UNIVERSIDADE ESTADUAL DA PARAÍBA
CAMPUS I
PRÓ-REITORIA DE PÓS-GRADUAÇÃO E PESQUISA
PROGRAMA DE PÓS-GRADUAÇÃO EM ODONTOLOGIA
DOUTORADO EM ODONTOLOGIA

MARINA TAVARES COSTA NÓBREGA

IMPACTO DA PROTRAÇÃO MAXILAR NAS VIAS AÉREAS E DO SOFTWARE NA AVALIAÇÃO DO COMPLEXO NASAL EM TOMOGRAFIA COMPUTADORIZADA DE PACIENTES COM FISSURA DE LÁBIO E/OU PALATO

CAMPINA GRANDE/ PB

2021

MARINA TAVARES COSTA NÓBREGA

IMPACTO DA PROTRAÇÃO MAXILAR NAS VIAS AÉREAS E DO SOFTWARE NA AVALIAÇÃO DO COMPLEXO NASAL EM TOMOGRAFIA COMPUTADORIZADA DE PACIENTES COM FISSURA DE LÁBIO E/OU PALATO

Tese apresentada ao Programa de Pós-Graduação em Odontologia da Universidade Estadual da Paraíba, como requisito parcial à obtenção do título de Doutora em Odontologia.

Orientador: Prof. Dr. Manuel Antonio Gordón-Núñez

Co-orientador: Prof. Dr. Carlos Flores-Mir

CAMPINA GRANDE/ PB

2021

N754i Nóbrega, Marina Tavares Costa.
Impacto da protração maxilar nas vias aéreas e do software na avaliação do complexo nasal em tomografia computadorizada de pacientes com fissura de lábio e/ou palato [manuscrito] / Marina Tavares Costa Nóbrega. - 2021.
107 p.

Digitado.
Tese (Doutorado em Odontologia) - Universidade Estadual da Paraíba, Centro de Ciências Biológicas e da Saúde , 2021.
"Orientação : Prof. Dr. Manuel Antonio Gordón-Núñez , Coordenação do Curso de Odontologia - CCTS."

1. Fissura palatina. 2. Fissura labial. 3. Enxerto de osso alveolar. 4. Cavidade nasal. I. Título

21. ed. CDD 617.52

Elaborada por Lucas H. A. da Silva - CRB - 15/898 BC/UEPB

MARINA TAVARES COSTA NÓBREGA

IMPACTO DA PROTRAÇÃO MAXILAR NAS VIAS AÉREAS E DO SOFTWARE NA AVALIAÇÃO DO COMPLEXO NASAL EM TOMOGRAFIA COMPUTADORIZADA DE PACIENTES COM FISSURA DE LÁBIO E/OU PALATO

Tese apresentada ao Programa de Pós-Graduação em Odontologia da Universidade Estadual da Paraíba, como requisito parcial à obtenção do título de Doutora em Odontologia.

Aprovada em: 16/08/2021

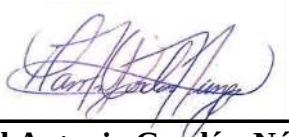
BANCA EXAMINADORA

Profa. Dra. Fabiana Tolentino de Almeida Marques
University of Alberta (UofA)

Profa. Dra. Andrea dos Anjos Pontual
Universidade Federal de Pernambuco (UFPE)

Profa. Dra. Daniela Pita de Melo
Universidade Estadual da Paraíba (UEPB)

Prof. Dr. Saulo Leonardo Sousa Melo
Universidade Estadual da Paraíba (UEPB)



Prof. Dr. Manuel Antonio Gordón-Núñez (Orientador)
Universidade Estadual da Paraíba (UEPB)

A Deus e à Nossa Senhora que sempre foram minha luz e direção.

No mundo haveis de ter aflições. Coragem! Eu venci o mundo.” (Jo 16,33)

AGRADECIMENTOS

Acima de qualquer coisa preciso agradecer imensamente a Deus e a intercessão de Nossa Senhora. Eles foram meu sustento todos os dias e me deram forças para persistir e chegar nesse momento tão sonhado.

Ao meu orientador Prof. Manuel, que me permitiu trabalhar com minha área de interesse, mesmo não sendo sua área de expertise. Obrigada pelo auxílio, orientações e disposição em aprender junto comigo!

Aos professores membros da banca, titulares e suplentes. Prof(a)s Saulo, Cassiano, Andréa e Maria Luiza, muito obrigada por aceitarem fazer parte desse momento. Tenho profunda admiração por todos vocês! Os demais serão citados adiante.

À Profa. Daniela, por me estender a mão quando um dos meus maiores sonhos estava se concretizando, me auxiliando a conseguir tudo necessário para o doutorado sanduíche e por continuar a meu lado, me orientando e me ajudando a chegar até aqui. Sem sua generosidade, eu jamais estaria aqui hoje. Muito obrigada!

Ao Prof. Carlos por ter me aceitado como sua aluna na Universidade de Alberta e ter me permitido viver um dos períodos mais transformadores da minha vida. Obrigada por sua imensa generosidade em dividir seu enorme conhecimento comigo, por abrir as portas da sua casa para mim num Natal onde eu estava longe de casa e dos meus, por me fazer sentir que minhas opiniões eram válidas e pertinentes, mesmo quando estavam confusas e você me conduzia brilhantemente. Sua conduta como professor e pesquisador me inspiram a evoluir como profissional, mas seu lado humano me inspira ainda mais a ser uma pessoa melhor! Obrigada por tanto! Estendo os agradecimentos a sua família, representada pela figura de Alexa, que foi um amor em todos os nossos encontros.

Aos professores do PPGO/UEPB, que nos transmitiram inúmeros ensinamentos, nos abastecendo para enfrentar o mercado para recursos humanos altamente qualificados.

Aos funcionários da UEPB, em especial Ayanna e Dioliane, que sempre foram muito prestativas e dispostas a ajudar todos os alunos da melhor maneira.

Aos meus colegas de turma e de programa, que tornaram todo esse árduo caminho mais leve e agradável, por meio de conversas e uma convivência da qual sinto muita falta. Agradeço em especial a alguns dos novos amigos que fiz nesse processo, Isabela, Érick e Larissa, pessoas incríveis de quem eu tive o privilégio de me aproximar e tenho certeza de que nunca mais sairão da minha vida.

A amizades antigas que me acompanham há mais tempo. Julliana, minha dupla de graduação, companheira de mestrado e agora de doutorado, com quem já dividi muitas conquistas e frustrações, e me sinto muito feliz de ter percorrido esse caminho em conjunto. Obrigada por tudo que construímos dentro e fora do ambiente acadêmico!

À Andressa, minha amiga, colega de turma e de trabalho, parceira de especialidade, conselheira, ouvinte... São infinitas funções desempenhadas por você na minha vida, amiga. Agradeço a Deus todos os dias por ter colocado você no meu caminho, a irmã que não tive e com quem posso dividir tudo com total confiança. Sem nossas viagens pra CG ou Vancouver, sem nossas lamentações ao telefone, sem sua paciência em ouvir meus áudios infinitos e tantas outras coisas, seria imensamente mais difícil chegar até aqui. Muito obrigada!

Aos anjos que conheci durante minha estadia em Edmonton. Dentre eles, Natália, Isabela, Ivana, Ellie, Leah, Priscilla, Silvia... E Fabiana, que com sua maravilhosa e acolhedora família, logo de início me fez não morrer de frio com o impacto de pegar -27 ºC no primeiro dia de Canadá, me ajudou com várias coisas ao longo desse ano incrível, me acolheu quando eu estava entrando em parafuso com os softwares em teste para uso no trabalho, mas acima de tudo, se preocupou em sempre demonstrar que eu tinha apoio na família dela. Muito obrigada de coração Fabi! Você é uma profissional espetacular e um ser humano ímpar, e me inspira em todos os aspectos!

Aos meus pais Leonardo e Eliane, que sempre estiveram ao meu lado, me estimulando a alcançar meus sonhos, se esforçando a máximo para tornar tudo isso possível e me estimulando a enfrentar os novos desafios da vida, mesmo que para isso os corações ficassem apertados. Amo vocês!

A toda a minha família, especialmente tia Neide, Rodolfo, Aninha, Bruninha e Thaisinha, que sempre abriram as portas de casa para me abrigar durante esses anos, me recebendo com muito amor e alegria. Ir para casa de vocês era a melhor parte das minhas noites em CG! E claro que eu também quero agradecer a meu tio Ronaldo, que ao longo desses anos foi morar mais perto de vovó Lourdinha, junto a Deus, mas cuja frase que me foi dita logo quando fui aprovada no doutorado nunca me saiu da cabeça: “A casa é sua minha filha. Venha e fique aqui quando quiser e precisar.” Obrigada por ser essa peça fundamental na nossa família, de quem todos sentimos uma imensa saudade.

Ao meu marido, que segurou muitas barras comigo nessa jornada, aguentou muitos dias de estresse e ansiedade, me apoiou mesmo teríamos que ficar um ano separados geograficamente, me acalmou quando eu não achava a solução e foi meu pilar quando eu já não conseguia sozinha. Obrigada por ser esse homem de coração bom e cheio de amor, o

melhor pai para nossa neném canina, que aprendeu com você a me encher de carinho. Sei que Nossa Senhora habita em você, e sem nenhuma dúvida, você é um instrumento mandado por Ela para minha vida, pois vejo o reflexo dela em você todos os dias. Te amo e estou aqui para te dizer que conseguimos!

O presente trabalho foi realizado com apoio da Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) - Código de Financiamento 001

RESUMO

Artigo 1: Objetivo: Comparar Dolphin Imaging e 3D Slicer avaliando reconstruções feitas por meio de imagens de tomografia computadorizada (TC) de desvio de septo nasal (DSN), hipertrofia de conchas e volume da cavidade nasal de pacientes com fissura labial e/ou palatina (FL/P) antes (T1) e após (T2) enxerto ósseo alveolar. Métodos: Registros em prontuários e imagens de TC craniofacial de 12 pacientes com FL/P entre 9 e 24 anos de idade atendidos em um centro de apoio foram coletados. Após orientação das imagens, foram realizadas mensurações do DSN e hipertrofia de conchas nasais, além da avaliação do volume da cavidade nasal. Considerando um nível de significância de 5% ($p < 0,05$), a análise estatística foi realizada por meio do teste de Wilcoxon. Resultados: As medianas de todos os grupos representaram DSN leve. A maioria das comparações não mostrou diferenças estatisticamente significativas, exceto para T1 e T2 no software Dolphin ($p = 0,026$). Não houve diferenças significativas em nenhuma comparação em relação à hipertrofia das conchas direitas e esquerdas. A avaliação do volume da cavidade nasal não mostrou diferença dentro do software; entretanto, apresentou diferenças estatísticas comparando T1 ($p = 0,034$) e T2 ($p = 0,015$) para ambos os softwares. Artigo 2: Objetivo: Sintetizar os efeitos da protração maxilar nas dimensões das vias aéreas superiores de pacientes em crescimento com FLP. Métodos: A revisão sistemática foi conduzida de acordo com a declaração de 2020 *Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)*. A pesquisa foi realizada no MEDLINE, EMBASE, LILACS, Web of Science e Scopus até fevereiro de 2021. Literatura adicional foi identificada no Google Scholar, Proquest e pesquisas manuais de bibliografias dos estudos incluídos. Após a remoção das duplicatas, os estudos foram selecionados para leitura completa para confirmar sua elegibilidade, e as informações necessárias dos artigos selecionados foram coletadas. ROBINS-I (o risco de viés em estudos de intervenção não randomizados) foi usado para avaliar os estudos incluídos. Foi realizada uma síntese qualitativa dos estudos incluídos, no entanto, a síntese quantitativa não era viável. Resultados: Após a busca no banco de dados, 530 resultados foram identificados. Apenas nove artigos foram selecionados para revisão de texto completo, resultando em 4 estudos incluídos. Heterogeneidade significativa na avaliação da dimensão das vias aéreas superiores foi observada. Em relação à avaliação do risco de viés, três estudos foram classificados com de risco moderado de viés e um com de risco sério de viés. Os quatro estudos encontraram diferenças antes e depois da protração maxilar. Conclusões: O software utilizado pode não

influenciar quando se considera a avaliação do complexo nasal em pacientes com FL/P. Embora tenha havido alguma variabilidade entre os softwares em relação ao volume da cavidade nasal e ao desvio do septo nasal, as diferenças podem não ser consideradas clinicamente relevantes. Além disso, com base em baixos níveis de evidência, as dimensões das vias aéreas superiores de pacientes com FLP podem mudar com a protração maxilar, mas é improvável que a magnitude das alterações seja clinicamente relevante. Além disso, não houve consistência nas mudanças.

Palavras-chave: Enxerto de osso alveolar. Fissura palatina. Fissura labial. Manejo das vias aéreas.

ABSTRACT

Article 1: Objective: To compare Dolphin Imaging and 3D Slicer evaluating reconstructions made using computed tomography (CT) images of nasal septum deviation (NSD), concha hypertrophy and nasal cavity volume in patients with cleft lip and/or palate (FL/P) before (T1) and after (T2) alveolar bone graft. Methods: Medical records and craniofacial CT images of 12 patients with CL/P between 9 and 24 years of age attending a support center were collected. After orientation of the images, measurements of the NSD and nasal concha hypertrophy were performed, in addition to the evaluation of the volume of the nasal cavity. ($P < 0.05$), a statistical analysis was performed using the Wilcoxon test. Results: The medians of all groups represent the NSD level. Most comparisons do not show statistically related differences, except for T1 and T2 in the Dolphin software ($p = 0.026$). There were no significant differences compared to right and left concha hypertrophy. Nasal cavity volume assessment showed no difference within the software; however, statistical differences comparing T1 ($p = 0.034$) and T2 ($p = 0.015$) for both software. Article 2: Objective: To synthesize the effects of maxillary protraction on the dimensions of the upper airways of growing patients with CLP. Methods: The systematic review was conducted in accordance with the 2020 Statement of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). The search was conducted in MEDLINE, EMBASE, LILACS, Web of Science and Scopus until February 2021. Additional literature was identified in Google Scholar, Proquest and manual searches of bibliographies of the included studies. After removing the duplicates, the studies were selected for full reading to confirm their eligibility, and as required information from the selected articles was collected. ROBINS-I (the risk of bias in nonrandomized intervention studies) was used to assess the included studies. A qualitative synthesis of the included studies was performed, however, quantitative synthesis was not feasible. Results: After searching the database, 530 results were identified. Only nine articles were selected for full-text review, launching into 4 included studies. Necessary heterogeneity in the assessment of the dimension of the upper airways was obtained. Regarding the assessment of risk of bias, three studies were classified as having moderate risk of bias and one with serious risk of bias. The four studies differences before and after maxillary protraction. Conclusions: The software used cannot be conducted if it considers the assessment of the nasal complex in patients with CL / P. Although there was some variability between the software in relation to nasal cavity volume and nasal septum deviation, as

differences may not be considered clinically relevant. Furthermore, based on low levels of evidence, how upper airway dimensions with FLP may change with maxillary protraction, but the magnitude of the changes is unlikely to be clinically relevant. Furthermore, there was no consistency in the changes.

Keywords: Orofacial cleft. Nasal cavity. Alveolar bone grafting. Airway management, Extraoral traction appliances.

LISTA DE ABREVIATURAS E ACRÔNIMOS

FLP:	Fissura labiopalatina
FL/P:	Fissura de lábio e/ou palato
FP/L:	Fissura de palato e/ou lábio
3D:	Tridimensional
2D:	Bidimensional
TCFC:	Tomografia computadorizada de feixe cônico
TC:	Tomografia computadorizada
kV:	Kilovolt
mAs:	Miliamperes
mm:	Milímetros
DICOM:	Digital Imaging and Medical Communications
FH:	Frankfort Horizontal
ICC:	Intraclass Correlation Coefficient
DSN:	Desvio de Septo Nasal
GIPL:	Gammon Infrastructure Projects Limited
ROBINS-I:	The Risk Of Bias In Non-randomized Studies of Interventions
FLPB:	Fissura de lábio e palato bilateral
FLPU:	Fissura de lábio e palato unilateral
RME:	Expansão Rápida da Maxila
PRISMA:	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
cm:	Centímetros
MCA:	Minimal Cross-sectional Area

LISTA DE TABELAS

ARTIGO I

ARTIGO II

LISTA DE FIGURAS

ARTIGOS I

SUMÁRIO

1 INTRODUÇÃO

Dentre as deformidades craniofaciais, a fissura labiopalatina (FLP) é a mais comum (VIEIRA et al., 2008). Têm uma prevalência média de 1 para cada 700 nascidos vivos em todo o mundo (DIXON et al., 2011). No Brasil, os registros de prevalência de fissura labiopalatina encontrados aumentaram na última década (3,94 por 10.000 nascidos vivos em 2000 para 5,46 por 10.000 em 2013), principalmente nas regiões do país com menos recursos financeiros provavelmente devido à aprimoramento dos relatos de casos do Sistema Único de Informação em Saúde (ABREU et al., 2016).

A morfologia craniofacial de indivíduos com FLP é diferente daqueles sem fissura, pois afeta várias estruturas craniofaciais (AKARSU-GUVEN et al., 2015). Essa população pode apresentar uma maxila mais retrognática em relação à base do crânio, o crescimento da mandíbula pode ser aumentado ou diminuído, a crista alveolar pode ser reduzida, o padrão de crescimento vertical geralmente é dominante e as vias aéreas podem ser mais estreitas. (AKARSU-GUVEN et al., 2015; GANDEDKAR et al., 2017; KOCHHAR et al., 2020; ZHANG et al., 2019).

O terço médio da face média é a área mais afetada nessa deformidade, portanto seios paranasais, nariz e septo nasal estão entre as estruturas mais comprometidas (AL-FAHDAWI et al., 2017; ERTAŞ; ATAOL, 2019; FRIEL et al., 2015b; ZHANG et al., 2019). Em termos gerais, a estética médio-facial nesta população é afetada pela deformidade nasolabial associada e também devido aos efeitos adversos pós-cirúrgicos (ALONSO et al., 2014; DE SOUSA GIL et al., 2019; KIMURA et al., 2019). Muitas cirurgias consecutivas de tecidos moles e duros são necessárias para o manejo eficaz desses pacientes, especialmente durante o primeiro ano de vida. Esses procedimentos cirúrgicos progressivos podem ter um impacto significativo em seu desenvolvimento e morfologia craniofacial (THIERENS et al., 2017).

Farzal et al. (2016) observaram que o volume da cavidade nasal em crianças com FLP unilateral e bilateral foi aproximadamente 30% menor do que em crianças não fissuradas. Friel et al. (2015) sugeriram que indivíduos com FLP unilateral podem apresentar algum grau de estenose das vias aéreas e um desvio significativo do septo nasal. No entanto, outros autores não identificaram diferenças estatisticamente significativas entre indivíduos com e sem fissura (AL-FAHDAWI et al., 2017; ERTAS; ATAOL, 2019; ZHANG et al., 2019). Esses resultados contrastantes aumentam a necessidade de mais estudos melhor estruturados nesta área.

A análise craniofacial, aspecto importante para o processo diagnóstico, pode ser realizada por meio de imagens tridimensionais (3D) ou bidimensionais (2D). A imagem 2D pode criar distorções e sobreposições de estruturas que reforçam as diferenças entre os dois métodos. Essas diferenças podem influenciar o processo diagnóstico, por exemplo, no que diz respeito à gravidade da doença. Isso pode ser verificado em VON ARX et al., 2016 que encontraram 40,5% de discordância entre a TCFC (Tomografia Computadorizada de Feixe Cônico) e as radiografias periapicais. A TCFC mostrou piora do quadro clínico em quase um terço dos casos avaliados. Além disso, outro estudo revelou achados assimétricos em relação à gravidade da periodontite, incluindo perdas de suporte ósseo e inserções periodontais, entre dados 2D e 3D (HONG et al., 2017).

Além disso, em relação à avaliação cefalométrica, existem diferenças significativas envolvendo medidas lineares e angulares. Em relação às avaliações do plano anatômico, as imagens 3D apresentam melhor desempenho do que nas imagens 2D, onde serão representadas por uma linha. A acurácia e reprodutibilidade das medidas cefalométricas revelam-se maiores nos dados 3D, o que pode ser identificado como um aspecto clinicamente significativo. Assim, a imagem 3D é uma opção mais precisa que pode ser usada para análise craniofacial, minimizando as limitações 2D, como distorções de imagem (GRIBEL et al., 2011; VAN VLIJMEN et al., 2010; WEN et al., 2017). Além disso, a imagem 3D permite a avaliação do volume 3D, que é uma avaliação importante durante o processo de diagnóstico (ALSUFYANI et al., 2014; FARZAL et al., 2016; YATABE-IOSHIDA et al., 2019).

A tomografia computadorizada (TC) ou tomografia computadorizada de feixe cônico (TCFC) é geralmente usada para avaliar dados 3D da morfologia esquelética craniofacial de pacientes com FLP. Existem muitas medidas obtidas a partir de imagens craniofaciais que ajudam os dentistas a avaliar e desenvolver os planos de tratamento do paciente (KOCHHAR et al., 2020). A TCFC desempenha um papel confiável e eficaz na avaliação dos pacientes e tem o benefício de uma menor exposição à dose de radiação, bem como um custo menor (GUYADER et al., 2018; RAZI; NIKNAMI; ALAVI GHAZANI, 2014).

No entanto, a TCFC pode apresentar ruído de imagem maior do que a TC, o que também apresenta a vantagem de fornecer melhor representação dos tecidos moles devido à sua maior capacidade de contraste em relação à TCFC, o que pode influenciar negativamente na análise das vias aéreas superiores. Isso está relacionado à própria imagem e à geometria de aquisição. Além disso, a CBCT gera mais radiação espalhada (MAH; REEVES; MCDAVID, 2010; RAZI; NIKNAMI; ALAVI GHAZANI, 2014; THEREZA-BUSSOLARO et al., 2020, 2021). Como consequência, os pesquisadores buscam técnicas que minimizam as diferenças entre as

duas modalidades de imagem (AWARUN et al., 2019; CASIRAGHI et al., 2021; NARDI et al., 2017; PARK et al., 2017; ZHANG et al., 2020).

A avaliação de dados por meio de software é amplamente utilizada na geração de imagens. Ajuda o processo de diagnóstico por meio de ferramentas para orientação de marcos, medidas, segmentação, orientação e assim por diante. Um dos mais usados é o Dolphin Imaging, que é fácil de usar e escolhido por muitos dentistas, tanto na clínica quanto na área acadêmica. Foi introduzido no mercado no início de 2000 e amplamente utilizado para avaliação das vias aéreas superiores (NADJMI et al., 2013; PINHEIRO et al., 2018; POWER et al., 2005; WANG; RANDAZZO, 2016).

No entanto, é fundamental compreender os benefícios e limitações do software, pois alguns artigos trazem comparações. Com relação aos custos, licenças caras são normalmente solicitadas, mas pode ser um problema especialmente para a prática odontológica com ambientes de poucos recursos, como em países em desenvolvimento. Portanto, o software gratuito é uma boa opção para fazer um diagnóstico quando o financiamento não está disponível. 3D Slicer é um software livre que foi usado em estudos anteriores com resultados positivos (CHEN et al., 2017; NADJMI et al., 2013; PINHEIRO et al., 2018).

Diante do que foi apresentado, o objetivo deste estudo foi comparar dois softwares de TC na avaliação de desvio de septo nasal, hipertrofia de conchas e volume da cavidade nasal de pacientes com fissura labiopalatina antes e após enxerto ósseo alveolar e realizar uma revisão sistemática em relação aos efeitos da protração maxilar nas vias aéreas superiores em pacientes com fissura labiopalatina.

2 OBJETIVOS

2.1 Objetivo Geral

Avaliar se o software (Dolphin (versão 11.95 Premium, Patterson Dental, EUA) e 3D Slicer (Versão 4.10.2, Laboratório de Planejamento Cirúrgico, Harvard University, Boston, Massachusetts, EUA)) influencia a análise do complexo nasal da fenda labial e palato em indivíduos antes e após cirurgia de enxerto alveolar, as alterações que podem ocorrer, bem como realizar uma revisão sistemática sobre os efeitos da protração maxilar nas dimensões das vias aéreas superiores de pacientes em crescimento com fissura labiopalatina.

