**. The clinical trial registration number and name of the trial register should be included in the Acknowledgments at the submission stage.

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Randomized clinical trials should be reported using the Consolidated Standards of Reporting Trials (**CONSORT**). A CONSORT checklist and flowchart (as a Figure) should also be completed and included in the submission material.

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D. The peer-review process

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