2.2 Objetivos Específicos

- Avaliar alterações no volume da cavidade nasal, desvio do septo nasal e hipertrofia das conchas em indivíduos com fissura labiopalatina após cirurgia de enxerto alveolar.
- Avaliar se o software (Dolphin (versão 11.95 Premium, Patterson Dental, EUA) e 3D Slicer (Versão 4.10.2, Laboratório de Planejamento Cirúrgico, Harvard University, Boston, Massachusetts, EUA)) utilizado para realizar a análise influencia os resultados obtidos.
- Realizar uma revisão sistemática sobre os efeitos da protração maxilar nas dimensões das vias aéreas superiores de pacientes em crescimento com fissura labiopalatina.

3 MATERIAIS & MÉTODOS

3.1 Aspectos éticos

O projeto foi registrado na Plataforma Brasil e submetido ao Comitê de Ética em Pesquisa da Universidade Estadual da Paraíba (CAAE: 24596319.3.0000.5187). A pesquisa atende aos princípios éticos estabelecidos na resolução do Conselho Nacional de Saúde (CNSN466 / 2012) e é regida internacionalmente pela Declaração de Helsinque, revisada em 2013.

3.2 Desenho do estudo

O estudo foi um estudo retrospectivo de série de casos.

3.3 População

Foram considerados a população todos os prontuários e tomografias computadorizadas disponíveis de pacientes atendidos em um centro de apoio a pacientes com DLC da Associação Brasileira de Odontologia - Seção Paraíba, na cidade de João Pessoa, Paraíba de 2017 a 2019.

3.4 Amostra

A amostra do estudo foi uma amostra de conveniência que incluiu todos os indivíduos com prontuário disponível e imagem tomográfica craniofacial atendidos no referido serviço, que possuíam imagens tomográficas pré e pós-cirurgia óssea alveolar disponíveis para avaliação.

3.5 Critérios de elegibilidade

3.5.1 Critérios de inclusão

- Indivíduos (com idade entre 9 e 24 anos) com fissura labiopalatina submetidos à TC craniofacial antes e um ano após o enxerto ósseo alveolar.

3.5.2 Critérios de exclusão

- Pacientes com histórico de fratura na face.
- Pacientes com quaisquer síndromes associadas.

3.6 Análise das vias aéreas

3.6.1 Aquisição da imagem

As imagens foram adquiridas usando um Toshiba Aquilion TC Scanner de 64 canais. Primeiro, uma varredura de reconhecimento foi feita para limitar a exposição da varredura à área de preocupação, que era da glabela ao osso hióide, e reduzir a dose de radiação ionizante para o mais baixo possível, seguindo o princípio do mínimo possível (princípio ALARA). As aquisições foram feitas com o tomógrafo operando a 120 kV, 150 mAs, por 4 a 6 segundos, com tamanho de voxel de 0,5mm.

3.6.2 Coleta de dados em prontuários médicos

As informações sobre o tipo de fissura, as datas das cirurgias, a idade do paciente e o sexo foram coletadas nos prontuários do Centro de Apoio à Fissura Labiopalatina da Associação Brasileira de Odontologia - Seção da Paraíba.

3.6.3 Análise das imagens

Os volumes da tomografia computadorizada foram armazenados em formato de imagem digital e comunicações médicas (DICOM) e transferidos para um computador com os dois softwares avaliados, Dolphin (versão 11.95 Premium, Patterson Dental, EUA) e 3D Slicer (Versão 4.10.2, Laboratório de Planejamento Cirúrgico, Harvard University, Boston, Massachusetts, EUA) que foram usados para cada análise.

As imagens tridimensionais da TC foram inicialmente orientadas da seguinte forma: o plano axial era o plano Frankfort Horizontal (FH) (definido pelos porios direito e esquerdo e pelo centro dos pontos orbitários direito e esquerdo); o plano coronal que é a linha que passa pelo ponto mais profundo da superfície lateral dos ossos zigomáticos, ao nível da furca do primeiro molar superior direito; o plano sagital que é perpendicular aos planos FH e coronal, passando pelo ponto médio entre os pontos orbitais bilaterais (KAVAND et al., 2019).

3.6.4 Calibração

Todas as medidas e análises dos dados foram realizadas por um único examinador. Para garantir a confiabilidade e reprodutibilidade do método de medição, calibração e treinamento foram realizados para ambos os softwares, pelo examinador que, sem consultar as informações clínicas do paciente, realizou as análises. A calibração do examinador foi realizada em 5 casos com medidas repetidas feitas após uma e duas semanas. Após a obtenção da alta concordância intraexaminador por meio do coeficiente de correlação intraclasse (ICC), que pode ser verificada nas Tabelas 1 e 2, e consequente validação do método, foi realizada avaliação completa de todas as imagens. A confiabilidade foi definida seguindo valores que menos de 0,5 é ruim, entre 0,5 e 0,75 moderado, entre 0,75 e 0,9 bom e maior que 0,90 excelente (KOO; LI, 2016).

O percentual de erro de medição foi calculado usando a seguinte fórmula:

$$\%error = \left| \frac{\sum_{i=1}^{n}(x_i - \overline{x})}{n\overline{x}} \right| \times 100\%$$

Onde $\overline{x}$ é a média da amostra e no número de medições, e correspondem à porcentagem de variação entre as medições em relação ao total (CHEN, 2020; MORELL, 2020).

Tabela 1 – ICC do Dolphin e valores percentuais de erro de medição.

	ICC	INTERVALO DE CONFIANÇA		PERCENTUAL DE ERRO DE MEDIÇÃO
		Limite inferior	Limite superior	
SEPTO NASAL REAL	0.990	0.952	0.999	1.24%
SEPTO NASAL IDEAL	0.982	0.913	0.998	1.89%
CONCHA DIREITA	0.991	0.961	0.999	1.75%
CONCHA ESQUERDA	0.968	0.843	0.996	2.70%
NARINA DIREITA	0.989	0.947	0.999	2.77%
NARINA ESQUERDA	0.980	0.900	0.998	3.58%
CAVIDADE NASAL	0.891	0.429	0.988	6.16%

Tabela 2 - 3D Slicer ICC e valores percentuais de erro de medição.

	ICC	INTERVALO DE CONFIANÇA		PERCENTUAL DE ERRO DE MEDIÇÃO
		Limite inferior	Limite inferior	
SEPTO NASAL REAL	0.961	0.805	0.996	2.38%
SEPTO NASAL IDEAL	0.989	0.943	0.999	1.31%
CONCHA DIREITA	0.990	0.950	0.999	1.97%
CONCHA ESQUERDA	0.989	0.943	0.999	3.48%
NARINA DIREITA	0.996	0.980	1.000	1.31%
NARINA ESQUERDA	0.981	0.902	0.998	3.08%
CAVIDADE NASAL	0.963	0.811	0.996	4.02%

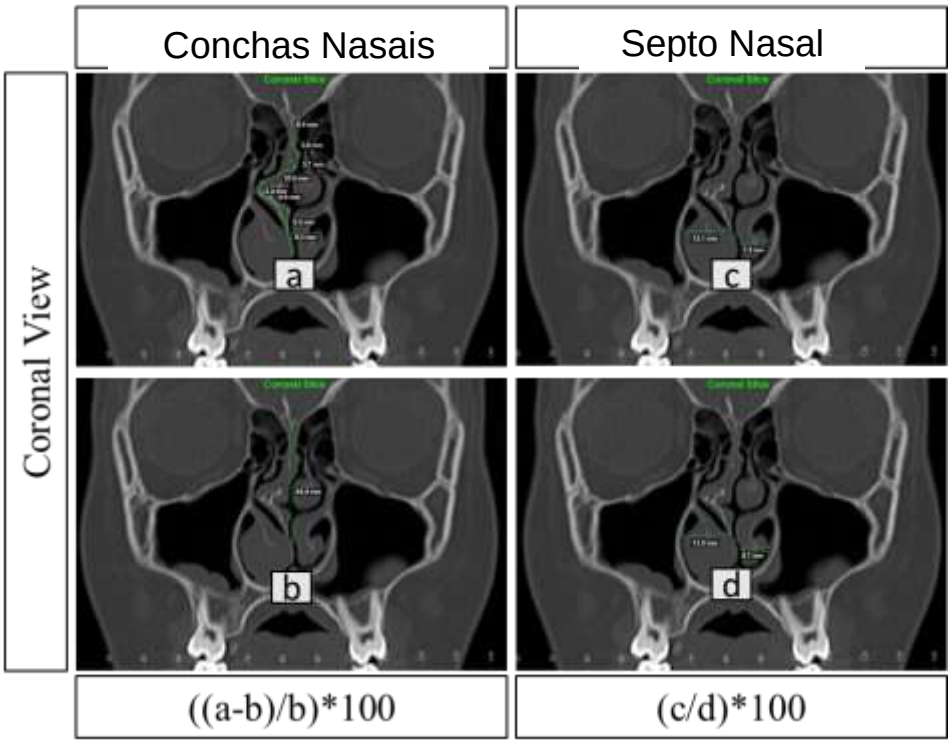
3.6.5 Análise de septo e concha nasal

As medidas foram feitas em corte coronal que inclui a furca dos primeiros molares superiores. Após a orientação da imagem, uma linha seguindo o formato linear do septo nasal foi traçada do limite inferior da Crista Galli na placa cribriforme até o palato duro (a), bem como uma linha reta hipotética foi traçada entre esses pontos (b). Em seguida, os valores lineares foram colocados em uma fórmula para analisar o desvio, conforme mostrado em BADDAM et al., 2021. A fórmula do septo nasal é ((ab) / b) x100, onde a é o comprimento real do septo nasal e b é a hipotética linha reta construída (BADDAM et al., 2021). O desvio do septo nasal de cada participante da pesquisa foi classificado de acordo com o grau de

desvio do plano sagital mediano, de acordo com (SETLUR; GOYAL, 2011), em: leve (≤8º), moderado (9-15 °) e grave (≥ 16 °) estudo.

As conchas nasais foram avaliadas por medidas dela mesma, ou seja, do ponto mais próximo ao mais distante em relação ao plano sagital, e da largura da narina, considerando o espaço ao redor da narina seguindo a mesma lógica, ambos no mesmo corte que o gerado para o desvio de septo nasal (DSN), em ambos os lados na área mais ampla da concha (BADDAM et al., 2021). Além disso, utilizou-se uma fórmula, (c / d)x100, que c é a largura da concha e d é a largura da narina.

Figura 1 - Fórmulas para analisar desvio do septo nasal e hipertrofia das conchas.



3.6.6 Análise de cavidade nasal

Os limites da cavidade nasal foram determinados com base em pontos de referência previamente sugeridos (KAVAND et al., 2019). Assim, os limites na vista sagital foram definidos como linhas que conectam a espinha nasal posterior à linha da sela (S) nasion (N), N à ponta do osso nasal, a ponta do osso nasal à espinha nasal anterior e anterior espinha nasal com espinha nasal posterior. No corte coronal, as bordas eram limitadas com base na lâmina cribiforme, a cortical que divide a cavidade nasal das órbitas e seios maxilares e palato duro.

Para determinar o limiar utilizado, foi realizado uma calibração em três faixas diferentes. O nível de limiar mais baixo foi -1000 HU (unidades Hounsfield), e o nível de

limiar mais alto variou entre -800, -600 e -400 (CHEROBIN et al., 2018; NAKANO et al., 2013). Após a avaliação de qual limite mostra a definição de imagem mais alta, todas as imagens foram avaliadas com o limite escolhido que estava entre -1000 HU e -400 HU.

3.7 Análise de software

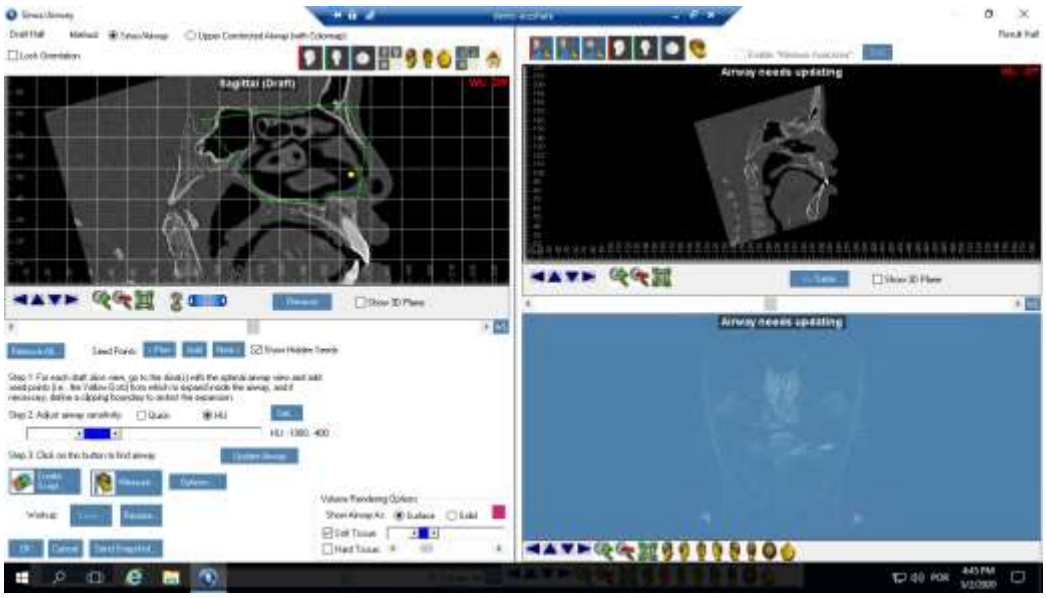
3.7.1 Dolphin Imaging Software (version 11.95 Premium, Patterson Dental, USA)

Previamente a todas as análises, os arquivos DICOM foram reorientados utilizando a ferramenta de orientação, e seguindo a descrição mencionada no início desta seção.

3.7.1.1 Análise do volume aéreo da cavidade nasal

Para a realização dessa análise foi utilizada a ferramenta Sinus / Airway, e o primeiro passo para a renderização do volume da cavidade nasal foi a escolha dos pontos anatômicos pré-estabelecidos para delimitar a área de interesse em ambas as incidências, sagital e coronal. Em seguida, pontos sementes, representados por pontos amarelos, foram utilizados para demarcar o espaço aéreo na cavidade nasal, e foi feito através de toda a imagem (Figura 2) Em seguida, foi definida a faixa de limiar, e foi feito um comando permitindo que o software renderizar o volume.

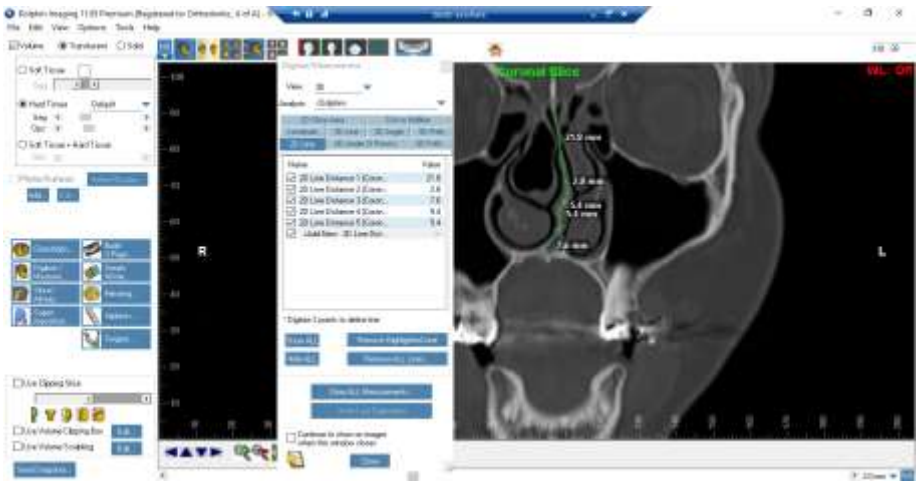
Figura 2 - Captura de tela da ferramenta Sinus / Airway no Dolphin Software.



3.7.1.2 Análise de septo e conchas nasais

Para avaliação do septo nasal e concha nasal, foi utilizada a ferramenta “digitalizar / medir”. Linhas 2D foram traçadas para delimitar o septo nasal ideal e real, além do corneto e sua narina (BADDAM et al., 2021). Os valores encontrados foram aplicados na fórmula ((a-b) / b) x100 para NSD, e (c / d) x100 para análise de conchas nasais (BADDAM et al., 2021).

Figura 3 - Análise do septo nasal sendo realizada

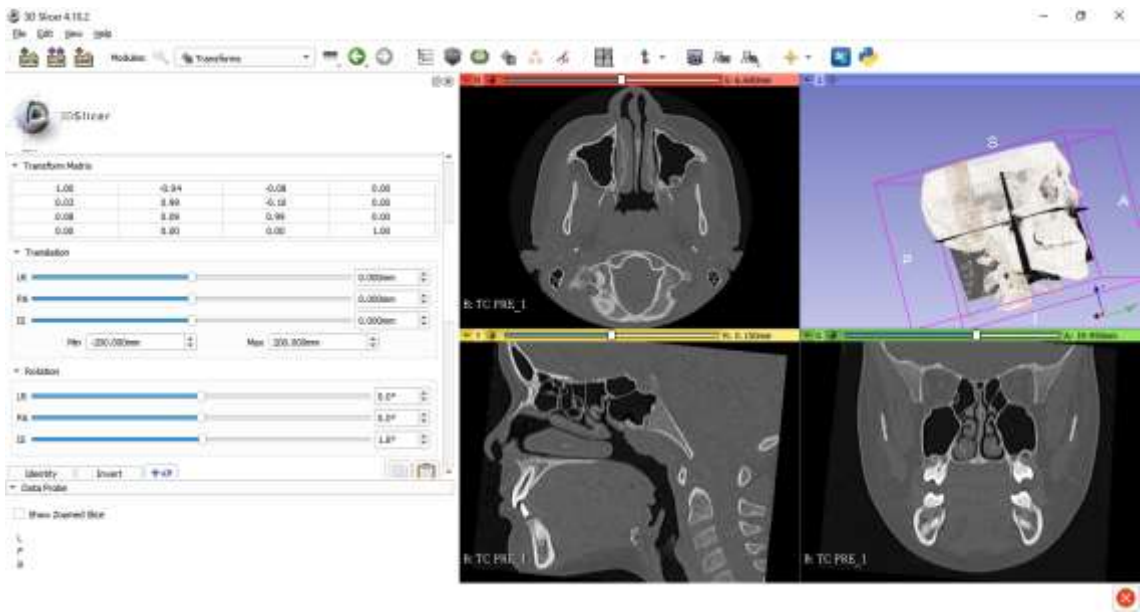


3.7.2 3D Slicer (Version 4.10.2, Surgical Planning Laboratory, Harvard University, Boston, Massachusetts, USA)

Os arquivos DICOM foram importados para o ITK-Snap versão 3.8.0 (YUSHKEVICH et al., 2006) e convertidos em arquivos Gammon Infrastructure Projects Limited (GIPL). Assim, tornou-se compatível para ser analisado no 3D Slicer.

Os arquivos GIPL foram abertos no 3D Slicer e reorientados seguindo a descrição mencionada no início desta seção usando a ferramenta “transforma”. Foi guiado por todos os três cortes apresentados no modelo 3D (Figura 4). Depois disso, todas as análises foram realizadas.

Figura 4 - Orientação sendo executada no 3D Slicer.



3.7.2.1 Análise do volume das vias aéreas da cavidade nasal

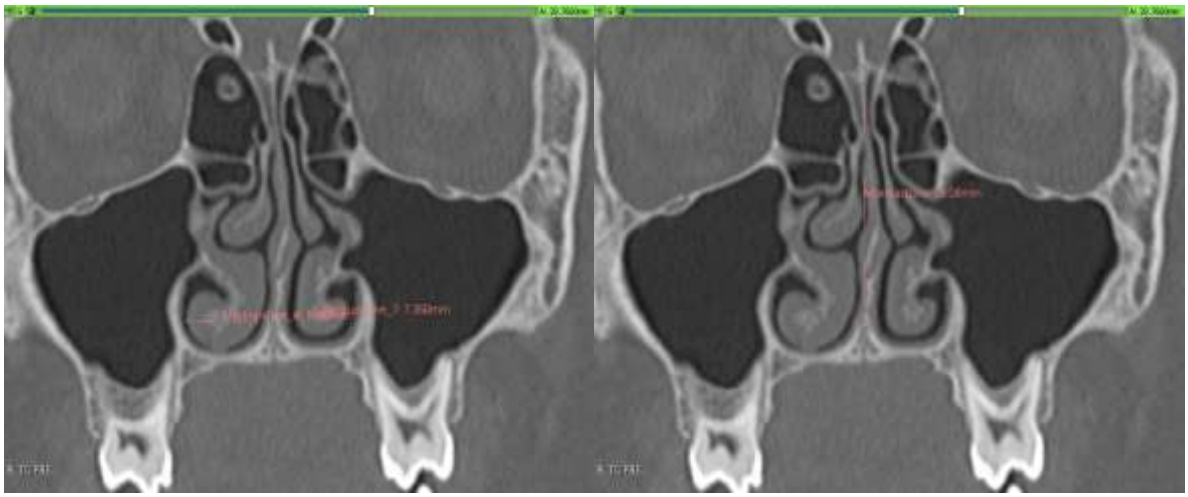
Primeiramente, por meio da ferramenta “editor de segmentos” o limiar foi determinado e a segmentação iniciada com a ferramenta “pintar”. Após a garantia de que os limites das estruturas anatômicas pré-estabelecidas foram respeitados e que todo o espaço aéreo da cavidade nasal foi incluído, o volume foi renderizado com o comando da ferramenta “fast marching tool” (**Erro! Fonte de referência não encontrada.**5).

Figura 5 - Desempenho do volume da cavidade nasal no 3D Slicer.

3.7.2.2 Análise de septo e conchas nasais

Para avaliação do septo nasal e concha nasal, foi utilizada a ferramenta de “marcações”, traçadas linhas 2D e os valores obtidos aplicados na fórmula ((ab) / b) x100 para septo nasal e (c / d) x100 para conchas (BADDAM et al., 2021).

Figura 6 – Análise de DSN conchas nasais no 3D Slicer.



3.8. Análise estatística

Os resultados foram organizados em um banco de dados de planilhas eletrônicas do Excel (Microsoft Office 2016). Com o auxílio do programa IBM SPSS Statistics (versão 25.0; IBM Corp., Armonk, NY) e considerando um nível de significância de 5% ($p < 0,05$), foram realizadas as seguintes análises estatísticas:

A normalidade e a variabilidade dos dados foram avaliadas, e o volume da cavidade nasal apresentou distribuição normal e variabilidade homogênea, enquanto septo nasal e concha nasal não eram normais. No entanto, um boxplot foi realizado para certificar a escolha correta do teste para a cavidade nasal, e os resultados apresentados foram distorcidos. Portanto, os seguintes testes estatísticos foram escolhidos:

- Teste de Wilcoxon foi realizado para avaliar as diferenças entre os valores (T1) e (T2) em ambos os softwares.

3.9 Revisão sistemática

3.9.1 Título

Effects of maxillary protraction on the upper airway dimensions of growing patients with cleft lip and palate: A systematic review

3.9.2 Palavras-chave

Maxillary protraction; cleft lip; cleft palate; airway management

3.9.3 Data de início/ Data de término/ Busca

Início: 15/02/2021 Término: 30/04/2021 Busca: 24/02/2021

3.9.4 Apoio

CAPES – Coordenação de Aperfeiçoamento de Pessoal de Nível Superior

3.9.5 Conflito de interesses

Não houve conflito de interesses.

3.9.6 Autores

Tabela 3 - Autores

Autorws	**Afiliações**	**E-mail**	**Contribuições** (usar legenda no rodapé)
Marina Tavares Costa Nóbrega	UEPB	marinatavarescn@gmail.com	1R
Andressa Cavalcanti Pires	UEPB	andressa_cavalcanti@hotmail.com	2R
Ana Priscila Lira de Farias Freitas	UEPB	anapriscila_f@hotmail.com	3R
Alessandro Leite Cavalcanti	UEPB	alessandrouepb@gmail.com	E
Manuel Antonio Gordón-Núñez	UEPB	gordonnunez162531@gmail.com	E

Daniela Pita de Melo	UEPB	danipita@gmail.com	SC
Carlos Flores-Mir	UofA	cf1@ualberta.ca	C

1R= Primeiro revisor (conceituação e desenho do estudo / Pesquisa e seleção / Coleta de dados / Análise de dados / Preparação do manuscrito).
2R= Segundo revisor (Pesquisa e seleção / Coleta de dados / Análise de dados / Preparação do manuscrito).
3R= Terceiro revisor (análise de dados).
E=Expert (Conceituação e design do estudo / Análise de dados).
SC= Subcoodenador (conceituação e projeto do estudo / análise de dados).
C= Coordenador (Conceituação e desenho do estudo / Análise de dados).
Todos os autores: Revisão do manuscrito.

Tabela 4 - Autor correspondente

Autor correspondente	**Endereço/email**
Marina Tavares Costa Nóbrega	UEPB – Campina Grande, PB 58429-500/ marinatavarescn@gmail.com

3.9.7 Metódos

3.9.7.1 Pergunta de pesquisa

Em pacientes em crescimento com fissura labiopalatina, a protração maxilar em comparação com o crescimento craniofacial normal modifica as dimensões das vias aéreas superiores?

Tabela 5 – Estratégia PICO

PICOs	
Participantes	Pacientes com fissura labiopalatina em crescimento
Intervenção	Protração maxilar
Comparação ou controle	Nenhum tratamento ou mesmo tratamento em indivíduos sem fissura
Outcome	Alterações dimensionais das vias aéreas superiores medidas por meio de valores cefalométricos, área transversal e volume.
Tipos de estudos incluídos	Ensaios clínicos controlados ou estudos longitudinais

3.9.7.2 Critérios de elegibilidade

3.9.7.2.1 Critérios de inclusão

Ensaios clínicos controlados ou estudos longitudinais com seguimento de pelo menos 6 meses. Não houve restrição quanto ao idioma de publicação.

3.9.7.2.2 Critérios de exclusão

Tabela 6 – Critérios de exclusão

	Critérios de exclusão:
Participantes	1- Outros tipos de fissuras orofaciais ou pacientes sindrômicos ou pacientes sem crescimento.
Intervenção	2- Tratamentos ortodônticos que não incluem protração maxilar ou nenhum tratamento ortodôntico.
Comparação ou controle	3- Ausência de um grupo de controle.
Outcome	4- Alterações oclusais, avaliação do perfil ou qualquer alteração que não se relacione com as dimensões das vias aéreas superiores.
Tipos de Estudos Excluídos	5- Revisões de literatura ou revisões integrativas, visões gerais, revisões de escopo, revisões guarda-chuva, revisões sistemáticas, resumos de conferências, capítulos de livros, protocolos, estudos transversais, relatos de casos, séries de casos ou estudos de controle de caso.

3.9.7.3 Fontes de informação

3.9.7.3.1 Bases de dados

1. (X) Medline
2. (X) EMBASE
3. (X) LILACS
4. (X) Web of Science
5. ( ) Science Direct
6. (X) Scopus
7. (X) Cochrane (clinical trials)
8. ( ) PsycINFO
9. ( ) Livivo

3.9.7.3.2 Literatura adicional

1. (X) Google Scholar web search
2. ( ) Open Grey
3. (X) Busca manual na bibliografia de estudos incluidos
3. ( ) Experts
4. (X) Proquest (Dissertation and Theses)

3.9.7.4 Gestão de dados

1. (X) Endnote
2. ( ) Refworks
3. ( ) Procite
4. ( ) Mendeley
5. (X) Rayyan

3.9.7.5 Processo de seleção

As referências obtidas na busca nas bases de dados escolhidas foram importadas para o gerenciador de referências Endnote Web (EndNote, Thomson Reuters, VA), para organização e remoção das duplicatas. A seleção foi realizada em duas fases. Na fase 1, dois revisores revisaram independentemente os títulos e resumos de todas as citações de bancos de dados eletrônicos identificados usando o programa Rayyan qcri (Qatar Computing Research Institute, Doha, Qatar). Um terceiro revisor foi envolvido quando solicitado a tomar uma

decisão final. Todos os estudos que não atenderam aos critérios de inclusão foram descartados. Na fase 2, os mesmos critérios de seleção foram aplicados aos artigos completos para confirmação de sua elegibilidade. Os mesmos dois revisores realizaram a fase 2. Qualquer desacordo foi resolvido por discussão e acordo mútuo entre os três revisores.

3.9.7.6 Processo de coleta de dados

O primeiro revisor coletou as informações necessárias dos artigos selecionados. O segundo revisor verificou todas as informações recuperadas. Mais uma vez, as divergências foram resolvidas por discussão e acordo mútuo entre os 3 revisores. Os autores coletaram dados relativos aos autores do estudo, ano, tipo de estudo, país, tamanho da amostra, idade, acompanhamento, fonte de coleta de dados em cada estudo, avaliação das vias aéreas e principais conclusões.

3.9.7.7 Avaliação de risco de viés

ROBINS-I (The Risk Of Bias In Non-randomized Studies of Interventions) (STERNE et al., 2016) foi usado por dois revisores, que fizeram a avaliação individualmente. Da mesma forma que nas outras etapas, qualquer divergência foi discutida entre os três revisores visando um acordo mútuo.

3.9.7.8 Síntese de dados

Os revisores se familiarizaram com os resultados coletados após a coleta de dados, e uma síntese qualitativa dos estudos incluídos foi realizada. A síntese quantitativa não era viável devido à heterogeneidade metodológica e clínica nos estudos incluídos.

4 ARTIGOS I

Apresentação

The following article will be submitted to Dentomaxillofacial Radiology with an impact factor of 2.419.

Artigo

Impact of software reconstruction on the assessment of nasal cavity in patients with cleft lip and/or palate before and after alveolar bone graft

Marina Tavares Costa Nóbrega[1], Daniela Pita de Melo[1], Manuel Antonio Gordón-Núñez[1], Carlos Flores-Mir[2]

[1]Department of Dentistry, State University of Paraíba, Campina Grande, Paraíba, Brazil

[2] School of Dentistry, University of Alberta, Edmonton, Canada

Corresponding author:

Marina Tavares Costa Nóbrega

Universidade Estadual da Paraíba

[1]Department of Dentistry – Pos-graduation Dentistry Program

Rua Juvêncio Arruda, s/n – Bodocongó – Campina Grande – PB – Brasil CEP 58429-600

Phone/ Fax: +55 83 3315-3471

E-mail: marinatavarescn@gmail.com

Abstract

Objectives: To compare Dolphin Imaging and 3D Slicer assessing Computed Tomography (CT) measurements of nasal septum deviation (NSD), turbinate hypertrophy, and nasal cavity volume of cleft lip and/or palate patients (CL/P) before (T1) and after (T2) alveolar bone graft.

Methods: Medical records and craniofacial CT images from 12 CL/P between 9 and 24 years old treated at a support centre were collected. Calibration was performed for both software. After image orientation, measurements of NSD and turbinates hypertrophy were done, and nasal cavity volume evaluation was also performed. Considering a significance level of 5% ($p < 0.05$), the statistical analysis was performed through Wilcoxon's test.

Results: All groups' medians represented mild NSD. Most comparisons did not show statistically significant differences except for T1 and T2 in Dolphin software ($p=.026$). There were no significant differences between software in any comparison regarding right and left turbinate hypertrophy. Nasal cavity volume assessment did not show a difference within the software; however, it presented statistical differences comparing T1 ($p=.034$) and T2 ($p=.015$) for both software.

Conclusions: Although the results identified some variability between both software regarding nasal cavity volume and nasal septum deviation, the differences may not be considered clinically relevant. There was not a statistical difference for right and left turbinate hypertrophy evaluation. The small sample size and age range of the participants may have influenced those results.

Keywords: orofacial cleft, nasal cavity, alveolar bone grafting, nasal septum, turbinates.

Introduction

Cleft lip and palate (CLP) is the most common craniofacial deformity worldwide, with a prevalence rate of 1 for every 700 live births.[1,2] Overall, midfacial aesthetics for this population is affected by the deformity itself and also because of post-surgical scarring effects.[3–5] Many consecutive hard and soft tissue surgeries are necessary to effectively manage these patients, especially during the first few years of life. Multiple surgical procedures can significantly impact either positively or negatively their craniofacial development and morphology.[6]

The craniofacial morphology of CLP individuals is different from those without cleft, as this syndrome affects several craniofacial structures.[7] Controversy is identified regarding nasal

septum and nasal cavity morphology. Some authors suggest that these anatomic structures may differ between patients with and without CLP.[8,9] Nevertheless, some studies disagree with this point of view, concluding that there are no differences between both groups.[10–12]

To evaluate craniofacial morphology, two-dimensional (2D) and/or three-dimensional (3D) imaging can be used. However, there are imaging differences between both methods, which may compromise diagnostic findings.[13,14] Moreover, some measurements such as lines, angles, and anatomical planes are better identified in 3D imaging. Therefore, 3D appears to be more accurate due to overcoming disadvantages of 2D imaging, including image distortion and the impossibility of performing 3D volumetric evaluation. [15–18]

3D data assessment is commonly performed through computed tomography (CT) or cone-beam computed tomography (CBCT) imaging. [19] Although CBCT benefits from a lower radiation dose exposure, and a lower cost,[20,21] its acquisition geometry, shows higher image noise than medical-grade CT. CT also presents the advantage of providing a better depiction of soft tissues (important when analyzing upper airways) because of its increased contrast capability over CBCT imaging. [21–24]

Different software is widely used to assess 3D data sets. Dolphin Imaging (Patterson Dental, USA) is a user-friendly software; hence, it is used by many dentists in either clinical or academic settings. This software is commonly used for upper airway assessment.[25–28] Expensive licenses are needed, which may be an issue for dental practices or health institutions in developing countries. Therefore, free-of-charge software may be a good option when funding is not available. Facing this reality, one option that stands out is 3D Slicer (Surgical Planning Laboratory, Harvard University, Boston, Massachusetts, USA) a free software that has been used in previous craniofacial morphological studies with promising results.[26,28,29]

The objective of this study was to compare these two software assessing CT imaging reconstructions of nasal septum deviation, turbinate hypertrophy, and nasal cavity volume of patients with CLP before (T1) and after (T2) alveolar bone graft. The assessment of these nasal structures is essential in CLP before/after surgeries. If similar results are depicted, 3D slicer software could be considered an adequate no-cost option for institutions with significantly related budget limitations.

Materials and Methods

This was a retrospective case series study, approved by the Research Ethics Committee of State University of Paraíba (CAAE: 24596319.3.0000.5187).

The study was performed on a convenience sample that included all individuals with available medical records and craniofacial CT images treated at a support centre for patients with CLP of the Brazilian Association of Dentistry - Paraíba section, in João Pessoa, Paraíba, Brazil from 2017 to 2019. The inclusion criteria were individuals (aged between 9 and 24 years) with cleft lip and palate who underwent craniofacial CT imaging prior and one year after the alveolar bone graft, while the exclusion criteria was a history of facial bone fracture or any associated syndromes.

Images were acquired using a 64-channel Toshiba Aquilion CT Scanner. First, a scout scan was made to limit the scanning exposure to the area of concern, from glabella to hyoid bone, to reduce ionizing radiation. The acquisitions were made with the CT scanner operating at 120 kV, 150 mAs, for 4 to 6 seconds, with a voxel size of 0.5mm. Moreover, information on the type of cleft, surgery dates, patient age and sex were also collected.

Image analysis

Computed tomography data were stored in digital imaging and medical communications (DICOM) format and transferred to a computer with the required software for each analysis. It was performed in two software, 3D Slicer (Version 4.10.2, Surgical Planning Laboratory, Harvard University, Boston, Massachusetts, USA) and Dolphin Imaging Software (version 11.95 Premium, Patterson Dental USA).

The three-dimensional CT images were first oriented as follows: the axial plane will be set using the Frankfort Horizontal (FH) plane (defined by the right and left Porium and the center of the right and left orbital points); the coronal plane that is the line passing through the deepest point of the lateral surface of the zygomatic bones, at the level of the furcation of maxillary right first molar; the sagittal plane that is perpendicular to the FH and coronal planes, passing through the midpoint between the bilateral orbital points. [30]

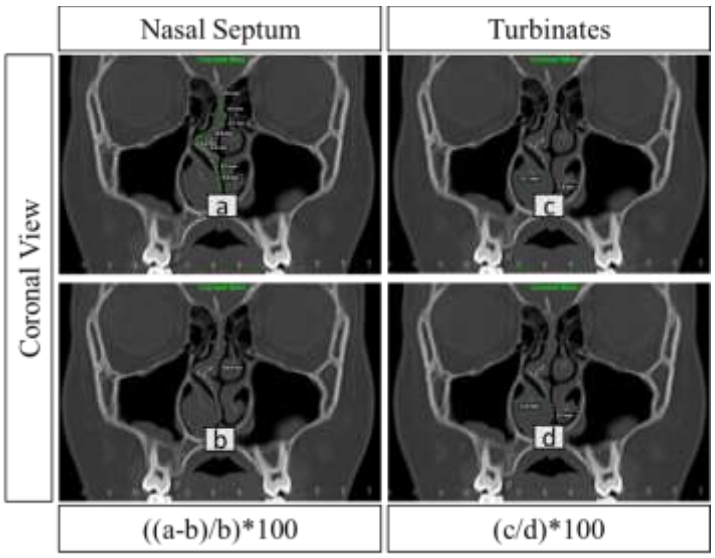
A single examiner performed all measurements and data analysis, and calibration was conducted for both software. After obtaining high intra-examiner agreement through intraclass correlation coefficient (ICC), which varied between 0.891-0.991 for Dolphin and 0.961-0.96 for 3D Slicer, a full evaluation of all images was performed. [31]

Regarding the nasal septum and turbinate, measurements were done in the coronal view that includes the furcation of the upper first molars. After image orientation, a line following the linear shape of the nasal septum was drawn from the lower limit of *Crista Galli* in cribriform plate to anterior nasal spine (a) and a hypothetical straight line between those points (b). Then the linear values were put in a formula to analyze the deviation, as is shown in Baddam

(2021). The nasal septum formula is ((a-b)/b) x100, which a is the actual nasal septum length and b is the hypothetical straight line built. The nasal septum deviation (NSD) of each research participant was classified according to the degree of deviation from the median sagittal plane as mild (≤8º), moderate (9–15°) and severe (≥ 16°). [32,33]

Inferior turbinate hypertrophy was analyzed by doing measurements from the inferior turbinate itself and the nostril width in the same cut as the one generated for the nasal septum deviation in both sides in the broadest area of the turbinate. Moreover, the values were used in a formula, (c/d) x100, which c is the turbinate width and d is the nostril width. [33]

Figure 1 - Formulas to analyze nasal septum deviation and turbinate hypertophy.



When it comes to nasal cavity analysis, the nasal cavity boundaries were determined based on previously suggested landmarks.[30] Thus, the boundaries in the sagittal cut were defined as lines connecting the posterior nasal spine to the Sella (S) to the Nasion (N) line, N to the tip of the nasal bone, the nasal bone tip to the anterior nasal spine and anterior nasal spine with the posterior nasal spine. In the coronal view, the borders were limited based on the cribriform plate, which divides the nasal cavity from orbits and maxillary sinuses and hard palate.

A calibration using three different ranges to determine the threshold that was used. The lowest threshold level was -1000 HU, and the highest threshold level varied between -800, -600 and -400.[34,35] After eye inspection of which threshold shows the highest image definition, the chosen threshold range was between -1000 HU and -400 HU, and all images were evaluated.

In Dolphin Imaging Software, the Sinus/Airway tool was used to perform this analysis. The first step to nasal cavity's air space volume rendering was to choose the preestablished anatomic points to delimit the area of interest in both views, sagittal and coronal. Then, seed points, represented by yellow dots, were used to mark the air space in the nasal cavity, and it

was made through the whole image. After that, the threshold range was defined, and command was made allowing the software to render the volume.

In 3D Slicer, the DICOM files were imported to ITK-Snap[36] and converted from Gammon Infrastructure Projects Limited (GIPL) files. Thus, it became compatible to be analyzed in 3D Slicer. Then, through the tool "segment editor", threshold was determined, and segmentation started using the "paint" tool. After reassuring that pre-established anatomic structures were being respected and all the air space in the nasal cavity was included, the volume rendering was commanded with a "fast marching tool".

Statistical analysis

The results were organized in a computerized Excel spreadsheet database (Microsoft Office 2016). With the aid of the IBM SPSS Statistics program (version 25.0; IBM Corp., Armonk, NY) and considering a significance level of 5% ($p < 0.05$), the statistical analysis was performed through Wilcoxon's test to evaluate differences between (T1) and (T2) values in both software and between them.

Results

Records of twelve patients were considered in this research. There were five different types of clefts, including left transforamen, right transforamen, bilateral transforamen, left preforamen, and left pre- and post-foramen, according to Spina (1973) classification.

Regarding the patient's age at surgery day, children and teenagers were most of the sample, while one patient was already an adult (9 to 24 years old).

Table 1 – Medians of all analysis

Measured Variables	Dolphin		3D Slicer	
	T1 Median (min-max)	T2 Median (min-max)	T1 Median (min-max)	T2 Median (min-max)
Nasal Cavity ($m^3/x10^{-5}$)	1.60 (1.31 – 1.72)	1.73 (1.47 – 1.95)	1.38 (1.04 – 1.48)	1.34 (1.20 – 1.48)
Nasal Septum Deviation (°)	4.99 (1.59 – 14.00)	2.79 (0.72 – 13.32)	6.28 (3,32 – 13.54)	4.36 (0.80 – 15.91)
Right Turbinate analysis (%)	78.66 (77.03 – 79.77)	76.99 (68.90 – 82.01)	78.54 (63.41 – 80.12)	79.42 (72.98 – 82.84)
Left Turbinate analysis (%)	69.72 (66.51 – 78.54)	69.97 (67.73 –74.56)	74.38 (67.66 – 83.42)	71.44 (70.13 – 79.83)

Descriptive analysis of measured variables, including medians, are described in Table 3. Regarding NSD, all groups' medians represented mild NSD. Most comparisons did not show statistically significant differences except for T1 and T2 in Dolphin software (p=.026). (Tables 1 & 2)

Considering right and left turbinate hypertrophy analysis, there were no significant differences between software in any comparison. (Tables 1 & 2)

Nasal cavity volume assessment did not show a difference within the software; however, there were statistically significant differences when the volumes in T1 and the volumes in T2 were compared between software. (Tables 1 & 2)

Table 2 – Wilcoxon's test results for NSD, Turbinate hypertrophy, and nasal cavity volume analysis

Measured Variables	Dolphin		3D Slicer		T1 X T1		T2 X T2	
	Z	P-value	Z	P-value	Z	P-value	Z	P-value
Nasal Cavity	1.098	.272	.471	.638	2.118	**.034**	2.432	**.015**
Nasal Septum Deviation	2.223	**.026**	.078	.937	.471	.638	1.255	.209
Right Turbinate analysis	.549	.583	.941	.347	.235	.814	1.962	.050
Left Turbinate analysis	1.177	.239	1.490	.136	1.962	.050	1.569	.117

Discussion

To our knowledge, there are only a handful of studies that evaluate the nasal complex of patients with CLP through 3D imaging, more precisely, 3D volume analysis. [8,38–43] The 3D analysis is essential as this is a complex anatomical area, and the deformity brings an extra level of complexity to perform a 3D analysis of it. Comparison of measurements between software has not been reported in this area. As software licenses usually have a high cost, limiting the access by health professionals, identifying the impact that software may have is paramount.

The nasal complex of patients with CLP may present variations compared to those without the deformity, such as different nasal cavity volume, which might be related to the size and position of the maxilla, as well as internal nasal structures such as nasal septum and turbinate.[8,39,40,44] This exploratory research suggested that the utilized software may not matter when considering nasal complex evaluation in this population.

Although nasal cavity volume variability was identified between the software in T1 (p=.034) and T2 (p=.015), the comparisons between T1 and T2 performed in the same software were not statistically different (Dolphin p=.272, 3D Slicer p=.638). The implications of these findings in clinical practice are likely that both software measure the lack of volumetric changes, but what is unknown is which one of the software is closer to the actual volume (lack of ground truth). Nevertheless, differences in volumetric calculations were likely clinically irrelevant (around 0.30 $m^3/x10^{-5}$). In that sense, either software could be recommended to be used.

Some studies that also analyzed 3D imaging regarding CLP patients showed different conclusions. Ertas; Ataol (2019) evaluated 15 UCLP and 15 without cleft through CBCT, and concluded that nasal airway volume of CLP patients was larger than non-cleft group, while Farzal et al. (2016) and Takahashi et al. (2019), where the first one evaluated 20 UCLP and BCLP through CT, and the second had a more significant sample with 83 CLP patients through CBCT, agreed that CLP patients presented decreased nasal airway volume in comparison to non-cleft individuals. Lastly Pimenta et al. (2015), who evaluated 30 UCLP and 15 noncleft subjects through CBCT, concluded no differences between nasopharyngeal airway of CLP and non-CLP patients in their research. The real question in these studies is the clinical significance of the portrayed volumetric differences if they indeed exist.

It is important to mention that Farzal et al. (2016); Pimenta et al. (2015) used Mimics 16.0 software (Materialise, Plymouth, MI), Takahashi et al. (2019) used InVivo dental software

(Anatomage, San Jose, CA), and Ertas; Ataol (2019) used Dolphin 3D Imaging Software Version 11.9. None of these studies did compare nasal volumetric measurements between different software. The present study suggests that software selection may not matter. This should be assessed in the future with larger samples.

Another aspect to consider is the segmentation process. This study compared an automatic segmentation (Dolphin Imaging) with a semi-automatic one (3D Slicer). Automated segmentation is more prone to better reproducibility (but not necessarily accuracy) and is usually less time-consuming; however, it is more susceptible to errors, especially when the image presents noise and artifacts.[45] 3D slicer showed to be a little more time-consuming (10 to 15 more minutes) than Dolphin imaging, and it was easier to demarcate boundaries in Dolphin. However, it probably will not be an issue in clinical practice, considering that the clinician usually does not need to analyze a high number of images at once.

Individuals with CLP present a high prevalence of nasal obstruction with severe symptoms. Which procedures and when they went through also influence its severity [46]. Yan et al. (2020) found that in patients with UCLP, the cleft side tends to present lower nasal airway volume than the noncleft side, and this volume increases when the NSD is not in complete contact with inferior turbinate. Banari et al. (2021) concluded that aspects such as nasal cross-sectional area and nasal volume were higher on the non-cleft side than the cleft side. In our study, no changes in the right or left turbinates were noted.

Even though NSD only presented a significant difference in Dolphin software analysis at T1 (around 2 degrees), this difference is unlikely to be of clinical significance, especially considering that the groups mainly showed mild NSD. The literature suggests that patients with CLP usually present a severe NSD and are likely to present greater NSD than patients without the deformity.[48,49] In contrast with our findings, however, there was not a non-cleft control group for comparison.

Nasal obstruction and reduction of airflow can exacerbate rhinosinusitis and airway stenosis.[43,47] It is known that patients with CLP are more prone to present nasal obstructions due to the deformity and the surgeries throughout life. The orthodontic treatment has an important role in this aspect, and it can help improving airway width and thickness.[50–52] The possibility of assessing 3D data through free-of-charge software allows more clinicians to improve their care because they can be aware of the patient's needs, which is fundamental for developing an adequate treatment plan.

The main relevance of this study is the increased understanding of the nasal complex anatomy as assessed three-dimensionally through a novel approach, as the previously published studies

present some discrepant results regarding the morphology of the nasal complex in CLP patients, as well as analyze the performance of a free software regarding these analyses in comparison with one of the most used software among dental practice.[3–5,10–12,48,53] The fact that CT imaging was used needs to be emphasized. CT imaging presents better spatial resolution compared to CBCT (which is the most likely used hard tissue 3D imaging technology in dentistry).

The main limitation of this study was the absence of a control group, which would enable more comparisons and important conclusions about the nasal complex of CLP patients. This limitation could not be overcome as it would be unethical to expose an otherwise healthy individual to medical craniofacial CT. Furthermore, the large age range and diversity of cleft types is also a weak point to work on in future research in this field.

Conclusion

Although the present results identified some variability between both software regarding nasal cavity volume and nasal septum deviation, the differences may not be considered clinically relevant. There was not a statistical difference for right and left turbinate hypertrophy evaluation. Caution should be exercised as the small sample size and age range of the participants may have influenced those results.

References

1. Vieira AR, McHenry TG, Daack-Hirsch S, Murray JC, Marazita ML. Candidate gene/loci studies in cleft lip/palate and dental anomalies finds novel susceptibility genes for clefts. Genet Med [Internet]. 2008;10(9):668–74. Available from: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2734954&tool=pmcentrez&rendertype=abstract

2. Dixon MJ, Marazita ML, Beaty TH, Murray JC. Cleft lip and palate: Understanding genetic and environmental influences. Nat Rev Genet [Internet]. 2011;12(3):167–78. Available from: http://dx.doi.org/10.1038/nrg2933

3. Kimura N, Nozoe E, Okawachi T, Ishihata K, Fuchigami T, Nakamura N. Three-dimensional analyses of nasolabial forms and upper lip surface symmetry after primary lip repair in patients with complete unilateral cleft lip and palate. J Cranio-Maxillofacial Surg [Internet]. 2019;47(2):245–54. Available from:

https://doi.org/10.1016/j.jcms.2018.11.035

4. Alonso N, Risso GH, Denadai R, Raposo-Amaral CE. Effect of maxillary alveolar reconstruction on nasal symmetry of cleft lip and palate patients: A study comparing iliac crest bone graft and recombinant human bone morphogenetic protein-2. J Plast Reconstr AESTHETIC Surg. 2014;67(9):1201–8.

5. de Sousa Gil AP, Guijarro-Martínez R, Haas OL, Masià-Gridilla J, Valls-Ontañón A, de Oliveira RB, et al. Nasolabial soft tissue effects of segmented and non-segmented Le Fort I osteotomy using a modified alar cinch technique—a cone beam computed tomography evaluation. Int J Oral Maxillofac Surg. 2019;

6. Thierens LAM, Brusselaers N, De Roo NMC, De Pauw GAM. Effects of labial adhesion on maxillary arch dimensions and nasolabial esthetics in cleft lip and palate: a systematic review. Oral Dis. 2017;23(7):889–96.

7. Akarsu-Guven B, Karakaya J, Ozgur F, Aksu M. Growth-related changes of skeletal and upper-airway features in bilateral cleft lip and palate patients. Am J Orthod Dentofac Orthop [Internet]. 2015;148(4):576–86. Available from: http://dx.doi.org/10.1016/j.ajodo.2015.02.031

8. Farzal Z, Walsh J, de Rezende Barbosa GL, Zdanski CJ, Davis SD, Superfine R, et al. Volumetric Nasal Cavity Analysis in Children With Unilateral and Bilateral Cleft Lip and Palate. Laryngoscope. 2016 Jun;126(6):1475–80.

9. Friel MT, Starbuck JM, Ghoneima AM, Murage K, Kula KS, Tholpady S, et al. Airway Obstruction and the Unilateral Cleft Lip and Palate Deformity: Contributions by the Bony Septum. Ann Plast Surg [Internet]. 2015;75(1):37–43. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&PAGE=reference&D=emed16&NEWS=N&AN=612767759

10. Al-Fahdawi MA, Farid MM, El-Fotouh MA, El-Kassaby MA. Cone-beam computed tomography analysis of the nasopharyngeal airway in nonsyndromic cleft lip and palate subjects. Cleft Palate-Craniofacial J. 2017;54(2):202–9.

11. Ertaş Ü, Ataol M. Evaluation of Nasal Airway Volume of Operated Unilateral Cleft Lip and Palate Patients Compared With Skeletal Class III Individuals. Cleft Palate Craniofac J. 2019;56(1):15–20.

12. Zhang Y, Wang Y, Zhang Y, Li S, Wang L, Qian Y. Cone-Beam Computed Tomography Evaluation of Skeletal Deformities and Pharyngeal Airway in Chinese Han Individuals With Nonsyndromic Unilateral Cleft Lip and Palate. Cleft Palate-Craniofacial J. 2019;105566561986070.

13. von Arx T, Janner SFM, Hänni S, Bornstein MM. Agreement between 2D and 3D radiographic outcome assessment one year after periapical surgery. Int Endod J. 2016;49(10):915–25.

14. Hong HH, Liu HL, Hong A, Chao P. Inconsistency in the Crown-to-Root Ratios of Single-Rooted Premolars Measured by 2D and 3D Examinations. Sci Rep [Internet]. 2017;7(1):1–8. Available from: http://dx.doi.org/10.1038/s41598-017-16612-x

15. van Vlijmen OJC, Maal T, Bergé SJ, Bronkhorst EM, Katsaros C, Kuijpers-Jagtman AM. A comparison between 2D and 3D cephalometry on CBCT scans of human skulls. Int J Oral Maxillofac Surg. 2010;39(2):156–60.

16. Gribel BF, Gribel MN, Frazão DC, McNamara JA, Manzi FR. Accuracy and reliability of craniometric measurements on lateral cephalometry and 3D measurements on CBCT scans. Angle Orthod. 2011;81(1):28–37.

17. Wen J, Liu S, Ye X, Xie X, Li J, Li H, et al. Comparative study of cephalometric measurements using 3 imaging modalities. J Am Dent Assoc [Internet]. 2017;148(12):913–21. Available from: https://doi.org/10.1016/j.adaj.2017.07.030

18. Yatabe-Ioshida MS, Campos LD, Yaedu RY, Trindade-Suedam IK. Upper Airway 3D Changes of Patients With Cleft Lip and Palate After Orthognathic Surgery. Cleft Palate Craniofac J. 2019;56(3):314–20.

19. Kochhar AS, Sidhu MS, Prabhakar M, Bhasin R, Kochhar GK, Dadlani H, et al. Frontal and axial evaluation of craniofacial morphology in repaired unilateral cleft lip and palate patients utilizing cone beam computed tomography; An observational study. Int J Environ Res Public Health. 2020;17(21):1–9.

20. Guyader E, Savéan J, Clodic C, Letellier P, Meriot P, Marianowski R. Three-dimensional reconstruction of the temporal bone: Comparison of in situ, CT, and CBCT measurements. Eur Ann Otorhinolaryngol Head Neck Dis [Internet]. 2018;135(6):393–8. Available from: https://doi.org/10.1016/j.anorl.2018.08.013

21. Razi T, Niknami M, Alavi Ghazani F. Relationship between Hounsfield Unit in CT Scan and Gray Scale in CBCT. J Dent Res Dent Clin Dent Prospects [Internet]. 2014;8(2):107–10. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25093055%0Ahttp://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC4120902

22. Mah P, Reeves TE, McDavid WD. Deriving Hounsfield units using grey levels in cone beam computed tomography. Dentomaxillofacial Radiol. 2010;39(6):323–35.

23. Thereza-Bussolaro C, Pacheco-Pereira C, Lagravère M, Flores-Mir C. Some Challenges and Potential Issues Regarding Cone Beam Computed Tomography of the Upper Airway. J ofDentalSleepMedicine. 2021;8(2).

24. Thereza-Bussolaro C, Lagravère M, Pacheco-Pereira C, Flores-Mir C. Development, validation and application of a 3D printed model depicting adenoid hypertrophy in comparison to a Nasoendoscopy. Head Face Med. 2020;16(1):1–8.

25. Power G, Breckon J, Sherriff M, McDonald F. Dolphin Imaging Software: An analysis of the accuracy of cephalometric digitization and orthognathic prediction. Int J Oral Maxillofac Surg. 2005;34(6):619–26.

26. Nadjmi N, Tehranchi A, Azami N, Saedi B, Mollemans W. Comparison of soft-tissue profiles in le Fort i osteotomy patients with Dolphin and Maxilim softwares. Am J Orthod Dentofac Orthop [Internet]. 2013;144(5):654–62. Available from: http://dx.doi.org/10.1016/j.ajodo.2013.06.019

27. Wang CH, Randazzo L. Evolution of imaging and management systems in orthodontics. Am J Orthod Dentofac Orthop [Internet]. 2016;149(6):798–805. Available from: http://dx.doi.org/10.1016/j.ajodo.2016.03.016

28. Pinheiro ML, Yatabe M, Ioshida M, Orlandi L, Dumast P de, Trindade-Suedam IK. Volumetric reconstruction and determination of minimum crosssectional area of the pharynx in patients with cleft lip and palate: comparison between two different softwares. J Appl Oral Sci. 2018;26:e20170282.

29. Chen J gang, Han K wei, Zhang D feng, Li Z xing, Li Y ming, Hou L jun. Presurgical Planning for Supratentorial Lesions with Free Slicer Software and Sina App. World Neurosurg [Internet]. 2017;106:193–7. Available from:

http://dx.doi.org/10.1016/j.wneu.2017.06.146

30. Kavand G, Lagravère M, Kula K, Stewart K, Ghoneima A. Retrospective CBCT analysis of airway volume changes after bone-borne vs tooth-borne rapid maxillary expansion. Angle Orthod. 2019;89(4):566–74.

31. Koo TK, Li MY. A Guideline of Selecting and Reporting Intraclass Correlation Coefficients for Reliability Research. J Chiropr Med [Internet]. 2016;15(2):155–63. Available from: http://dx.doi.org/10.1016/j.jcm.2016.02.012

32. Setlur J, Goyal P. Relationship between septal body size and septal deviation. Am J Rhinol Allergy. 2011;25(6):397–400.

33. Baddam P, Thereza-bussolaro C, Flores-mir C, Graf D. Nasal cavity structural anomalies in children and adolescents at high risk of sleep-disordered breathing: An exploratory cone-beam computed tomography study. Am J Orthod Dentofac Orthop [Internet]. 2021; Available from: https://doi.org/10.1016/j.ajodo.2020.05.020

34. Cherobin GB, Voegels RL, Gebrim EMMS, Garcia GJM. Sensitivity of nasal airflow variables computed via computational fluid dynamics to the computed tomography segmentation threshold. PLoS One. 2018;13(11):1–16.

35. Nakano H, Mishima K, Ueda Y, Matsushita A, Suga H, Miyawaki Y, et al. A new method for determining the optimal CT threshold for extracting the upper airway. Dentomaxillofacial Radiol. 2013;42(3):1–3.

36. Yushkevich PA, Piven J, Hazlett HC, Smith RG, Ho S, Gee JC, et al. User-guided 3D active contour segmentation of anatomical structures: Significantly improved efficiency and reliability. Neuroimage. 2006;31(3):1116–28.

37. Spina V. A proposed modification for the classification of cleft lip and cleft palate. Cleft Palate J. 1973;10:251–2.

38. Ümit E, Mert A. Evaluation of Nasal Airway Volume of Operated Unilateral Cleft Lip and Palate Patients Compared With Skeletal Class III Individuals. Cleft Palate - Craniofacial J [Internet]. 2019 Jan;56(1):15–20. Available from: http://login.ezproxy.library.ualberta.ca/login?url=https://search.proquest.com/docview/2156293772?accountid=14474

39. Aras I, Olmez S, Dogan S. Comparative evaluation of nasopharyngeal airways of unilateral cleft lip and palate patients using three-dimensional and two-dimensional methods. Cleft Palate-Craniofacial J. 2012;49(6):75–81.

40. Tse RW, Mercan E, Fisher DM, Hopper RA, Birgfeld CB, Gruss JS. Unilateral Cleft Lip Nasal Deformity: Foundation-Based Approach to Primary Rhinoplasty. Plast Reconstr Surg. 2019;144(5):1138–49.

41. Takahashi M, Yamaguchi T, Lee MK, Suzuki Y, Adel M, Tomita D, et al. Three-dimensional assessment of the pharyngeal airway in Japanese preschoolers with orofacial clefts. Laryngoscope. 2019;i:1–8.

42. Pimenta LA, de Rezende Barbosa GL, Pretti H, Emodi O, van Aalst J, Rossouw PE, et al. Three-Dimensional Evaluation of Nasopharyngeal Airways of Unilateral Cleft Lip and Palate Patients. Laryngoscope. 2015 Mar;125(3):736–9.

43. Yan H, Xu Y, Wei S, Pan YC, Wan LZ, Du Y, et al. A Novel Classification of Relationship Between Nasal Septum and Inferior Turbinate Associated With Nasal Airway Obstruction in Patients With Unilateral Alveolar Cleft. J Craniofac Surg. 2020;32(2):496–9.

44. Ertas U, Ataol M. Evaluation of Nasal Airway Volume of Operated Unilateral Cleft Lip and Palate Patients Compared With Skeletal Class III Individuals. CLEFT PALATE-CRANIOFACIAL J. 2019 Jan;56(1):15–20.

45. Koçak B, Durmaz EŞ, Ateş E, Kılıçkesmez Ö. Radiomics with artificial intelligence: A practical guide for beginners. Diagnostic Interv Radiol. 2019;25(6):485–95.

46. Zhang RS, Lin LO, Hoppe IC, Jackson OA, Low DW, Bartlett SP, et al. Nasal Obstruction in Children With Cleft Lip and Palate: Results of a Cross-Sectional Study Utilizing the NOSE Scale. Cleft Palate-Craniofacial J. 2019;56(2):177–86.

47. Banari AS, Datana S, Agarwal SS, Bhandari SK. Evaluation of Nasal Patency Among Patients With Unilateral Cleft Lip and Palate: Cleft Versus Non-Cleft Side. Cleft Palate-Craniofacial J. 2021;58(3):340–6.

48. Friel MT, Starbuck JM, Ghoneima AM, Murage K, Kula KS, Tholpady S, et al. Airway Obstruction and the Unilateral Cleft Lip and Palate Deformity Contributions by

the Bony Septum. Ann Plast Surg. 2015 Jul;75(1):37–43.

49. Jiang M, You M, Wang S, Wang K, Feng B, Wang H. Analysis of Nasal Septal Deviation in Cleft Palate and/or Alveolus Patients Using Cone-Beam Computed Tomography. Otolaryngol NECK Surg. 2014;151(2):226–31.

50. Martin MA, Lipani E, Lorenzo AA, Martinez LB, Aiuto R, Dioguardi M, et al. The effect of maxillary protraction, with or without rapid palatal expansion, on airway dimensions: A systematic review and meta-analysis. Eur J Paediatr Dent. 2020;21(4):262–70.

51. Ming Y, Hu Y, Li Y, Yu J, He H, Zheng L. Effects of maxillary protraction appliances on airway dimensions in growing class III maxillary retrognathic patients: A systematic review and meta-analysis. Int J Pediatr Otorhinolaryngol [Internet]. 2018;105(426):138–45. Available from: https://doi.org/10.1016/j.ijporl.2017.12.013

52. Niu X, Di Carlo G, Cornelis MA, Cattaneo PM. Three-dimensional analyses of short- and long-term effects of rapid maxillary expansion on nasal cavity and upper airway: A systematic review and meta-analysis. Orthod Craniofacial Res. 2020;23(3):250–76.

53. Iwasaki T, Suga H, Minami-Yanagisawa A, Hashiguchi-Sato M, Sato H, Yamamoto Y, et al. Upper airway in children with unilateral cleft lip and palate evaluated with computational fluid dynamics. Am J Orthod Dentofac Orthop [Internet]. 2019;156(2):257–65. Available from: https://doi.org/10.1016/j.ajodo.2018.09.013

5 ARTIGO II

Apresentação

The following article will be submitted to The Cleft-Palate Craniofacial Journal with an impact factor of 1.433.

Artigo

Effects of maxillary protraction on the upper airway dimensions of growing patients with cleft lip and palate: A systematic review

Marina Tavares Costa Nóbrega[1], Andressa Cavalcanti Pires[1], Ana Priscila Lira de Farias Freitas[1], Alessandro Leite Cavalcanti[1], Manuel Antonio Gordón-Núñez[1], Daniela Pita de Melo[1], Carlos Flores-Mir[2]

[1]*Department of Dentistry, State University of Paraíba, Campina Grande, Paraíba, Brazil*

[2]*School of Dentistry, University of Alberta, Edmonton, Canada*

Corresponding author:
Marina Tavares Costa Nóbrega
Universidade Estadual da Paraíba
[1]Department of Dentistry – Pos-graduation Dentistry Program
Rua Juvêncio Arruda, s/n – Bodocongó – Campina Grande – PB – Brasil CEP 58429-600
Phone/ Fax: +55 83 3315-3471
E-mail: marinatavarescn@gmail.com

Abstract

Objective: To synthesize the effects of maxillary protraction on the upper airway dimensions of growing patients with CLP. **Design:** This systematic review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement. The search was performed on MEDLINE, EMBASE, LILACS, Web of Science, and Scopus until February 2021. Additional literature was identified in Google Scholar web search, Proquest, and hand searches of bibliographies from included studies. After duplicate removal, through titles and abstracts of all identified electronic database citations, studies were selected for full read to confirm their eligibility, and the required information from the selected articles were collected. ROBINS-I (The Risk Of Bias In Non-randomized Studies of Interventions) was used to assess the included studies. Qualitative synthesis of included studies was performed; however, quantitative synthesis was not feasible because of the methodological and clinical heterogeneity. **Results:** After database searching, 530 results were identified. Only nine articles were selected for full-text review, resulting in 4 included studies. Significant heterogeneity in the upper airway dimension's evaluation was noted. Concerning the risk of bias assessment, three studies were classified as at moderate risk of bias, while the other one as at serious risk of bias. The four studies found differences before and after maxillary protraction. **Conclusion:** Based on low certainty levels, upper airway dimensions of patients with CLP may change with maxillary protraction, but the magnitude of the changes is unlikely to be clinically relevant. In addition, there was no consistency in the changes.

Keywords: orofacial cleft, airway management, extraoral traction appliances.

Introduction

Globally, cleft lip and/or palate have an average prevalence of 1 for every 700 live births, the most common craniofacial deformity. There is significant variability in cleft lip and palate (CLP) prevalence according to geographic origin, ethnic background, environmental exposures, and socioeconomic status.[1–3]

Orthodontic and orthopedic management is fundamental to CLP patients, as jaw growth, tooth development, dental occlusion, and aesthetics are affected according to individual development, jaw discrepancy degree, and cleft type. [4–7]

Whether the cleft is unilateral or bilateral, in addition to which dental deformities are involved, will guide each patient's orthodontic needs. Deficiency in maxilla growth is associated with the deformity itself and the scarring that these patients face due to the needed craniofacial surgeries. [8–10]

Individuals with bilateral cleft lip and palate (BCLP) usually have a more affected maxillary development; however, they appear to be more symmetric, but still presenting anterior and posterior crossbites. Unilateral cleft lip and palate (UCLP) usually show anterior crossbite with or without a posterior crossbite in the cleft side. Furthermore, regardless of cleft type, a large number develops a Class III skeletal deformity pattern. [5,11]

Considering the abnormal maxillary growth, this patient group needs transverse and sagittal maxillary corrections, which should be performed at different times during early adolescence. Rapid or slow expansion are used for transverse correction in the upper arch, and customizations can be made to individualize the appliance to the patient's needs. [12,13]

Maxillary expansion is often performed combined with maxillary protraction to address the sagittal needs. [14]

Maxillary protraction shows satisfactory results in individuals with and without CLP.[14,15] One aspect that has been briefly explored is its effect on the upper airway. It has been argued that

this therapy can modify upper airway dimensions, which may help to improve respiratory function. [16,17] A systematic review performed by Ming (2018) evaluated the effects of maxillary protraction in upper airway dimensions in children with Class III and maxillary retrognathism. They reported that maxillary protraction increases pharyngeal airway dimensions in children. Another systematic review analyzed whether (rapid maxillary expansion) RME influenced maxillary protraction effects on the upper airway. It concluded that maxillary protraction without RME in non-cleft class III patients effectively widened the pharyngeal dimensions.[18]

The effect of maxillary protraction on upper airway dimensions on CLP individuals has not been synthesized yet. Sharshar and El-bialy (2012) evaluated the changes in airways after anterior maxillary advancement by distraction osteogenesis in patients with CLP. They found a reduction of nasal resistance and increased upper airway size; however, there was a lack of high-quality evidence. Distraction osteogenesis is mechanically distinctive to maxillary protraction supported by a headgear. Although a scoping review has been published more recently that assessed orthodontic outcomes in patients with CLP, upper airway changes were not a deeply explored goal.[19]

Hence, the present systematic review aims to synthesize the effects of maxillary protraction on the upper airway dimensions of growing patients with CLP.

Methods

Registration

This systematic review was registered in the International Prospective Register of Systematic Reviews (PROSPERO) under the registration code CRD42021240533. It was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement.

Search strategy

The search was performed on MEDLINE, EMBASE, LILACS, Web of Science, and Scopus until February 2021. Moreover, additional literature was identified in Google Scholar web search, Proquest, and hand searches of bibliographies from included studies. Search strategies were adapted individually for each database. (Appendix 1)

Inclusion and Exclusion criteria

Interventional or observational clinical studies with a prospective or retrospective follow-up of at least six months were included. There was no restriction on publication language or year of publication.

Regarding the exclusion criteria, studies were excluded if they involved additional syndromic characteristics or not growing individuals; orthodontic treatments that did not include maxillary protraction as part of the orthodontic management; only measured occlusal changes, profile evaluation, or any change that do not relate to upper airway dimensions.

Selection Process

The references obtained from the search in the chosen databases were imported to the reference manager Endnote Web (EndNote, Thomson Reuters, VA) for organization and duplicate removal. The selection was completed in two phases. In phase 1, two reviewers independently reviewed the titles and abstracts of all identified electronic database citations using Rayyan QCRI (Qatar Computing Research Institute, Doha, Qatar). A third reviewer was involved when required to make a final decision. Any studies which did not fulfill the inclusion criteria were discarded. In phase 2, the same selection criteria were applied to the full articles to confirm their eligibility. The same two reviewers performed phase 2. Any disagreement was resolved by discussion and mutual agreement between the three reviewers.

Data collection

The first reviewer collected the required information from the selected articles and summarized key data. The second reviewer cross-checked all the retrieved data. Again, disagreements were resolved by discussion and mutual agreement between the three reviewers.

The authors collected data regarding the study authors, year, study type, country, sample size, age, follow-up, source of data collection, airway evaluation (upper airway dimensional changes measured through cephalometric values, cross-sectional area, and volume), and main conclusions.

Synthesis methods

Reviewers got familiarized with results gathered after data collection, and qualitative synthesis of included studies was performed. Quantitative synthesis was not feasible because of the methodological and clinical heterogeneity in the included studies.

Effect measures

Primary outcomes were upper airway volume and minimal cross-sectional area as assessed through CBCT or lateral cephalography. Median and mean differences between before and after treatment were collected.

Risk of Bias Assessment

ROBINS-I (The Risk Of Bias In Non-randomized Studies of Interventions) was used by two reviewers who individually assessed the included studies. Similar to the other selection stages, any disagreement was discussed between the three reviewers aiming for a mutual agreement.

Results

After database searching, 96 studies were primarily identified. Regarding grey literature, 434

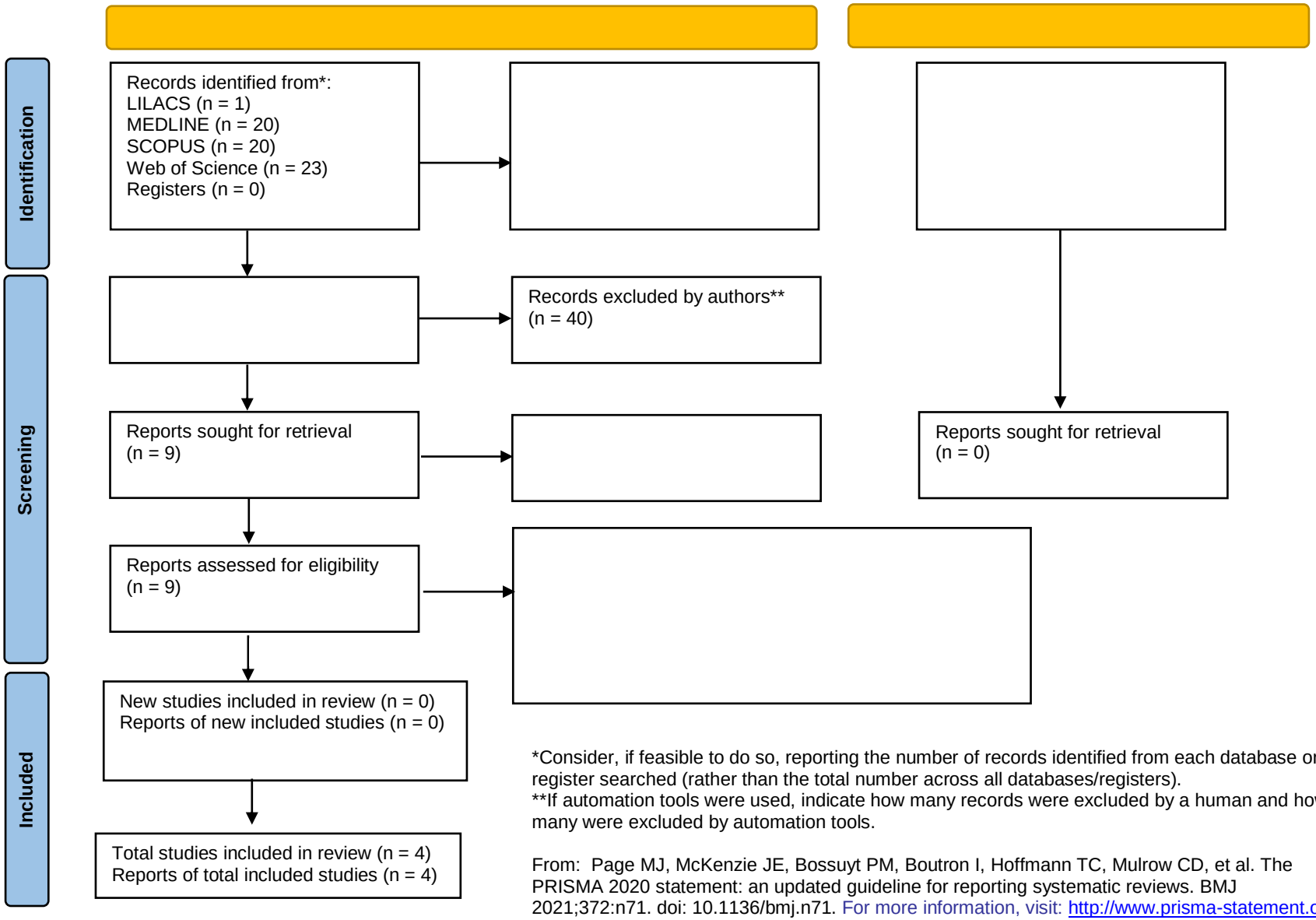
studies were added, and the total was submitted to phase 1 selection. Only nine articles were selected for full-text review, finally resulting in 4 included studies. The flowchart of the selection process according to PRISMA 2020 statement [20] is shown in Figure 1.

Data collection from these four included studies was performed. (Table 1) Significant heterogeneity in the upper airway dimension's evaluation was noted, and there was a variable follow-up mean from 6 to 24 months. Two studies evaluated upper airway dimensions through CBCT imaging scans, while the other two used lateral cephalometric radiographs[21–24].

Concerning the risk of bias assessment Alrejaye et al. (2019), Keçik (2017) and Singla et al. (2014) were classified as at moderate risk of bias, while Fu et al. (2016) as at serious risk of bias because of confounding by the study group and control group were not assessed through the same imaging type (CT x CBCT). (Table 2)

The four studies found differences before and after maxillary protraction. However, Alrejaye et al. (2019) reported a median of 3.6 cm^3 volumetric change in the control group vs. 2.6 cm^3 in the control group. This difference may not be considered clinically relevant. Similarly, Keçik (2017) identified a mean difference of 34.67mm^2 for nasopharynx changes and 57.39mm^2 for oropharynx changes in the experimental group, while the control group resulted in 38.43mm^2 for nasopharynx and 61.27mm^2 oropharynx volumetric changes. Again, these differences may not be considered clinically relevant. Fu et al. (2016), Singla et al. (2014) found differences within and between groups. Regarding the control group, Fu et al. (2016)[22] found a mean change of 85.3 mm^3 in pharyngeal airway volume, while the experimental group presented 3001.9 mm^3. This difference is likely clinically relevant. Finally, Singla et al. (2014) found a mean change of 1.74mm (Ba-pm) in the experimental group and 0.40mm (Ba-pm) in the control group. Again, these differences may not be considered clinically relevant.

Figure 1 - Flow Diagram of Literature Search and Selection Process according to PRISMA 2020 [20]



*Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers).
**If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools.

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71. For more information, visit: http://www.prisma-statement.org/

Table 1 - Data collection of included studies (n=4).

Author, Year, Country, Study type	Sample (n)	Age (mean/SD)	Follow up (months)	Source of Data collection	Airway evaluation	Main conclusions
Alrejaye et al., 2019, Saudi Arabia / USA, Retrospective non-randomized controlled trial	Experimental group (fan-shaped or hyrax expander and protraction with a face mask): n=18 (11 males and 7 females with CP/L; 3 cleft palate only, 5 BCLP and 10 UCLP); Control group (teeth alignment only): n= 8 (3 males, 5 females with CP/L; 3 cleft palate, 5 UCLP)	Experimental group: T0 = 8.4 years (± 1.7) T1 = 10.4 years (+/- 1.9) Control group: T0 = 8.9 (+/- 1) T1 = 11 (+/- 1.7)	Experimental group: 24.1± 7.6 months, including the maxillary expansion and protraction followed by a 2x4 fixed appliance to level and align anterior teeth.	For the analysis, volume and minimal cross-sectional area (MCA) measurements through CBCT, use 3dMDvultus software (Atlanta, GA).	**Experimental group:** Volume change cm^3 (median based): T1-T0 = 3.6 (P<0.0001) Median error = 0.75 Minimum = -0.74 Maximum = 34.3 Q1=1.6 Q3=9.8 MCA change mm^2 (median based) = 20.5 (P = 0.12) Median error = 7.7 Minimum = -189 Maximum = 311.3 Q1 = -17.9 Q3 = 94.7 **Control group:** Volume change cm^3 (median based): T1 – T0 = 2.6 (P=0.007) Median error = 3.5 Minimum = 0.33	No strong evidence shows that maxillary expansion and protraction treatment influence the airway volume or MCA in cleft individuals.

Author, Year, Country, Study type	Sample (n)	Age (mean/SD)	Follow up (months)	Source of Data collection	Airway evaluation	Main conclusions
					Maximum = 53.7 Q1 = 1.5 Q3 = 38.1 MCA change mm² (median based) = -16.9 (P=1) Median error = 12.6 Minimum = -172.5 Maximum = 101.4 Q1=-23.8 Q3=42.5	
Fu et al., 2016, China, Prospective non-randomized controlled trial	Experimental group: n=18 UCLP and anterior crossbite who used Hyrax appliances and reverse headgears Control group: 14 UCLP who did not receive orthopedic treatment	Experimental group: 10.4 ± 1.3 years Control group: 9.6 ± 1.7 years	6 to 24 months	CBCT volume scans were taken before (T0) and immediately after treatment (T1) in the study group, and CT scans for the control group, which were analyzed using Dolphin software (version 11.7; Dolphin Imaging & Management Solutions, Chatsworth, Calif)	**Control group:** Pharyngeal airway volume (mm³) Change = 85.3 ± 3490.1 (p>0.o5) **Experimental group:** Pharyngeal airway volume (mm³) Change = 3001.9 ± 4128.0 (P<0.01) Differences between groups: T0 = 752.8 ± 1133.1 (p>0.05) T1=3669.4 ±	There was a significant change in pharyngeal airways within experimental group and between groups.

Author, Year, Country, Study type	Sample (n)	Age (mean/SD)	Follow up (months)	Source of Data collection	Airway evaluation	Main conclusions
					1586.4 (p<0.05) Change = 2916.6 ± 1377.1 (p<0.05)	
Keçik et al., 2017, Turkey, Retrospective non-randomized controlled trial	49 lateral cephalometric radiographs Experimental group: 23 operated nonsyndromic UCLP patients (12 females, 11 males) Control group: 26 noncleft Class III subjects with maxillary retrusion (14 females, 12 males)	Experimental group: 8.3 ± 2.4 years Control group: 8.1 ± 2.5 years	Experimental group: 0.8 – 1.2 years Control group: 1 – 1.4 years years	Cephalometric images were analysed by Dolphin Imaging Software 11.5 (Dolphin Imaging and Management solutions, Chatsworth, CA), and area measurements of the upper airway dimensions were performed on lateral cephalograms with the software Image J 1.38e (developed by the National Institute of Health)	**Experimental group changes**: Nasopharynx (mm2) 34.67 ± 8.76 p<0.001 Oropharynx (mm2) -57.39 ± 12.45 p<0.001 **Control group changes:** Nasopharynx (mm2) 38.43 ± 9.38 p<0.001 Oropharynx (mm2) 61.27 ± -44.53 p<0.001 **UCLP X Control:** Nasopharynx (mm2) p=0.462 Oropharynx (mm2) p= 0.376	The pharyngeal morphology was changed with maxillary protraction in UCLP and control group; however, there were no statistical differences between groups.
Singla et al., 2014, India/Canada, Retrospective Prospective non-randomized controlled trial	Experimental group: 19 North Indian children with repaired UCLP, submitted to protraction carried out with a Delaire	Experimental group: 9.36 ± 2.89 years Control group: 8.25 ± 2.25 years	11.71 ± 3.39 months	Lateral cephalometric radiographs were acquired for each patient before treatment (T1) and after the maxillary protraction	**Experimental group:** Change Ba-pm (mm) = 1.74 ± 1.10 p<0.001 **Control group:**	The depth of the bony nasopharynx increased following treatment of maxillary deficiency by using reverse headgear in patients with unilateral cleft lip and palate.

Author, Year, Country, Study type	Sample (n)	Age (mean/SD)	Follow up (months)	Source of Data collection	Airway evaluation	Main conclusions
	type reverse headgear face mask (Leone S. p. A., Firenze, Italy) Control group: 5 age-matched repaired UCLP who could not receive maxillary protraction.			(T2), and one examiner traced it using a 3H pencil on a 0.003-inch acetate film to do measurements. Ba-pm measured nasopharynx depth.	Change Ba-pm (mm) = -0.40 ± 0.55 **Difference between groups:** Ba-pm (mm) = 2.14 ± 0.51 p=0.004	

CP/L: Cleft palate with or without cleft lip; CBCT: Cone-Beam Computed Tomography; UCLP: Unilateral cleft lip and palate; BCLP: Bilateral cleft lip and palate; Ba-pm: Basion-pterygoid-maxillary point

Table 2 – Risk of bias domains for each study.

Study	Bias due to confounding	Bias in the selection of participants into the study	Bias in the classification of interventions	Bias due to deviations from intended interventions	Bias due to missing data	Bias in measurement of outcomes	Bias in selection of the reported result	Overall Bias
Singla et al., 2014	Low	Low	Low	Low	Low	Moderate	Moderate	Moderate
Fu et al., 2016	Serious	Low	Low	Low	Low	Moderate	Moderate	Serious
Alrejaye et al., 2019	Low	Low	Low	Low	Low	Moderate	Moderate	Moderate
Keçic, 2017	Low	Low	Low	Low	Low	Moderate	Moderate	Moderate

Discussion

This systematic review found four non-randomized controlled trials that evaluated upper airway dimensional changes after maxillary protraction. The literature suggests that maxillary protraction increases upper airway dimensions in non-cleft patients[16,18]. Our findings indicate that there are no major upper airway dimensional changes after maxillary protraction. When statistical differences were identified, their magnitude was unlikely to be clinically relevant. It was also noted that there is limited high-quality information regarding upper airway dimensional changes for patients with CLP.

Maxillary protraction is a standard therapy among patients with CLP [14]. Three studies compared treatment versus no treatment in patients with cleft palate with or without lip (CP/L) [21,22,24], while the other compared patients with UCLP and Class III individuals with maxillary retrusion [23].

Fu et al. (2016)[21] and Singla et al. (2014)[22] suggested that patients with UCLP who received maxillary protraction had increased their upper airway dimensions than those who did not receive the treatment. However, Keçik (2017) did not identify differences between groups with or without UCLP, where both received the treatment. Moreover, Alrejaye et al. (2019) found statistically significant differences in airway volume of patients with CP/L after maxillary protraction (median of change 3.6 cm^3). Still, no difference was detected between experimental and untreated control groups. However, there were patients with varied types of CLP, which may compromise their conclusion considering that craniofacial development may differ between UCLP and BCLP. For instance, UCLP tends to present more asymmetry than BCLP. [26,27]

Kim et al. (2020) [28] evaluated maxillary protraction with skeletal anchorage and found positive effects of this therapy over the nasopharynx and oropharynx of patients with CLP. There were improvements in superior posterior (2.25-4.92mm), and middle (1.86-2mm)

airway spaces. Nevertheless, they only analyzed treated individuals divided according to maxillary advancement achieved after treatment. Their results are concordant with most studies included in this systematic review. [21,22,24]

Regarding the risk of bias, all studies showed moderate bias in the measurement of outcomes due to any study presents blinding, and when it comes to bias in the selection of the reported result, there were multiples measures of the outcome [21–24]. Fu et al. (2016) presented serious bias due to confounding because the control group was evaluated by CT, while the study group was through CBCT. It could be an issue supported by Ayoub et al. (2019), who concluded that due to the changes in the patient's position, airway analysis could be modified according to which tomography is being analyzed.

Alrejaye et al. (2019) and Fu et al. (2016) completed the evaluations of experimental groups through cone-beam computed tomography (CBCT) imaging, a 3D data that provides reliable information in patients' evaluation and presents a good cost-benefit ratio. [30,31] In contrast, Keçik, (2017) and Singla et al. (2014) used lateral cephalometric radiographs in their analysis, which is a 2D imaging with limitations, such as inaccuracy, imaging distortions, and does not assess transverse dimension.[32–35]

CLP patients already present a higher risk of developing sleep-breathing disorders, such as obstructive sleep apnea (OSA).[25] Upper airway obstructions may be associated with OSA, a disorder characterized by partial or complete upper airway obstruction during sleep.[36] Children with CLP are more susceptible to developing upper airway obstructions due to their deformity.[37] Gorucu-Coskuner et al. (2020) found that children with UCLP and BCLP present a higher risk of developing OSA than children without deformities. This group showed a risk of 12.2%, while the controls 4.5%. Nevertheless, sleep breathing disorders are multifactorial and morphological variations are only a small part of the disease complexity. There is a current trend in identifying specific phenotypes in which anatomical obstruction may be the

major factor. In those cases, the intervention that explicitly increases the upper airway dimensions may be promising.

Ming et al. (2018), Martin et al. (2020), Celikoglu;Buyukcavus (2017), and Hwang et al. (2019) found in their studies that maxillary protraction modified upper airway dimensions in non-cleft class III growing patients and showed that it alters the position of the hyoid bone, as well as tongue posture. The findings suggest that maxillary protraction might improve respiratory function, including limiting breathing disorders in children, such as OSA.

The limitations of this systematic review were that none of the included studies were randomized controlled trials. Hence, significant biases cannot be discarded. Moreover, due to the heterogeneity of studies, a meta-analysis was not feasible. It reflects the limited available identified evidence. Blinding was not performed in any of the studies, which could have been done if a different researcher would be responsible for imaging assessment.

Conclusion

Based on low certainty levels, upper airway dimensions of patients with CLP may change with maxillary protraction, but the magnitude of the changes is unlikely to be clinically relevant. In addition, there was no consistency in the changes.

References

1. Vieira AR, McHenry TG, Daack-Hirsch S, Murray JC, Marazita ML. Candidate gene/loci studies in cleft lip/palate and dental anomalies finds novel susceptibility genes for clefts. *Genet Med*. 2008;10(9):668-674. doi:10.1097GIM.0b013e3181833793
2. Abreu MHNG, Lee KH, Luquetti DV, Starr JR. Temporal trend in the reported birth prevalence of cleft lip and/or cleft palate in Brazil, 2000 to 2013. *Birth Defects Res Part A - Clin Mol Teratol*. 2016;106(9):789-792. doi:10.1002/bdra.23528
3. Dixon MJ, Marazita ML, Beaty TH, Murray JC. Cleft lip and palate: Understanding genetic and environmental influences. *Nat Rev Genet*. 2011;12(3):167-178. doi:10.1038/nrg2933
4. Broder HL, Wilson-Genderson M, Sischo L, Norman RG. Examining factors associated with oral health-related quality of life for youth with cleft. *Plast Reconstr Surg*. 2014;133(6):1-12. doi:10.1097/PRS.0000000000000221
5. Parsaei Y, Uribe F, Steinbacher D. Orthodontics for Unilateral and Bilateral Cleft Deformities. *Oral Maxillofac Surg Clin North Am*. 2020;32(2):297-307. doi:10.1016/j.coms.2020.01.011
6. Feragen KB, Borge AIH. Peer harassment and satisfaction with appearance in children with and without a facial difference. *Body Image*. 2010;7(2):97-105. doi:10.1016/j.bodyim.2009.12.001
7. Sharshar HH, El-Bialy TH. Cephalometric evaluation of airways after maxillary anterior advancement by distraction osteogenesis in cleft lip and palate patients: A systematic review. *Cleft Palate-*

Craniofacial J. 2012;49(3):255-261. doi:10.1597/11-031
8. Shi B, Losee JE. The impact of cleft lip and palate repair on maxillofacial growth. *Int J Oral Sci*. 2015;7(1):14-17. doi:10.1038/ijos.2014.59
9. Good PM, Mulliken JB, Padwa BL. Frequency of Le Fort I osteotomy after repaired cleft lip and palate or cleft palate. *Cleft Palate-Craniofacial J*. 2007;44(4):396-401. doi:10.1597/06-075.1
10. Normando ADC, da Silva Filho OG, Capelozza Filho L. Influence of surgery on maxillary growth in cleft lip and/or palate patients. *J Cranio-Maxillofacial Surg*. 1992;20(3):111-118. doi:10.1016/S1010-5182(05)80092-7
11. Shetye PR, Evans CA. Midfacial morphology in adult unoperated complete unilateral cleft lip and palate patients. *Angle Orthod*. 2006;76(5). doi:10.2319/032505-121
12. Garib D, Lauris RDCMC, Calil LR, et al. Dentoskeletal outcomes of a rapid maxillary expander with differential opening in patients with bilateral cleft lip and palate: A prospective clinical trial. *Am J Orthod Dentofac Orthop*. 2016;150(4):564-574. doi:10.1016/j.ajodo.2016.05.006.Dentoskeletal
13. D.S.F. F, F.U.C. B, C.R. R, J.M. P, M.C.R. H, I. AJ. Dentoskeletal effects of 3 maxillary expanders in patients with clefts: A cone-beam computed tomography study. *Am J Orthod Dentofac Orthop*. 2014;146(1):73-81. doi:http://dx.doi.org/10.1016/j.ajodo.2014.04.013
14. Lin Y, Fu Z, Guo R, Ma L, Li W. Maxillary Protraction Therapy in Class III Patients With and Without Cleft Lip and Palate: An Interim Report of a Prospective Comparative Study. *Cleft Palate-Craniofacial J*. 2021;58(4):429-437. doi:10.1177/1055665620954058
15. Terumi Ozawa O, Daniela Salzedas C, Beatriz Oliveira de L, Sathler R, Baessa G, Garib D. Efficacy of Rapid Maxillary Expansion Associated With Maxillary Protraction in Patients With Unilateral Complete Cleft Lip and Palate. *Cleft Palate-Craniofacial J*. 2020;57(7):872-876. doi:10.1177/1055665619896675
16. Ming Y, Hu Y, Li Y, Yu J, He H, Zheng L. Effects of maxillary protraction appliances on airway dimensions in growing class III maxillary retrognathic patients: A systematic review and meta-analysis. *Int J Pediatr Otorhinolaryngol*. 2018;105(426):138-145. doi:10.1016/j.ijporl.2017.12.013
17. Hwang DM, Lee JY, Choi YJ, Hwang CJ. Evaluations of the tongue and hyoid bone positions and pharyngeal airway dimensions after maxillary protraction treatment. *Cranio - J Craniomandib Pract*. 2019;37(4):214-222. doi:10.1080/08869634.2017.1418644
18. Martin MA, Lipani E, Lorenzo AA, et al. The effect of maxillary protraction, with or without rapid palatal expansion, on airway dimensions: A systematic review and meta-analysis. *Eur J Paediatr Dent*. 2020;21(4):262-270. doi:10.23804/ejpd.2020.21.04.2
19. Tsichlaki A, O'Brien K, Johal A, Fleming PS. A scoping review of outcomes related to orthodontic treatment measured in cleft lip and palate. *Orthod Craniofacial Res*. 2017;20(2):55-64. doi:10.1111/ocr.12152
20. Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*. 2021;372. doi:10.1136/bmj.n71
21. Singla S, Utreja A, Singh SP, Lou W, Suri S. Increase in sagittal depth of the bony nasopharynx following maxillary protraction in patients with unilateral cleft lip and palate. *Cleft Palate-Craniofacial J*. 2014;51(5):585-592. doi:10.1597/12-287
22. Fu Z, Lin Y, Ma L, Li W. Effects of maxillary protraction therapy on the pharyngeal airway in patients with repaired unilateral cleft lip and palate: A 3-dimensional computed tomographic study. *Am J Orthod Dentofac Orthop*. 2016;149(5):673-682. doi:10.1016/j.ajodo.2015.10.024
23. Keçik D. Evaluation of Protraction Face-Mask Therapy on the Craniofacial and Upper Airway Morphology in Unilateral Cleft Lip and Palate. *J Craniofac Surg*. 2017;28(7):e627-e632. doi:10.1097/SCS.0000000000003652
24. Alrejaye N, Gao J, Hatcher D, Oberoi S. Effect of maxillary expansion and protraction on the oropharyngeal airway in individuals with non-syndromic cleft palate with or without cleft lip. *PLoS One*. 2019;14(7):1-8. doi:10.1371/journal.pone.0213328
25. Gorucu-Coskuner H, Saglam-Aydinatay B, Aksu M, Ozgur FF, Taner T. Comparison of Positive Screening for Obstructive Sleep Apnea in Patients With and Without Cleft Lip and Palate. *Cleft Palate-Craniofacial J*. 2020;57(3):364-370. doi:10.1177/1055665619875321
26. Ahmad Y, Starbuck JM. Disruption of symmetry: A quantitative assessment of facial skeleton anatomy in children born with unilateral cleft lip and palate. *Clin Anat*. 2018;31(8):1129-1136. doi:10.1002/ca.23277
27. Santana N, Starbuck JM. Breaking Symmetry: A Quantitative Analysis of Facial Skeleton Disharmony in Children Born with Bilateral Cleft Lip and Palate. *Anat Rec Integr Anat Evol Biol*. 2019;302(10):1726-1732. doi:10.1002/ar.24111
28. Kim JE, Yim S, Choi JY, Kim S, Kim SJ, Baek SH. Effects of the long-term use of maxillary protraction facemasks with skeletal anchorage on pharyngeal airway dimensions in growing patients with cleft lip and palate. *Korean J Orthod*. 2020;50(4):238-248. doi:10.4041/kjod.2020.50.4.238

29. Ayoub N, Eble P, Kniha K, et al. Three-dimensional evaluation of the posterior airway space: differences in computed tomography and cone beam computed tomography. *Clin Oral Investig*. 2019;23(2):603-609. doi:10.1007/s00784-018-2478-y
30. Guyader E, Savéan J, Clodic C, Letellier P, Meriot P, Marianowski R. Three-dimensional reconstruction of the temporal bone: Comparison of in situ, CT, and CBCT measurements. *Eur Ann Otorhinolaryngol Head Neck Dis*. 2018;135(6):393-398. doi:10.1016/j.anorl.2018.08.013
31. Razi T, Niknami M, Alavi Ghazani F. Relationship between Hounsfield Unit in CT Scan and Gray Scale in CBCT. *J Dent Res Dent Clin Dent Prospects*. 2014;8(2):107-110. doi:10.5681/joddd.2014.019
32. van Vlijmen OJC, Maal T, Bergé SJ, Bronkhorst EM, Katsaros C, Kuijpers-Jagtman AM. A comparison between 2D and 3D cephalometry on CBCT scans of human skulls. *Int J Oral Maxillofac Surg*. 2010;39(2):156-160. doi:10.1016/j.ijom.2009.11.017
33. Gribel BF, Gribel MN, Frazão DC, McNamara JA, Manzi FR. Accuracy and reliability of craniometric measurements on lateral cephalometry and 3D measurements on CBCT scans. *Angle Orthod*. 2011;81(1):28-37. doi:10.2319/032210-166.1
34. Wen J, Liu S, Ye X, et al. Comparative study of cephalometric measurements using 3 imaging modalities. *J Am Dent Assoc*. 2017;148(12):913-921. doi:10.1016/j.adaj.2017.07.030
35. Sawchuk D, Currie K, Vich ML, Palomo JM, Flores-Mir C. Diagnostic methods for assessing maxillary skeletal and dental transverse deficiencies: A systematic review. *Korean J Orthod*. 2016;46(5):331-342. doi:10.4041/kjod.2016.46.5.331
36. Marcus CL, Brooks LJ, Draper KA, et al. Diagnosis and management of childhood obstructive sleep apnea syndrome. *Pediatrics*. 2012;130(3):576-584. doi:10.1542/peds.2012-1671
37. Cielo CM, Montalva FM, Taylor JA. Craniofacial disorders associated with airway obstruction in the neonate. *Semin Fetal Neonatal Med*. 2016;21(4):254–262. doi:10.1016/j.siny.2016.03.001.Craniofacial
38. Celikoglu M, Buyukcavus MH. Changes in pharyngeal airway dimensions and hyoid bone position after maxillary protraction with different alternate rapid maxillary expansion and construction protocols: A prospective clinical study. *Angle Orthod*. 2017;87(4):519-525. doi:10.2319/082316-632.1

Appendix 1 – Search strategy developed in all databases.

Database	Search (Feb 24th, 2021)
MEDLINE	(Cleft Palate/ or Cleft Lip/ or cleft.mp. OR (cleft* adj5 (palat* or lip* or maxilla* or oral or orofacial or alveolar)).mp.) AND (Extraoral Traction Appliances/ or protraction.mp. OR (maxilla* adj3 management).mp. OR (maxilla adj3 orthodontic*).mp.) AND (airway.mp. OR pharynx.mp. or Pharynx/ OR oropharynx.mp. or Oropharynx/ OR nasopharynx.mp. or Nasopharynx/ OR Nose/ or nose.mp. OR nasal cavity.mp. or Nasal Cavity/ OR (nasal adj3 cavity).mp OR (nasomaxillary adj3 complex).mp. OR nasomaxillary complex.mp. OR pharyngeal.mp.)
EMBASE	('cleft' NEAR/3 'lip' OR 'cleft' NEAR/3 'palate') AND ('protraction' OR 'maxilla' NEAR/3 'management' OR 'maxilla' NEAR/5 'orthodontic' OR 'extraoral' NEAR/3 'traction') AND ('airway' OR 'pharynx' OR oropharynx OR 'pharynx' OR 'pharyngeal' OR nose OR 'nasomaxillary complex' OR 'nasal' NEAR/3 'cavity' OR nasopharynx)
LILACS	(tw:("cleft lip" OR "fenda labial" OR "labio leporino" OR "cleft palate" OR "fissura palatina" OR "Fisura del Paladar")) AND (tw:(protraction OR protração OR prolongación)) AND (tw:(airway OR "vias aéreas" OR "vías respiratorias" OR "nasal cavity" OR "cavidade nasal" OR "cavidad nasal"))
Web of Science	TS=("cleft lip" OR "cleft palate" OR "cleft") AND TS=("protraction" OR "maxillary management" OR "extraoral traction") AND TS=("airway" OR "pharynx" OR "oropharynx" OR "nasopharynx" OR "nose" OR "nasal cavity" OR "nasomaxillary" OR "pharyngeal")
SCOPUS	TITLE-ABS-KEY (*"cleft"* W/3 *"lip"* OR *"cleft palate"*)) AND TITLE-ABS-KEY (*"Extraoral Traction"* OR *"protraction"* OR *"maxillary management"*) AND (TITLE-ABS-KEY (*"airway"* OR *"pharynx"* OR *"oropharynx"* OR *"nasopharynx"* OR *"nose"* OR *"nasal cavity"* OR *"nasomaxillary complex"* OR *"pharyngeal"*)
Google Scholar	("cleft lip" OR "cleft palate") AND (protraction) AND (airway OR "nasal cavity" OR "pharynx")

ProQuest	Ti,ab("cleft lip" OR "cleft palate" OR "cleft") AND Ti,ab("protraction" OR "maxillary management" OR "extraoral traction") AND Ti,ab("airway" OR "pharynx" OR "oropharynx" OR "nasopharynx" OR "nose" OR "na sal cavity" OR "nasomaxillary" OR "pharyngeal")

5 CONCLUSÃO

O software utilizado pode não importar quando se considera a avaliação do complexo nasal em pacientes com FL / P. Embora tenha havido alguma variabilidade entre os softwares em relação ao volume da cavidade nasal e ao desvio do septo nasal, as diferenças podem não ser consideradas clinicamente relevantes.

Além disso, com base em baixos níveis de certeza, as dimensões das vias aéreas superiores de pacientes com FLP podem mudar com a protração maxilar, mas é improvável que a magnitude das alterações seja clinicamente relevante. Além disso, não houve consistência nas mudanças.

.

REFERÊNCIAS

ABREU, M. H. N. G. et al. Temporal trend in the reported birth prevalence of cleft lip and/or cleft palate in Brazil, 2000 to 2013. **Birth Defects Research Part A - Clinical and Molecular Teratology**, v. 106, n. 9, p. 789–792, 2016.

AKARSU-GUVEN, B. et al. Growth-related changes of skeletal and upper-airway features in bilateral cleft lip and palate patients. **American Journal of Orthodontics and Dentofacial Orthopedics**, v. 148, n. 4, p. 576–586, 2015.

AL-FAHDAWI, M. A. et al. Cone-beam computed tomography analysis of the nasopharyngeal airway in nonsyndromic cleft lip and palate subjects. **Cleft Palate-Craniofacial Journal**, v. 54, n. 2, p. 202–209, 2017.

ALONSO, N. et al. Effect of maxillary alveolar reconstruction on nasal symmetry of cleft lip and palate patients: A study comparing iliac crest bone graft and recombinant human bone morphogenetic protein-2. **JOURNAL OF PLASTIC RECONSTRUCTIVE AND AESTHETIC SURGERY**, v. 67, n. 9, p. 1201–1208, 2014.

ALSUFYANI, N. A. et al. Cone beam computed tomography registration for 3-D airway analysis based on anatomic landmarks. **Oral Surgery, Oral Medicine, Oral Pathology and Oral Radiology**, v. 118, n. 3, p. 371–383, 2014.

AWARUN, B. et al. Three-dimensional imaging methods to quantify soft and hard tissues change after cleft-related treatment during growth in patients with cleft lip and/or cleft palate: A systematic review. **Dentomaxillofacial Radiology**, v. 48, 2019.

BADDAM, P. et al. Nasal cavity structural anomalies among children at high risk of sleep-disordered breathing: an exploratory cone-beam computed tomography study. **American Journal of Orthodontics and Dentofacial Orthopedics**, 2021.

CASIRAGHI, M. et al. Effective dose and image quality for intraoperative imaging with a cone-beam CT and a mobile multi-slice CT in spinal surgery: A phantom study. **Physica Medica**, v. 81, n. September 2020, p. 9–19, 2021.

CHEN, J. GANG et al. Presurgical Planning for Supratentorial Lesions with Free Slicer Software and Sina App. **World Neurosurgery**, v. 106, p. 193–197, 2017.

CHEN, K. **Volumetric analysis of the alveolar housing around the mandibular incisors in response to class II Orthodontic**. [s.l: s.n.].

CHEROBIN, G. B. et al. Sensitivity of nasal airflow variables computed via computational fluid dynamics to the computed tomography segmentation threshold. **PLoS ONE**, v. 13, n. 11, p. 1–16, 2018.

DE SOUSA GIL, A. P. et al. Nasolabial soft tissue effects of segmented and non-segmented Le Fort I osteotomy using a modified alar cinch technique—a cone beam computed tomography evaluation. **International Journal of Oral and Maxillofacial Surgery**, 2019.

DIXON, M. J. et al. Cleft lip and palate: Understanding genetic and environmental influences. **Nature Reviews Genetics**, v. 12, n. 3, p. 167–178, 2011.

ERTAS, U.; ATAOL, M. Evaluation of Nasal Airway Volume of Operated Unilateral Cleft Lip and Palate Patients Compared With Skeletal Class III Individuals. **CLEFT PALATE-CRANIOFACIAL JOURNAL**, v. 56, n. 1, p. 15–20, jan. 2019.

ERTAŞ, Ü.; ATAOL, M. Evaluation of Nasal Airway Volume of Operated Unilateral Cleft Lip and Palate Patients Compared With Skeletal Class III Individuals. **The Cleft palate-craniofacial journal : official publication of the American Cleft Palate-Craniofacial Association**, v. 56, n. 1, p. 15–20, 2019.

FARZAL, Z. et al. Volumetric Nasal Cavity Analysis in Children With Unilateral and Bilateral Cleft Lip and Palate. **LARYNGOSCOPE**, v. 126, n. 6, p. 1475–1480, jun. 2016.

FRIEL, M. T. et al. Airway Obstruction and the Unilateral Cleft Lip and Palate Deformity: Contributions by the Bony Septum. **Annals of Plastic Surgery**, v. 75, n. 1, p. 37–43, 2015a.

FRIEL, M. T. et al. Airway Obstruction and the Unilateral Cleft Lip and Palate Deformity Contributions by the Bony Septum. **ANNALS OF PLASTIC SURGERY**, v. 75, n. 1, p. 37–43, jul. 2015b.

GANDEDKAR, N. H. et al. Comparative evaluation of the pharyngeal airway space in unilateral and bilateral cleft lip and palate individuals with noncleft individuals: A cone beam computed tomography study. **Cleft Palate-Craniofacial Journal**, v. 54, n. 5, p. 509–516, 2017.

GRIBEL, B. F. et al. Accuracy and reliability of craniometric measurements on lateral cephalometry and 3D measurements on CBCT scans. **Angle Orthodontist**, v. 81, n. 1, p. 28–37, 2011.

GUYADER, E. et al. Three-dimensional reconstruction of the temporal bone: Comparison of in situ, CT, and CBCT measurements. **European Annals of Otorhinolaryngology, Head and Neck Diseases**, v. 135, n. 6, p. 393–398, 2018.

HONG, H. H. et al. Inconsistency in the Crown-to-Root Ratios of Single-Rooted Premolars Measured by 2D and 3D Examinations. **Scientific Reports**, v. 7, n. 1, p. 1–8, 2017.

KAVAND, G. et al. Retrospective CBCT analysis of airway volume changes after bone-borne vs tooth-borne rapid maxillary expansion. **Angle Orthodontist**, v. 89, n. 4, p. 566–574, 2019.

KIMURA, N. et al. Three-dimensional analyses of nasolabial forms and upper lip surface symmetry after primary lip repair in patients with complete unilateral cleft lip and palate. **Journal of Cranio-Maxillofacial Surgery**, v. 47, n. 2, p. 245–254, 2019.

KOCHHAR, A. S. et al. Frontal and axial evaluation of craniofacial morphology in repaired unilateral cleft lip and palate patients utilizing cone beam computed tomography; An observational study. **International Journal of Environmental Research and Public Health**, v. 17, n. 21, p. 1–9, 2020.

KOO, T. K.; LI, M. Y. A Guideline of Selecting and Reporting Intraclass Correlation Coefficients for Reliability Research. **Journal of Chiropractic Medicine**, v. 15, n. 2, p. 155–163, 2016.

MAH, P.; REEVES, T. E.; MCDAVID, W. D. Deriving Hounsfield units using grey levels in cone beam computed tomography. **Dentomaxillofacial Radiology**, v. 39, n. 6, p. 323–335, 2010.

MORELL, G. F. C. **Comparison of the degree of external root resorption of lower incisors and canines when using the Forsus Spring ® over the arch or as part of a Crossbow ® device in a RCT**. [s.l: s.n.].

NADJMI, N. et al. Comparison of soft-tissue profiles in le Fort i osteotomy patients with Dolphin and Maxilim softwares. **American Journal of Orthodontics and Dentofacial Orthopedics**, v. 144, n. 5, p. 654–662, 2013.

NAKANO, H. et al. A new method for determining the optimal CT threshold for extracting the upper airway. **Dentomaxillofacial Radiology**, v. 42, n. 3, p. 1–3, 2013.

NARDI, C. et al. Head and neck effective dose and quantitative assessment of image quality: A study to compare cone beam CT and multislice spiral CT. **Dentomaxillofacial Radiology**, v. 46, n. 7, p. 1–11, 2017.

PARK, S. et al. Deformable registration of CT and cone-beam CT with local intensity matching. **Physics in Medicine and Biology**, v. 62, n. 3, p. 927–947, 2017.

PINHEIRO, M. L. et al. Volumetric reconstruction and determination of minimum crosssectional area of the pharynx in patients with cleft lip and palate: comparison between two different softwares. **Journal of applied oral science : revista FOB**, v. 26, p. e20170282, 2018.

POWER, G. et al. Dolphin Imaging Software: An analysis of the accuracy of cephalometric digitization and orthognathic prediction. **International Journal of Oral and Maxillofacial Surgery**, v. 34, n. 6, p. 619–626, 2005.

RAZI, T.; NIKNAMI, M.; ALAVI GHAZANI, F. Relationship between Hounsfield Unit in CT Scan and Gray Scale in CBCT. **Journal of dental research, dental clinics, dental prospects**, v. 8, n. 2, p. 107–10, 2014.

SETLUR, J.; GOYAL, P. Relationship between septal body size and septal deviation. **American Journal of Rhinology & Allergy**, v. 25, n. 6, p. 397–400, 2011.

STERNE, J. A. et al. ROBINS-I: A tool for assessing risk of bias in non-randomised studies of interventions. **BMJ (Online)**, v. 355, p. 4–10, 2016.

THEREZA-BUSSOLARO, C. et al. Development, validation and application of a 3D printed model depicting adenoid hypertrophy in comparison to a Nasoendoscopy. **Head and Face Medicine**, v. 16, n. 1, p. 1–8, 2020.

THEREZA-BUSSOLARO, C. et al. Some Challenges and Potential Issues Regarding Cone

Beam Computed Tomography of the Upper Airway. **Journal ofDentalSleepMedicine**, v. 8, n. 2, 2021.

THIERENS, L. A. M. et al. Effects of labial adhesion on maxillary arch dimensions and nasolabial esthetics in cleft lip and palate: a systematic review. **Oral Diseases**, v. 23, n. 7, p. 889–896, 2017.

VAN VLIJMEN, O. J. C. et al. A comparison between 2D and 3D cephalometry on CBCT scans of human skulls. **International Journal of Oral and Maxillofacial Surgery**, v. 39, n. 2, p. 156–160, 2010.

VIEIRA, A. R. et al. Candidate gene/loci studies in cleft lip/palate and dental anomalies finds novel susceptibility genes for clefts. **Genetics in medicine : official journal of the American College of Medical Genetics**, v. 10, n. 9, p. 668–74, 2008.

VON ARX, T. et al. Agreement between 2D and 3D radiographic outcome assessment one year after periapical surgery. **International Endodontic Journal**, v. 49, n. 10, p. 915–925, 2016.

WANG, C. H.; RANDAZZO, L. Evolution of imaging and management systems in orthodontics. **American Journal of Orthodontics and Dentofacial Orthopedics**, v. 149, n. 6, p. 798–805, 2016.

WEN, J. et al. Comparative study of cephalometric measurements using 3 imaging modalities. **Journal of the American Dental Association**, v. 148, n. 12, p. 913–921, 2017.

YATABE-IOSHIDA, M. S. et al. Upper Airway 3D Changes of Patients With Cleft Lip and Palate After Orthognathic Surgery. **The Cleft palate-craniofacial journal : official publication of the American Cleft Palate-Craniofacial Association**, v. 56, n. 3, p. 314–320, 2019.

YUSHKEVICH, P. A. et al. User-guided 3D active contour segmentation of anatomical structures: Significantly improved efficiency and reliability. **NeuroImage**, v. 31, n. 3, p. 1116–1128, 2006.

ZHANG, Y. et al. Cone-Beam Computed Tomography Evaluation of Skeletal Deformities and Pharyngeal Airway in Chinese Han Individuals With Nonsyndromic Unilateral Cleft Lip and Palate. **The Cleft Palate-Craniofacial Journal**, p. 105566561986070, 2019.

ZHANG, Y. et al. Improving CBCT Quality to CT Level using Deep-Learning with Generative Adversarial Network. **Medical Physics**, 2020.

ANEXO A- Relatório do Comitê de Ética em Pesquisa da UEPB.

UNIVERSIDADE ESTADUAL DA PARAÍBA - PRÓ-REITORIA DE PÓS-GRADUAÇÃO E PESQUISA / UEPB - PRPGP

PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: AVALIAÇÃO DO SEPTO NASAL E VIAS AÉREAS SUPERIORES DE PACIENTES COM FISSURA LABIOPALATINA ANTES E APÓS ENXERTO ÓSSEO ALVEOLAR

Pesquisador: MANUEL ANTONIO GORDON NÚÑEZ

Área Temática:

Versão: 1

CAAE: 24596319.3.0000.5187

Instituição Proponente: Universidade Estadual da Paraíba - UEPB

Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 3.585.886

Apresentação do Projeto:

O estudo consiste em uma pesquisa descritiva do tipo longitudinal, sendo utilizadas informações coletadas de prontuários e exames de tomografia computadorizada multislice do crânio de indivíduos com fissura labiopalatina antes e após um ano da cirurgia de enxerto ósseo alveolar.

Objetivo da Pesquisa:

Avaliar vias aéreas superiores e septo nasal de indivíduos com fissuras labiopalatinas, antes e um ano após cirurgia de enxerto ósseo alveolar.

Avaliação dos Riscos e Benefícios:

O projeto apresenta riscos mínimos uma vez que serão analisados dados de tomografias armazenadas em arquivos. O acesso aos dados de arquivos foi apresentado. Em relação aos benefícios, foram citados:

• Elucidação de dúvidas acerca do desenvolvimento craniofacial desses indivíduos no que se refere as vias aéreas superiores e septo nasal; • Melhor entendimento da influência da cirurgia de enxerto ósseo alveolar na morfologia das vias aéreas superiores e septo nasal; • Conhecer e há ou não uma possível relação entre o tipo de fissura e a morfologia das vias aéreas superiores e septo nasal desses indivíduos.

Endereço: Av. das Baraúnas, 351- Campus Universitário
Bairro: Bodocongó CEP: 58.109-753
UF: PB Município: CAMPINA GRANDE
Telefone: (83)3315-3373 Fax: (83)3315-3373 E-mail: cep@uepb.edu.br

UNIVERSIDADE ESTADUAL DA PARAÍBA - PRÓ-REITORIA DE PÓS-GRADUAÇÃO E PESQUISA / UEPB - PRPGP

Continuação do Parecer: 3.685.890

Comentários e Considerações sobre a Pesquisa:

A proposta do projeto é relevante, uma vez que a cirurgia de enxerto ósseo alveolar é uma etapa realizada com frequência no tratamento de pacientes fissurados e o entendimento da influência desse procedimento cirúrgico nas vias aéreas superiores se faz necessário.

Considerações sobre os Termos de apresentação obrigatória:

O projeto apresenta todos os termos de apresentação obrigatórios devidamente assinados.

Recomendações:

O projeto apresenta metodologia adequada ao que se propõe e apresenta todos os termos de apresentação obrigatórios devidamente assinados.

Conclusões ou Pendências e Lista de Inadequações:

O projeto apresenta todos os termos de apresentação e metodologicamente atende ao que se propõe. O projeto está aprovado salvo melhor entendimento

Considerações Finais a critério do CEP:

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Informações Básicas do Projeto	PB_INFORMAÇÕES_BÁSICAS_DO_PROJETO_1461858.pdf	30/10/2019 22:42:03		Aceito
Declaração de Pesquisadores	Termo_coleta_de_dados.pdf	30/10/2019 22:40:47	Marina Tavares Costa Nóbrega	Aceito
Declaração de Instituição e Infraestrutura	TAICD_ABO.pdf	30/10/2019 22:40:35	Marina Tavares Costa Nóbrega	Aceito
Declaração de Instituição e Infraestrutura	TAI_ABO.pdf	30/10/2019 22:39:52	Marina Tavares Costa Nóbrega	Aceito
Declaração de Pesquisadores	Termo_compromisso.pdf	30/10/2019 22:39:27	Marina Tavares Costa Nóbrega	Aceito
Cronograma	cronograma.pdf	30/10/2019 22:38:54	Marina Tavares Costa Nóbrega	Aceito
Declaração de Pesquisadores	Declaracao_concordancia.pdf	30/10/2019 22:36:28	Marina Tavares Costa Nóbrega	Aceito
Projeto Detalhado / Brochura Investigador	PROJETO_CEP_viasaereas_MARINA.pdf	30/10/2019 22:32:07	Marina Tavares Costa Nóbrega	Aceito
Folha de Rosto	folhaDeRosto_assinada.pdf	30/10/2019 22:30:47	Marina Tavares Costa Nóbrega	Aceito

UNIVERSIDADE ESTADUAL DA PARAÍBA - PRÓ-REITORIA DE PÓS-GRADUAÇÃO E PESQUISA / UEPB - PRPGP

Plataforma Brasil

Continuação do Parecer: 3.685.880

Situação do Parecer:
Aprovado

Necessita Apreciação da CONEP:
Não

CAMPINA GRANDE, 06 de Novembro de 2019

Assinado por:
Valeria Ribeiro Nogueira Barbosa
(Coordenador(a))

Endereço: Av. das Baraúnas, 351- Campus Universitário
Bairro: Bodocongó **CEP:** 58.109-753
UF: PB **Município:** CAMPINA GRANDE
Telefone: (83)3315-3373 **Fax:** (83)3315-3373 **E-mail:** cep@uepb.edu.br

ANEXO B- Instruções para autores (Dentomaxillofacial Journal)

INSTRUCTIONS FOR AUTHORS

Author contribution statement

DMFR requires that an author contribution statement accompany each submission, outlining the contributions of each author towards the work. A template statement can be downloaded here.

DMFR requires that for all submitted papers:

- **All the authors have made substantive contributions to the article and assume full responsibility for its content; and**
- **All those who have made substantive contributions to the article have been named as authors.**

The International Committee of Medical Journal Editors recommends the following definition for an author of a work, which we ask our authors to adhere to:

Authorship be based on the following 4 criteria [1]:

- **Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND**
- **Drafting the work or revising it critically for important intellectual content; AND**
- **Final approval of the version to be published; AND**
- **Agreement 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.**

1 The International Committee of Medical Journal Editors, Roles and Responsibilities of Authors, Contributors, Reviewers, Editors, Publishers, and Owners: Defining the Role of Authors and Contributors, http://www.icmje.org/roles_a.html

Title page

The title page is a separate submission item to the main manuscript and should provide the following information:

- **Title of the paper. Abbreviations other than CT or MRI should not be used in the title.**
- **A shortened version of the title (no more than 70 characters in length, including spaces) should be provided for use as the running head. Abbreviations are permissible.**
- **Type of Manuscript (see all types of manuscript)**
- **Author names should appear in full (in the format: "first name, initial(s), last name), qualifications and affiliations.**
- **Statement indicating any source of funding or financial interest where relevant should be included.**

- **A cover letter or statement can be included into the title page, but please note this is not a compulsory item.**

Blind title page

A blind title page should be included with the full manuscript, giving only the title (i.e. without the authors' names and affiliations), for use in the peer-review process.

Abstract

The abstract should be an accurate and succinct summary of the paper, not exceeding 250 words. For papers containing research: the abstract should be constructed under the following subheadings:

- **Objectives;**
- **Methods;**
- **Results;**
- **Conclusions.**

These subheadings should appear in the text of the abstract and the abstract should not contain references. The abstract should: indicate the specific objective or purpose of the article; describe the methods used to achieve the objective, stating what was done and how it was done; present the findings of the methods described – key statistics should be included; present the conclusion of the study based solely on the data provided, and highlight the novelty of the work.

Beneath the abstract please select up to 5 keywords from the current Medical Subject Headings (MeSH).

Main text

Please organise your paper in a logical structure with clear subheadings to indicate relevant sections. It is up to the authors to decide the specific nature of any subheadings as they see fit. Research papers typically follow the structure:

- **Introductory section;**
- **Methods and materials/patients;**
- **Results;**
- **Discussion;**
- **Conclusion;**
- **Acknowledgments (if relevant).**

Present results in a clear logical sequence. The conclusions drawn should be supported by the results obtained and the discussion section should comment critically on the findings and conclusions as well as any limitations of the work.

Acknowledgments should be brief and should indicate any potential conflicts of interest and sources of financial support.

An appendix may be used for mathematical formulae or method details of interest to readers with specialist knowledge of the area.

In addition:

- **Avoid repetition between sections.**
- **Avoid repetition of text featured in tables and the main body of the article.**
- **Abbreviations and acronyms may be used where appropriate, but must always be defined where first used.**
- **The names and locations (town, country) of manufacturers of all equipment and non-generic drugs must be given.**
- **Avoid the use of footnotes.**
- **Use SI units throughout the text (Grays, Sieverts not RADs and REMs).**

References

- **Authors are responsible for the accuracy of the references. Only papers closely related to the work should be cited; exhaustive lists should be avoided. All references must appear both in the text and the reference list.**
- **References should follow the Vancouver format.**
- **In the text, references are cited in numerical order as superscript numbers starting at 1. The superscript numbers are placed AFTER the full point.**
- **At the end of the paper they should be listed (double-spaced) in numerical order corresponding to the order of citation in the text.**
- **A reference cited in a table or figure caption counts as being cited where the table or figure is first mentioned in the text.**
- **Papers in press may be included in the list of references.**
- **Do not include references to uncompleted work or work that has not yet been accepted for publication. Abstracts and/or papers presented at meetings not in the public domain should not be included as references.**
- **References to private communications should be given only in the text (i.e. no number allocated). The author and year should be provided.**
- **If there are 6 or fewer authors, list them all. If there are 7 or more, list the first 6 followed by et al.**
- **Abbreviations for titles of medical periodicals should conform to those used in the latest edition of Index Medicus.**
- **The first and last page numbers for each reference should be provided.**
- **Abstracts and letters must be identified as such.**

Examples of references:

Journal article:
Gardner DG, Kessler HP, Morency R, Schaffner DL. The glandular odontogenic cyst: an apparent entity. J Oral Pathol 1988; 17:359–366.

Journal article, in press:
Dufoo S, Maupome G, Diez-de-Bonilla J. Caries experience in a selected patient population in Mexico City. Community Dent Oral Epidemiol (in press).

Complete book:
Kramer IRH, Pindborg JJ, Shear M. Histological typing of odontogenic tumours (2nd edn). Berlin: Springer Verlag, 1992.

Chapter in book:
DelBalso AM, Ellis GE, Hartman KS, Langlais RP. Diagnostic imaging of the salivary glands and periglandular regions. In: DelBaso AM (ed). Maxillofacial imaging. Philadelphia, PA: WB Saunders, 1990, pp 409–510.

Abstract:
Mileman PA, Espelid I. Radiographic treatment decisions - a comparison between Dutch and Norwegian practitioners. J Dent Res 1986; 65: 609 (Abstr 32).

Letter to the Editor:
Gomez RS, de Oliveira JR, Castro WH. Spontaneous regression of a paradental cyst. Dentomaxillofac Radiol 2001; 30: 296 (letter).

Journal article on the internet:
Abood S. Quality improvement initiative in nursing homes: the ANA acts in an advisory role. Am J Nurs [serial on the Internet]. 2002 Jun [cited 2002 Aug 12];102(6):[about 3 p.]. Available from: http://www.nursingworld.org/AJN/2002/june/Wawatch.htm.

Homepage/Web site:
Cancer-Pain.org [homepage on the Internet]. New York: Association of Cancer Online Resources, Inc.; c2000-01 [updated 2002 May 16; cited 2002 Jul 9]. Available from: http://www.cancer-pain.org/.

Tables

Tables should be referred to specifically in the text of the paper but provided as separate files.

- **Number tables consecutively with Arabic numerals (1, 2, 3, etc.), in the order in which they appear in the text.**
- **Give each table a short descriptive title.**
- **Make tables self-explanatory and do not duplicate data given in the text or figures.**
- **Aim for maximum clarity when arranging data in tables. Where practicable, confine entries in tables to one line (row) in the table, e.g. "value (±sd) (range)" on a single line is preferred to stacking each entry on three separate lines.**
- **Ensure that all columns and rows are properly aligned.**
- **Include horizontal rules at the top and bottom of a table and one below the column headings. If a column heading encompasses two or more subheadings, then the main headings and subheadings should be separated by a single short rule. No other rules should be included, neither horizontal nor vertical.**

- **Appropriate space should be used to separate columns. Rows should be double-spaced.**
- **A table may have footnotes if necessary. These should be referred to within the table by superscript letters, which will then also be given at the beginning of the relevant footnote. Begin each footnote on a new line. A general footnote referring to the whole table does not require a superscript letter.**
- **Define abbreviations in tables in the footnotes even if defined in the text or a previous table.**
- **Submit tables as editable text.**

Figures

Figures should be referred to specifically in the text of the paper.

- **Number figures consecutively using Arabic numerals (1, 2, 3, etc.) and any figure that has multiple parts should be labelled alphabetically (e.g. 2a, 2b).**
- **Concise, numbered legend(s) should be listed on a separate sheet. Avoid repeating material from the text.**
- **Abbreviations used in figures should be defined in the caption.**
- **Labelling of artwork should be Arial 8 point font.**
- **Ideally, figure sizes should be 84 mm wide, 175 mm wide or the intermediate width of 130 mm.**

Files

- **Supply image files in EPS, TIFF, PDF or JPEG format.**
- **TIFF is preferred for halftones, i.e. medical images such as radiographs, MR scans etc.**
- **EPS is preferred for drawn artwork (line drawings and graphs).**
- **For JPEG files, it is essential to save at maximum quality, i.e. "10", to ensure that quality is satisfactory when the files are eventually decompressed.**
- **Files supplied in Word, PowerPoint or Excel may prove acceptable, but please supply in EPS, TIFF or JPEG if practicable. Other formats will not be usable.**
- **Do not supply GIF files – GIF is a compressed format that can cause quality problems when printed.**
- **Upload each figure separately and numbered.**

Colour

- **Unless essential to the content of the article, all illustrations should be supplied in black and white with no colour (RGB, CMYK or Pantone references) contained within them.**
- **The cost of reproduction of colour images will be charged to the author at the following rates: £300 for one colour image, £500 for two colour images and £100 for each subsequent additional colour image. All prices are exclusive of UK VAT.**
- **Images that do need to be reproduced in colour should be saved in CMYK, with no RGB or Pantone references contained within them.**

Resolution

- **Files should be saved at the appropriate dpi (dots per inch) for the type of graphic (the typical screen value of 72 dpi will not yield satisfactory printed results). Lower resolutions will not be usable.**
- **Line drawings – save at 800 dpi (or 1200 dpi for fine line work).**
- **Halftone and colour work – save at 300 dpi.**

Composition

- **The image should be cropped to show just the relevant area (i.e. no more than is necessary to illustrate the points made by the author whilst retaining sufficient anatomical landmarks). The amount of white space around the illustration should be kept to a minimum.**
- **Supply illustrations at the size they are to be printed, usually 76 mm wide (single column of text) or for especially large figures 161 mm (two columns of text).**
- **Annotations, e.g. arrows, should be used to indicate subtle but salient points. All annotations should be included within the images supplied.**
- **Patient identification must be obscured.**

Additional points to note:

- **Do not put a box around graphs, diagrams or other artwork.**
- **Avoid background gridlines unless these are essential (e.g. confidence limits).**
- **Fonts should be Adobe Type 1 standard – Helvetica or Times are preferred.**
- **Ensure that lettering is appropriately sized – should correspond to 8 or 9 pt when printed.**
- **Include all units of measurement on axes.**
- **All lines (e.g. graph axes) should have a minimum width of ¼ pt (0.1 mm) otherwise they will not print; 1 pt weight is preferable.**
- **Avoid using tints (solid black and white or variations of crosshatching are preferred), but any tints that are used must be at a minimum 5% level to print (but do not use too high a tint as it may print too dark).**
- **Do not use three-dimensional histograms when the addition of a third dimension gives no further information.**

Appendices

Appendices should be used to include detailed background material that is essential for the understanding of the manuscript e.g. statistical analyses, very detailed preliminary studies, but which is too comprehensive to include as part of the main text.

Where possible, authors are encouraged to include all relevant material in the main body of the text, however, if an appendix is necessary it should be supplied as a separate file. If more than one appendix is included, these should be identified using different letters.

- **An appendix may contain references, but these should be listed separately and numbered A1, A2, etc.**
- **Appendices must be referred to in the main text in the relevant section.**

Supplementary material

Supplemental material is intended for material that would add value to your manuscript but is not essential to the understanding of the work. Supplementary material is typically used for including material that can not be accommodated in print form, for example multimedia files such as dynamic images, video/audio files etc.

There are no restrictions on supplementary file formats, though it is recommended that authors choose file types that the majority of readers will be able to open e.g.

- **Text/Data: PDF, Word, Excel, Powerpoint, .txt**
- **Graphics: TIF, PNG, JPEG, GIF**
- **Video: AVI, MOV, MP4, MPEG, WMV**
- **Audio: mp3, m4a**

Units, symbols and statistics

Authors should use the International System of Units (SI) [1]. Units of radiation should be given in SI, e.g. 1 Sv, 1 Gy, 1 MBq. Exceptions are mmHg for blood pressure and g dl–1 for haemoglobin. For guidance, authors can refer to the publication Units, Symbols and Abbreviations. A guide for medical and scientific authors [2].

- **All radiation factors (dose/time/fractionation) must be listed.**
- **Equations should be numbered (1), (2) etc. to the right of the equation. Do not use punctuation after equations.**
- **Do not include dots to signify multiplication – parameters should simply be typed closed up, or with a multiplication sign if necessary to avoid ambiguity.**

Statistical Guidelines

The aim of the study should be clearly described and a suitable design, incorporating an appropriate number of subjects, should be used to accomplish the aim. It is frequently beneficial to consult a professional statistician before undertaking a study to confirm it has adequate power, and presentation of a power calculation within the paper demonstrates the ability of the study to detect clinically or biologically meaningful effects.

Details should be provided on selection criteria, whether data were collected prospectively or retrospectively, and any exclusions or losses to follow-up that might affect the study population. Information on subject characteristics in groups being compared should be given for any factors that could potentially bias the comparison of the groups; such information is often best presented in a tabular format in which the groups are in adjacent columns. If the study was randomized, details of the randomization procedure should be included.

Measures of variation should be included for all important results. When means are presented, the standard deviation or the standard error of the mean should also be given, and it should be clear which of these two measures is being quoted. When medians are given, measures of variation such as the interquartile range or overall

range should also be included. Estimates of differences, e.g. between two means being compared, should be provided with 95% confidence limits to aid the reader and author to interpret the results correctly. Note that estimation of the size of effects, e.g. treatment or prognostic factor effects, is as important as hypothesis testing.

Statistical procedures should be described and referenced for all p-values given, and the values from which they were derived should be included. The validity of statistical procedures should also be confirmed, e.g. the t-test requires normal distribution(s) in the basic data and the chi-squared test is not valid when the expected numbers in cells are less than 5. Data may sometimes be transformed, e.g. using a log or square root transformation, to achieve normality. Non-parametric tests should be used when the conditions for normality are not met. It should be noted, however, that the Wilcoxon signed rank test (the non-parametric equivalent of the paired t-test) is semi-quantitative. If more than two groups are being compared then an analysis of variance should be performed before undertaking comparisons of pairs of groups. You are advised to seek the help of a professional statistician if you are uncertain of the appropriateness or interpretation of statistical methods.

Analysis of repeated measurements on the same subject can give rise to spurious results if comparisons are made at a large number of different time points. It is frequently preferable to represent each subject's outcome by a single summary measure chosen for its appropriateness. Examples of such measures are the area under the curve, the overall mean, the maximum or minimum, and the time to reach a given value. Simple statistics can then be applied to these summary measures.

The results of the evaluation of a test procedure should state clearly the criteria used to define positivity, and the sensitivity, specificity, positive predictive value and negative predictive value should all be quoted together with their 95% confidence limits.

1. Goldman DT, Bell RJ, eds. The International System of Units (SI). 5th edn. London, UK: HMSO; 1987.

2. Baron DN, ed. Units, symbols and abbreviations. A guide for medical and scientific authors. 5th edn. London, UK: Royal Society of Medicine Press; 1994.

ANEXO C- Instruções para autores (The Cleft Palate-Craniofacial Journal)

Manuscript Submission Guidelines:

Due to the worldwide impact of the COVID-19 pandemic, we are very aware that many researchers and reviewers will have difficulty meeting the typical timelines associated with our journal's peer review process. Our editorial office will continue to send reminders, but we intend to be very flexible during this time. Please do let us know if you will need additional time. Furthermore, journal submissions are currently substantially higher for *CPCJ* and the availability of reviewers in some cases is limited. This may cause delays, but please be rest assured that our journal team is working to ensure the timely management of your submission.

This Journal is a member of the Committee on Publication Ethics.

This Journal recommends that authors follow the Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals formulated by the International Committee of Medical Journal Editors (ICMJE).

Please read the guidelines below then visit the Journal's submission site https://mc.manuscriptcentral.com/cpcj to upload your manuscript. Please note that manuscripts not conforming to these guidelines may be returned.

SAGE Publishing disseminates high-quality research and engaged scholarship globally, and we are committed to diversity and inclusion in publishing. We encourage submissions from a diverse range of authors from across all countries and backgrounds.

Only manuscripts of sufficient quality that meet the aims and scope of *The Cleft Palate-Craniofacial Journal (CPCJ)* will be reviewed. *CPCJ* is directed to a multidisciplinary readership of clinicians and scientists interested in craniofacial anomalies, including cleft lip and cleft palate. The *CPCJ* publishes original research articles, clinical reports, brief communications, articles related to new ideas or innovations, letters to the editor, editorials, invited book reviews, and meeting announcements.

There are no fees payable to submit or publish in this journal.

As part of the submission process you will be required to warrant that you are submitting your original work, that you have the rights in the work, that you have obtained and can supply all

necessary permissions for the reproduction of any copyright works not owned by you, that you are submitting the work for first publication in the Journal, and that it is not being considered for publication elsewhere and has not already been published elsewhere. Note that the Journal may accept submissions of papers that have been posted on pre-print servers; include the DOI for the preprint in the designated field during the submission process. Authors should not post an updated version of their paper on the preprint server while it is being peer reviewed for possible publication in the journal. If the article is accepted for publication, the author may re-use their work according to the Journal's author archiving policy. If your paper is accepted, you must include a link on your preprint to the final version of your paper.

If you have any questions about publishing with SAGE, please visit the SAGE Journal Solutions Portal

1. What do we publish?

1.1 Aims & Scope

Before submitting your manuscript to *CPCJ*, please ensure you have read the Aims & Scope. *CPCJ* publishes manuscripts of the highest scientific quality on all topics related to orofacial clefts and other craniofacial anomalies in order to advance the global education of scientists and clinicians

1.2 Article Types

Original Articles: 7 typeset pages as they appear in the journal (about 7,000 words, with up to 6 figures or tables combined)

What I (We) Do: 2 typeset pages as they appear in the journal (about 1,000 words, with up to 3 figures or tables combined and up to 5 references)

Case Reports: 4 typeset pages as they appear in the journal (about 4,000 words, with up to 6 figures or tables combined)

Ethics / Health Policy / Ideas and Innovations / Brief Communications: 3 typeset pages as they appear in the journal (about 3,000 words, with up to 3 figures or tables combined)

Perspectives / Letters to the Editor / Editorials: Should provide thoughtful, scientific, constructive commentary pertaining to articles or research published in The Cleft Palate-Craniofacial Journal. 1.5 typeset pages as they appear in the journal (about 1,500 words, with up to 1 figure or table).

A single figure may include multiple images (a, b, c, etc.) but all must appear on the same page.

Supporting material that is not essential to an understanding of the article may be posted with the article as supplemental online-only material.

CPCJ allows as many citations and references as the authors feel necessary for the manuscript.

1.3 Writing your paper

The SAGE Author Gateway has some general advice and on how to get published, plus links to further resources.

1.3.1 Make your article discoverable

When writing up your paper, think about how you can make it discoverable. The title, keywords and abstract are key to ensuring readers find your article through search engines such as Google. For information and guidance on how best to title your article, write your abstract and select your keywords, have a look at this page on the Gateway: How to Help Readers Find Your Article Online

Back to top

2. Editorial policies

2.1 Peer review policy

Two independent peer reviews are typically solicited. At the discretion of the Section Editor, a third review by a biostatistician may also be solicited. The Editor is responsible for all final decisions regarding acceptance or rejection, recommendations for revision, and final editing. Manuscripts will be evaluated according to various criteria, including scientific methodology, level of evidence, novelty, clarity, and conciseness. Accepted articles describing novel

findings or methods with high levels of evidence may be advanced in the publication queue at the discretion of the Editor.

All submitted articles are "double-blinded" to ensure an unbiased review. Reviewers will not have access to author names or affiliations. Authors will not have access to reviewer names or affiliations.

The Editor or members of the Editorial Board may occasionally submit their own manuscripts for possible publication in the journal. In these cases, the peer review process will be managed by alternative members of the Board and the submitting Editor/Board member will have no involvement in the decision-making process.

> *CPCJ* is committed to delivering high quality, fast peer-review for your paper, and as such has partnered with Publons. Publons is a third party service that seeks to track, verify and give credit for peer review. Reviewers for *CPCJ* can opt in to Publons in order to claim their reviews or have them automatically verified and added to their reviewer profile. Reviewers claiming credit for their review will be associated with the relevant journal, but the article name, reviewer's decision and the content of their review is not published on the site. For more information visit the Publons website.
>
> The Editor or members of the Editorial Board may occasionally submit their own manuscripts for possible publication in the journal. In these cases, the peer review process will be managed by alternative members of the Board and the submitting Editor/Board member will have no involvement in the decision-making process.

2.2 Authorship

Papers should only be submitted for consideration once consent is given by all contributing authors. Those submitting papers should carefully check that all those whose work contributed to the paper are acknowledged as contributing authors.

The list of authors should include all those who can legitimately claim authorship. This is all those who:

(i) Made a substantial contribution to the concept or design of the work; or acquisition, analysis or interpretation of data,

(ii) Drafted the article or revised it critically for important intellectual content,

(iii) Approved the version to be published,

(iv) Participated sufficiently in the work to take public responsibility for appropriate portions of the content.

Each author must declare his or her contribution to the manuscript by signing the copyright transfer form. Authors should meet the conditions of all of the points above.

> CPCJ follows authorship guidelines as outlined by the International Committee of Medical Journal Editors (ICMJE). If a paper has more than 10 authors, a cover letter detailing the contributions of all authors should be included in the submission. Only those involved in writing the paper should be included in the author line. Others should be listed as a footnote or acknowledgment. While there is no limit on the number of authors, no more than 20 will be listed on the masthead of the published article; additional authors will be listed at the end of the article. These authors will be indexed in PubMed as full authors.

The *CPCJ* allows research groups to be recognized in submitted manuscripts. Authors should identify both the group name and the individual authors who accept responsbility for the article (e.g., Smith A, Johnson R, Williams T; The CleftCran Research Group). The named individuals must meet the full criteria and requirements for authorship as described above. Other research group members who do not qualify for authorship may be listed in an Acknowledgement.

Acquisition of funding, collection of data, or general supervision of the research group alone does not constitute authorship, although all contributors who do not meet the criteria for authorship should be listed in the Acknowledgments section. Please refer to the International Committee of Medical Journal Editors (ICMJE) authorship guidelines for more information on authorship.

2.3 Acknowledgements

All contributors who do not meet the criteria for authorship should be listed in an Acknowledgements section. Examples of those who might be acknowledged include a person who provided purely technical help, or a department chair who provided only general support.

Please supply any personal acknowledgements separately to the main text to facilitate anonymous peer review.

2.3.1 Third party submissions

Where an individual who is not listed as an author submits a manuscript on behalf of the author(s), a statement must be included in the Acknowledgements section of the manuscript and in the accompanying cover letter. The statements must:

- Disclose this type of editorial assistance – including the individual's name, company and level of input
- Identify any entities that paid for this assistance
- Confirm that the listed authors have authorized the submission of their manuscript via third party and approved any statements or declarations, e.g. conflicting interests, funding, etc.

Where appropriate, SAGE reserves the right to deny consideration to manuscripts submitted by a third party rather than by the authors themselves.

2.3.2 Writing assistance

Individuals who provided writing assistance, e.g. from a specialist communications company, do not qualify as authors and so should be included in the Acknowledgements section. Authors must disclose any writing assistance – including the individual's name, company and level of input – and identify the entity that paid for this assistance.

It is not necessary to disclose use of language polishing services.

2.4 Funding

CPCJ requires all authors to acknowledge their funding in a consistent fashion under a separate heading. Please visit the Funding Acknowledgements page on the SAGE Journal Author Gateway to confirm the format of the acknowledgment text in the event of funding, or state that: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

2.5 Declaration of conflicting interests

It is the policy of *CPCJ* to require a declaration of conflicting interests from all authors enabling a statement to be carried within the paginated pages of all published articles. Authors are required to disclose, in a cover letter accompanying their manuscript, any relevant conflict of interest, including direct or indirect financial interests they may have in the materials or subject matter dealt with in the manuscript. This information will be held in confidence by the Editor during the review process, but at the discretion of the Editor, may be included in publication of an accepted manuscript.

Please ensure that a 'Declaration of Conflicting Interests' statement is included at the end of your manuscript, after any acknowledgements and prior to the references. If no conflict exists, please state that 'The Author(s) declare(s) that there is no conflict of interest'.

For guidance on conflict of interest statements, please see the ICMJE recommendations here.

2.6 Research ethics and patient consent

Medical research involving human subjects must be conducted according to the World Medical Association Declaration of Helsinki. Compliance with these guidelines should be indicated in the Methods section of the manuscript, along with Institutional Review Board approval if appropriate.

Submitted manuscripts should conform to the ICMJE Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals, and all papers reporting animal and/or human studies must state in the methods section that the relevant Ethics Committee or Institutional Review Board provided (or waived) approval. Please ensure that you have provided the full name and institution of the review committee, in addition to the approval number.

While informed consent might not be required for consecutive case series and/or retrospective chart review reports, these are still considered research given that the objective of your report is to generalize the findings. As such, they require Humans Subjects Review Board approval. If a form IRB is not available, the authors must state so in a cover letter accompanying the submission, and include a statement in the manuscript that principles outlined in the Declaration of Helsinki were followed.

For research articles, authors are also required to state in the methods section whether participants provided informed consent and whether the consent was written or verbal.

Information on informed consent to report individual cases or case series should be included in the manuscript text. A statement is required regarding whether written informed consent for patient information and images to be published was provided by the patient(s) or a legally authorized representative. The author is responsible for ensuring the anonymity of protection of any individual depicted in a manuscript. A signed permission form must be submitted for any recognizable individual appearing in manuscript figures. Shading of the eyes is not an acceptable means of rendering an individual unrecognizable. If an author chooses to use his/her own institutional patient permission form, it must include permission to use photographs for all types of publication including but not limited to print, visual, electronic, or broadcast media. Consent forms should be uploaded at submission.

Please also refer to the ICMJE Recommendations for the Protection of Research Participants.

All research involving animals submitted for publication must be approved by an ethics committee with oversight of the facility in which the studies were conducted. The journal has adopted the Consensus Author Guidelines on Animal Ethics and Welfare for Veterinary Journals published by the International Association of Veterinary Editors.

2.7 Clinical trials

CPCJ endorses the ICMJE requirement that clinical trials are registered in a WHO-approved public trials registry at or before the time of first patient enrolment. However, consistent with the AllTrials campaign, retrospectively registered trials will be considered if the justification for late registration is acceptable. The trial registry name and URL, and registration number must be included at the end of the abstract.

2.8 Reporting guidelines

The relevant EQUATOR Network reporting guidelines should be followed depending on the type of study. For example, all randomized controlled trials submitted for publication should include a completed CONSORT flow chart as a cited figure and the completed CONSORT checklist should be uploaded with your submission as a supplementary file. Systematic reviews and meta-analyses should include the completed PRISMA flow chart as a cited figure and the completed PRISMA checklist should be uploaded with your submission as a supplementary file. The EQUATOR wizard can help you identify the appropriate guideline.

Other resources can be found at NLM's Research Reporting Guidelines and Initiatives.

2.9 Data

At SAGE we are committed to facilitating openness, transparency and reproducibility of research. Where relevant, *CPCJ* requests all authors submit any primary data used in their research articles alongside their article submissions to be published in the online version of the journal, or provide detailed information in their articles on how the data can be obtained. This information should include links to third-party data repositories or detailed contact information for third-party data sources. Data available only on an author-maintained website will need to be loaded onto either the journal's platform or a third-party platform to ensure continuing accessibility. Examples of data types include but are not limited to statistical data files, replication code, text files, audio files, images, videos, appendices, and additional charts and graphs necessary to understand the original research. The editor may consider limited embargoes on proprietary data. The editor(s) can also grant exceptions for data that cannot legally or ethically be released. All data submitted should comply with Institutional or Ethical Review Board requirements and applicable government regulations. Authors should also follow data citation principles. For more information please visit the SAGE Author Gateway, which includes information about SAGE's partnership with the data repository Figshare. For further information or clarification, please contact the Editor at the address given below.

Back to top

3. Publishing Policies

3.1 Publication ethics

SAGE is committed to upholding the integrity of the academic record. We encourage authors to refer to the Committee on Publication Ethics' International Standards for Authors and view the Publication Ethics page on the SAGE Author Gateway.

3.1.1 Plagiarism

CPCJ and SAGE take issues of copyright infringement, plagiarism, or other breaches of best practice in publication very seriously. We seek to protect the rights of our authors, and we always investigate claims of plagiarism or misuse of published articles. Equally, we seek to protect the reputation of the journal against malpractice. Submitted articles may be checked with duplication-checking software. Where an article, for example, is found to have plagiarised other work or included third-party copyright material without permission or with

insufficient acknowledgement, or where the authorship of the article is contested, we reserve the right to take action including, but not limited to: publishing an erratum or corrigendum (correction); retracting the article; taking up the matter with the head of department or dean of the author's institution and/or relevant academic bodies or societies; or taking appropriate legal action.

3.1.2 Prior publication

If material has been previously published it is not generally acceptable for publication in a SAGE journal. However, there are certain circumstances where previously published material can be considered for publication. Please refer to the guidance on the SAGE Author Gateway or if in doubt, contact the Editor at the address given below.

3.2 Contributor's publishing agreement

Before publication, SAGE requires the author as the rights holder to sign a Journal Contributor's Publishing Agreement. SAGE's Journal Contributor's Publishing Agreement is an exclusive licence agreement which means that the author retains copyright in the work but grants SAGE the sole and exclusive right and licence to publish for the full legal term of copyright. Exceptions may exist where an assignment of copyright is required or preferred by a proprietor other than SAGE. In this case copyright in the work will be assigned from the author to the society. For more information please visit the SAGE Author Gateway

3.3 Open access and author archiving

CPCJ offers optional open access publishing via the SAGE Choice programme. For more information on Open Access publishing options at SAGE please visit SAGE Open Access. For information on funding body compliance, and depositing your article in repositories, please visit SAGE's Author Archiving and Re-Use Guidelines and Publishing Policies.

Back to top

4. Preparing your manuscript for submission

4.1 Formatting

Original Articles: Reports of original clinical or basic science data pertaining to prevalence, causes, mechanisms, diagnosis, course, treatment, and prevention, including systematic

reviews and meta-analysis that represent a new contribution to the field. Limit: 7 typeset pages as they appear in the journal (about 7,000 manuscript words, with up to 6 figures or tables combined).

What I (We) Do: Introduce new solutions to clinical problems. Novelty and quality of illustrations and videos (when appropriate) are key ingredients. Authors should include a brief (50-75 words) abstract with the following format: background (what is the issue/problem), solution, what I/we did that is new. Also, include 3-5 keywords. If no patient identifiable data are included, no IRB form is necessary. Limit: 2 typeset pages as they appear in the journal (about 1,000 words, with up to 3 figures or tables combined, and up to 5 references).

Clinical Reports: Case reports presenting new clinical information. Limit: 4 typeset pages as they appear in the journal (about 4,000 manuscript words, with up to 6 figures or tables combined).

Ideas and Innovations: Short communications related to novel ideas, techniques, methods of assessment, etc. Limit: 3 typeset pages as they appear in the journal (about 3,000 manuscript words, with up to 3 figures or tables combined).

Brief Communications: Preliminary or limited results of origial research pertaining to prevalence, causes, mechanisms, diagnosis, course, treatment, and prevention. Limit: 3 typeset pages as they appear in the journal (about 3,000 manuscript words, with up to 3 figures or tables combined).

Ethics/Health Policy: *Ethical and Legal Reports* are original articles which examine issues of ethics or the law arising in cleft and craniofacial care and research. *Health Policy Reports* are original articles which examine social, political, and economic issues arising in cleft and craniofacial care or research. Limit: 3 typeset pages as they appear in the journal (about 3,000 manuscript words, with up to 3 figures or tables combined).

Perspectives are typically solicited articles (unsolicited articles will be considered) that provide background and context for an article in the issue in which they appear. Perspectives should provide thoughtful, scientific, constructive commentary. Limit: 1.5 typeset pages as they appear in the journal (about 1,500 manuscript words, with up to 1 figure or table). A single figure may include multiple images (a, b, c, etc.) but all must appear on the same page. Supporting material that is not essential to an understanding of the article may be posted with the article as supplemental online-only material.

Letters to the Editor: Comments in the form of letters that express differences of opinion or supporting views of recently published *CPCJ* content. They should provide thoughtful, scientific, constructive commentary. Limit: 1.5 typeset pages as they appear in the journal (about 1,500 manuscript words, with up to 1 figure or table). A single figure may include multiple images (a, b, c, etc.) but all must appear on the same page. Supporting material that is not essential to an understanding of the article may be posted with the article as supplemental online-only material.

Editorials: Brief substantiated commentaries on subjects of interest to the CPCJ readership. Editorials should be narrative in form and provide thoughtful, scientific, constructive commentary. Limit: 1.5 typeset pages as they appear in the journal (about 1,500 manuscript words, with up to 1 figure or table). A single figure may include multiple images (a, b, c, etc.) but all must appear on the same page. Supporting material that is not essential to an understanding of the article may be posted with the article as supplemental online-only material.

The preferred format for your manuscript is Word. LaTeX files are also accepted. Word and (La)Tex templates are available on the Manuscript Submission Guidelines page of our Author Gateway.

4.2 Artwork, figures and other graphics

For guidance on the preparation of illustrations, pictures and graphs in electronic format, please visit SAGE's Manuscript Submission Guidelines.

Figures supplied in colour will appear in colour online regardless of whether or not these illustrations are reproduced in colour in the printed version. For specifically requested colour reproduction in print, you will receive information regarding the costs from SAGE after receipt of your accepted article. The first color image is $800, and it is $200 for any additional color images within the same contribution.

4.3 Identifiable information

Where a journal uses double-blind peer review, authors are required to submit:

1. A **version of the manuscript** which has had any information that compromises the anonymity of the author(s) removed or anonymised. This version **will** be sent to the peer reviewers.

2. A **separate title page** which includes any removed or anonymised material. This **will not** be sent to the peer reviewers.

See https://sagepub.com/Manuscript-preparation-for-double-blind-journal for detailed guidance on making an anonymous submission.

4.4 Supplementary material

This journal is able to host additional materials online (e.g. datasets, podcasts, videos, images etc) alongside the full-text of the article. For more information please refer to our guidelines on submitting supplementary files.

Video

Video clips that contribute significantly to the manuscript may be submitted in either avi, mov, or mpeg formats. Videos should be submitted at the desired reproduction size and length, but should not exceed 6MB in size. If submitting avi files, the files must be compressed. Authors are solely responsible for all editing of video clips. Each video file must be accompanied by a still image from the video that conforms to the figure resolution and size requirements outlined above for figures. This image will be published in the print version of the journal in place of the video. Please indicate in the figure legend that the still image has an associated video file. Both the print-version figure and the video must share the same file name (e.g., Figure1.jpg and Figure1.mov). A "List of Video Legends" should be prepared on a separate page at the end of the manuscript article file. *Video submissions are strongly encouraged, particularly for articles dealing with surgical techniques.*

Audio

Audio clips that contribute significantly to the manuscript may be submitted in .au, .ram, .wav, or .mp3 formats. Audio files should not exceed 6 MB in size. Authors are solely responsible for all editing of audio clips. Audio clips should be cited in the manuscript as Audio 1, Audio 2, etc. A "List of Audio Legends" should be submitted on a separate page at the end of the manuscript article file.

4.5 Reference style

For citations and references, *CPCJ* uses the 11th Edition AMA Manual of Style.

4.6 English language editing services

Authors seeking assistance with English language editing, translation, or figure and manuscript formatting to fit the journal's specifications should consider using SAGE Language Services. Visit SAGE Language Services on our Journal Author Gateway for further information.

Back to top

5. Submitting your manuscript

CPCJ is hosted on SAGE Track, a web based online submission and peer review system powered by ScholarOne™ Manuscripts. Visit https://mc.manuscriptcentral.com/cpcj to login and submit your article online.

IMPORTANT: Please check whether you already have an account in the system before trying to create a new one. If you have reviewed or authored for the journal in the past year it is likely that you will have had an account created. For further guidance on submitting your manuscript online, please visit ScholarOne.

MANUSCRIPT FILES TO BE UPLOADED

1. Title Page

- The Title Page (submitted separately from the manuscript) must include (in the following order): Title (maximum 20 words); should be informative, relevant, and concise
- Author names with *no more than* three highest attained degrees, in the order that they will appear in print
- Academic rank or position, and institutional affiliation for each author
- Name, address, telephone number, fax number, and email address of the corresponding author, who will receive all editorial communication and reprint requests
- If applicable, statement that manuscript was presented orally at a professional meeting, including the name, date, and location of the meeting
- Credits and appropriate grant numbers if the study was supported by an agency.
- Running title (less than 8 words)
- If applicable, statement acknowledging all forms of financial support
- If desired, any other acknowledgements (e.g. individuals assisting with conduct of the study but not qualifying for authorship)

To ensure that the article is blinded, please do not include author names or affiliations, or any other identifying information in any portion of the manuscript other than this Title Page.

2. Manuscript

Please be sure you are using patient-first language in your entire manuscript (e.g., use "patients with CLP" instead of "CLP patients"; or "patients with 22q11.2 DS" instead of 22q11.2DS patients").

Manuscripts should avoid priority claims such as "this is the first study to...", "this is the largest study", etc. even when qualified by statements like "to our knowledge..."

Page 1: Title The first page of the manuscript text file should include only the title used on the Title Page (above).

Page 2: Abstract Original articles and ideas and innovations articles should include a structured abstract of no longer than 250 words (including Key Words) with the following headings and information, as applicable. Structured abstracts of no longer than 150 words should be used for data-based Brief Communications articles.

Structured Abstract:

Objective: State the main question or objective of the study and the major hypothesis tested, if any.

Design: Describe the design of the study indicating, as appropriate, use of randomization, blinding, criterion standards for diagnostic tests, temporal direction (retrospective or prospective), etc.

Setting: Indicate the study setting, including the level of clinical care (for example, primary or tertiary; private practice or institutional).

Patients, Participants: State selection procedures, entry criteria, and numbers of participants entering and finishing the study.

Interventions: Describe the essential features of any intervention, including the methods and duration of administration.

Main Outcome Measure(s): The primary study outcome measures should be indicated as planned before data collection began. If the hypothesis being reported was formulated during or after data collection, this fact should be clearly stated.

Results: Describe measurements that are not evident from the nature of the main results and indicate any blinding. If possible, the results should be accompanied by confidence intervals (most often the 95% interval) and the exact level of statistical significance. For comparative studies, confidence intervals should relate to the differences between groups. Absolute values should be indicated when risk changes or effect sizes are given.

Conclusions: State only those conclusions of the study that are directly supported by data, along with their clinical application (avoiding overgeneralization) and/or whether additional study is required before the information should be used in clinical settings. Equal emphasis must be given to positive and negative findings of equal scientific merit.

(Reproduced with permission from: Haynes RB et al. More informative abstracts revisited. *Ann Intern Med.* 1990;113:69–76).

Key Words: A short list of the key words that reflects the article's content. Clinical reports should include an unstructured abstract of no longer than 100 words, including Key Words, describing the objective, essential features and uniqueness of the case being presented, and conclusions. Non-data-based Brief Communications and Ethics, Legal, or Health Policy reports should include an unstructured abstract of no longer than 100 words, including Key Words.

Page 3: Body of Manuscript Where applicable, divide the body of the manuscript into the Introduction, Methods, Results, Conclusion, and References.

The *CPCJ* follows guidelines published in the *American Medical Association Manual of Style*. Manuscripts should be typed double-spaced with 1" margins, left justified, and use a standard 12-point font. Pages should be numbered consecutively in the upper right hand corner, beginning with the second page. Do not print a running title. Turn off the word processing program's hyphenation feature and ''smart quotes'' feature before typing. Headings must be used to designate the major divisions of the manuscript. Up to three levels of headings may be used.

<u>Statistics</u>

If a statistical analysis is conducted, explanation of the methods used must precede the Results section in the manuscript. Unusual or complex analysis methods should be referenced.

Units of Measure/ Abbreviations

The metric system is preferred for expressing units of measure. Abbreviations may be used for terms. The full term for each abbreviation should appear at its first use in the text, unless the abbreviation is a standard unit of measure. Abbreviations used in a table must be explained in a footnote below the table. For a list of standard abbreviations, consult the Council of Biology Editors Style Guide (available from the Council of Science Editors, 9650 Rockville Pike, Bethesda, MD 20814; http://www.councilscienceeditors.org) or other standard sources.

The table below lists standard accepted abbreviations for typical cleft-type classifications and study groups. Other abbreviations may be proposed for classifications and groups not listed.

ABBREVIATION USED TO DESCRIBE A SUBJECT GROUP THAT INCLUDES:	
	cleft lip (excludes (1) cleft lip and alveolus, (2) cleft lip and palate, and (3) cleft palate)
CL	cleft palate only (excludes (1) cleft lip and (2) cleft lip and palate)
CP	cleft lip and palate (excludes (1) cleft lip and (2) cleft palate)
CLP	cleft lip with or without cleft palate = cleft lip + cleft lip and palate (excludes cleft palate)
CL±P	cleft palate with or without cleft lip = cleft lip and palate + cleft palate (excludes cleft lip)
CP±L	cleft lip and/or cleft palate = cleft lip + cleft lip and palate + cleft palate (no exclusions)
CL/P	cleft lip with or without cleft alveolus = cleft lip + cleft lip and alveolus (excludes (1) cleft lip, (2) cleft lip and palate, and (3) cleft palate)
CL±A	

TERMS THAT MAY BE ADDED TO THE ABBREVIATIONS ABOVE (IF APPROPRIATE):

i isolated

I incomplete

U unilateral

B bilateral

SM submucous

Phonetic Symbols

Authors who use phonetic symbols are required to use Unicode-compliant fonts in their manuscripts. This will ensure the symbols display properly both during peer review and in the final published article. Examples of acceptable fonts include Charis SIL, Doulos SIL, and Gentium Unicode. Times New Roman is also acceptable, as it includes most IPA symbols and is Unicode compliant.

Citations/References

Single Author Article
Citation: Mantel (1963) or (Mantel, 1963)
Reference: Mantel N. Chi-square tests with one degree of freedom; extensions of the Mantel-Haenszel procedure. *J Am Stat Assoc*. 1963;58:690–700.

Two Author Article
Citation: Rasheed and Munshi (1996) or (Rasheed and Munshi, 1996)
Reference: Rasheed SA, Munshi AK. Electromyographic and ultrasonographic evaluation of the circum-oral musculature in children. *J Clin Pediatr Dent*. 1996;20:305-311.

Three Or More Author Article
Citation: Lilja et al. (2000) or (Lilja et al., 2000)
Reference: Lilja J, Elander A, Lohmander A, Persson C. Isolated cleft palate and submucous cleft palate. *Oral Maxillofac Surg Clin N Am*. 2000;12:455–468.

Two or more works by the same first author in the same year
Citation: Smith (1975a), Smith (1975b) or (Smith, 1975a) etc

Reference: Smith RC. Long term effects of smoking on fetal development. *Teratology* 1975a;42:75-84.

Monograph

Citation: Bardach (1967) or (Bardach, 1967)

Reference: Bardach J. *Cleft Lip and Palate* (Monograph). Warsaw: Polish Institute of Medical Publications; 1967.

Thesis

Citation: Dowden (1992)

Reference: Dowden PA. The Effects of Listener Training on the Speech Intelligibility of Severely Dysarthric Individuals. Seattle, WA: University of Washington; 1992. Dissertation.

Book

Citation: McWilliams et al. (1990) or (McWilliams et al., 1990)

Reference: McWilliams BJ, Morris HL, Shelton RL. *Cleft Palate Speech*. Philadelphia: BC Decker; 1990: 40-49. (only list pages if specific pages are cited).

Chapter in Book

Citation: Eliason (1990) or (Eliason, 1990)

Reference: Eliason MJ. Neuropsychological perspectives of cleft lip and palate. In: Bardach J, Morris HL, eds. *Multidisciplinary Management of Cleft Lip and Palate*. Philadelphia: WB Saunders; 1990:825–831.

Conference Presentation

Citation: Parke and Sawin (1975) or (Parke and Sawin, 1975)

Reference: Parke RD, Sawin DB. Infant characteristics and behavior as elicitors of maternal and paternal responsivity in the newborn period. Presented at the Meeting of the Society for Research in Child Development; April 1975; Denver, Colorado.

Website

Citation: World Health Organization (2005)

Reference: World Health Organization. International database on craniofacial anomalies. Available at: www.who.int/genomics/anomalies/. Accessed June 27, 2005.

When multiple references are cited simultaneously in the text, they should be arranged in chronological order, for example: (Smith, 1975; Jones et al., 1981; Brown, 1986). References

should be double-spaced, and listed in alphabetical order (unnumbered) according to the surname of the first author. For articles with more than ten authors, include only the first ten author names in the reference list, followed by “et al.”

Figure Legends

A list of figure legends must be included on a separate page at the end of the manuscript article file. The legend should explain each figure as concisely as possible. Do not include figure legends in your figure art file. Figure legends are not included in the word count limit.

Tables

Tables should be numbered consecutively using Arabic numerals. Each table should have an appropriate title and explanation at its head. Abbreviations used in a table must be explained in a footnote below the table. Submit tables as separate files, with one table per file, in either .doc (text) or .xls (spreadsheet) format.

Figures

All figures and illustrations must be original photographs or artwork. For figures or illustrations reprinted from published work, the author must obtain written permission from the copyright holder and upload that permission as an “Additional Information” file at submission. Figures should be numbered consecutively in the order in which they appear in the manuscript, using Arabic numerals. A “List of Figure” Legends must be included on a separate page following the body of the manuscript. The legend should explain each figure in detail. Authors will be responsible for the following charges for each color figure submitted: $75.00 for online only; $400.00 for both online and print for ACPA members or $500.00 for non-members. A single figure may include multiple images (a, b, c, etc.) but all must appear on the same page.

Figures should be submitted in one of the following formats: tif (preferable), eps, jpg, pdf. Each figure should be submitted as a separate file. Composite figures made up of more than one image should be submitted as separate files (e.g. Fig 1A, Fig 1B). However, composite figures should contain a single legend describing the contents of all figures in the composite.

Refer to the Digital Art Specifications document at www.cpcjournal.org (see ‘For Authors’) for image resolution, size, and format requirements. For symbols that must be explained, please use a key that can be shot with the figures. Do not include symbols in the figure

legend. Authors may be charged if artwork must be generated to incorporate figure symbols into the figure legend.

Figures submitted at lower than the required resolutions stated above will be allowed for review purposes. However, the publication process for accepted manuscripts will be delayed until acceptable images have been submitted.

5.1 ORCID

As part of our commitment to ensuring an ethical, transparent and fair peer review process SAGE is a supporting member of ORCID, the Open Researcher and Contributor ID. ORCID provides a unique and persistent digital identifier that distinguishes researchers from every other researcher, even those who share the same name, and, through integration in key research workflows such as manuscript and grant submission, supports automated linkages between researchers and their professional activities, ensuring that their work is recognized.

The collection of ORCID IDs from corresponding authors is now part of the submission process of this journal. If you already have an ORCID ID you will be asked to associate that to your submission during the online submission process. We also strongly encourage all co-authors to link their ORCID ID to their accounts in our online peer review platforms. It takes seconds to do: click the link when prompted, sign into your ORCID account and our systems are automatically updated. Your ORCID ID will become part of your accepted publication's metadata, making your work attributable to you and only you. Your ORCID ID is published with your article so that fellow researchers reading your work can link to your ORCID profile and from there link to your other publications.

If you do not already have an ORCID ID please follow this link to create one or visit our ORCID homepage to learn more.

5.2 Information required for completing your submission

You will be asked to provide contact details and academic affiliations for all co-authors via the submission system and identify who is to be the corresponding author. These details must match what appears on your manuscript. The affiliation listed in the manuscript should be the institution where the research was conducted. If an author has

moved to a new institution since completing the research, the new affiliation can be included in a manuscript note at the end of the paper. At this stage please ensure you have included all the required statements and declarations and uploaded any additional supplementary files (including reporting guidelines where relevant).

Please be sure you are using patient-first language in your entire manuscript (e.g., use "patients with CLP" instead of "CLP patients"; or "patients with 22q11.2DS" instead of "22q11.2DS patients").

5.3 Permissions

Please also ensure that you have obtained any necessary permission from copyright holders for reproducing any illustrations, tables, figures or lengthy quotations previously published elsewhere. Submission of a manuscript to the CPCJ is taken as evidence that no portion of hte text or figures has been published or submitted for publication elsewhere unless information regarding prevoius publication is explicitly cited and written copyright permission obtained and uploaded at the time of manuscript submission. Permission should be obtained for both print and online publication.

For further information including guidance on fair dealing for criticism and review, please see the Copyright and Permissions page on the SAGE Author Gateway.

Back to top

6. On acceptance and publication

6.1 SAGE Production

Your SAGE Production Editor will keep you informed as to your article's progress throughout the production process. Proofs will be sent by PDF to the corresponding author and should be returned promptly. Authors are reminded to check their proofs carefully to confirm that all author information, including names, affiliations, sequence and contact details are correct, and that Funding and Conflict of Interest statements, if any, are accurate. Please note that if there are any changes to the author list at this stage all authors will be required to complete and sign a form authorising the change.

6.2 Online First publication

Online First allows final articles (completed and approved articles awaiting assignment to a future issue) to be published online prior to their inclusion in a journal issue, which significantly reduces the lead time between submission and publication. Visit the SAGE Journals help page for more details, including how to cite Online First articles.

6.3 Access to your published article

SAGE provides authors with online access to their final article.

6.4 Promoting your article

Publication is not the end of the process! You can help disseminate your paper and ensure it is as widely read and cited as possible. The SAGE Author Gateway has numerous resources to help you promote your work. Visit the Promote Your Article page on the Gateway for tips and advice.

Back to top

7. Further information

Any correspondence, queries or additional requests for information on the manuscript submission process should be sent to the CPCJ editorial office as follows:

Editor: Jamie Perry, PhD
Editorial Office: The Cleft Palate-Craniofacial Journal
Email: perryja@ecu.edu

7.1 Appealing the publication decision

Editors have very broad discretion in determining whether an article is an appropriate fit for their journal. Many manuscripts are declined with a very general statement of the rejection decision. These decisions are not eligible for formal appeal unless the author believes the decision to reject the manuscript was based on an error in the review of the article, in which case the author may appeal the decision by providing the Editor with a detailed writ description of the error they believe occurred.

If an author believes the decision regarding their manuscript was affected by a publication ethics breach, the author may contact the publisher with a detailed written description of their concern, and information supporting the concern, at publication_ethics@sagepub.com