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Dissertação

Impacto das formas faciais na função mastigatória e na qualidade de vida de pacientes usuários de prótese total

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“Sempre desejei ir, não necessariamente para um lugar, mas ir. E hoje percebo que em cada passo que dei me multipliquei, e a cada dia sou mais de mim mesma.”

(PAULA CAVALCANTE)

Notas Preliminares

A presente dissertação foi redigida segundo o Manual de Normas para Dissertações, Teses e Trabalhos Científicos da Universidade Federal de Pelotas de 2013, adotando o Nível de Descrição 4 – estrutura em Artigos, descrita no Apêndice Ddo referido manual. <http://sisbi.ufpel.edu.br/?p=documentos&i=7> Acesso em: 20/06/2017.

O projeto de pesquisa contido nesta dissertação é apresentado em sua forma final após a qualificação realizada em 29de fevereiro de 2016e aprovado pela Banca Examinadora composta pelos Professores DoutoresFernanda Faot, Catiara Terra da Costa, Douver Michelon e Fábio Renato Manzolli Leite (suplente).

Resumo

MARTINS, Ana Paula Pinto.**Impacto das formas faciais na função mastigatória e naqualidade de vida de pacientes usuários de prótese total.**2017. 115f.Dissertação (Mestrado em Odontologia) – Programa de Pós Graduação em Odontologia.Universidade Federal de Pelotas, Pelotas, 2017.

O edentulismo causa várias consequências prejudiciais para a saúde oral e geral, suas implicações envolvem consequências funcionais, como reduçãoda capacidade mastigatória, e ainda impactos na qualidade de vida dos pacientes.Associado a isto, as diferentes formas faciais interferem diretamente no desempenho mastigatório. Portanto, o objetivo deste estudo foi avaliar a influência do padrão facial (PF)e da classificação ântero-posterior (AP)na função mastigatória (FM)e qualidade de vida relacionada a saúde oral (OHRQoL) de pacientes enquanto usuários de próteses totais convencionais (PT) e após a transição para overdentures mandibulares (OM). Ao total, 56 pacientes participaram do estudo. Foram realizados exames de telerradiografia lateral para a análise cefalométrica, onde o PF foi determindo através da análise de Ricketts, e a classificação AP pelo relacionamento da maxila e da mandíbula em relação à base do crânio. A FM foi avaliada pelos métodos da Performance mastigatória (PM): (PM_X50, PMB,EM5.6,, EM2.8) e Limiar de deglutição (LD): (LD_X50, LDB, EM5.6, EM2.8). A OHRQoL e a satisfação foram avaliadas através da aplicação do questionário de impacto dental na vida diária (DIDL). Os resultados encontrados mostram que, enquanto usuários de próteses totais, pacientes dolicofaciais possuem uma PM superior aos braquifaciais, os Classe III apresentam capacidade reduzida de homogeinizar o alimento teste, e o domínio do DIDL que mais impactou foi a aparência. Após a transição para overdentures mandibulares, estas demonstraram impactar positivamente na OHRQoL e satisfação de desdentados totais independentes do padrão facial ou relação AP, e quanto à FM, os pacientes braquifaciais foram os menos beneficiados pela instalação das OM.

Palavras-chave: Mastigação; Cefalometria;Qualidade de vida.

Abstract

MARTINS, Ana Paula Pinto.**Impact of facial forms on masticatory function and quality of life of patients with complete dentures.**2017. 115p. Dissertation (Master degree in Dentistry). Graduate Program in Dentistry.Federal University of Pelotas, Pelotas, 2017.

Edentulism causes several harmful consequences for oral and general health, its implications involve functional consequences, such as reduction of masticatory capacity, and also impacts on patients' quality of life. Associated to this, the different facial forms interfere directly in the masticatory performance. Therefore, the objective of this study was to evaluate the influence of facial pattern (FP) and antero-posterior (AP) classification on masticatory function (MF) and oral health related quality of life (OHRQoL) of patients as users of complete dentures (CD) and after the transition to mandibular overdentures (MO). Overall, 56 patients participated in the study. Lateral cephalometric examinations were performed for the cephalometric analysis, where the FP was determined by the Ricketts analysis, and the AP classification by the relationship of the maxilla and mandible to the base of the skull. MF was evaluated by the methods of masticatory performance (MP): (MP_X50, MPB, ME5.6, ME2.8) and swallowing threshold (STD): (ST_X50, STB, ME5.6, ME2.8). OHRQoL and satisfaction were assessed through the application of the dental impact questionnaire on daily living (DIDL). The results show that, as users of complete dentures, dolichofacial patients have a higher MP than the brachyfacials, Class III has a reduced capacity to homogenize the artificial test food, and the domain of DIDL that most impacted was appearance. After the transition to MO, these had a positive impact on the OHRQoL and total edentulous satisfaction independent of the facial pattern or AP relationship, and for MF, brachyfacial patients were the least benefited by the MO installation.

Key-words: Mastication;Cephalometry; quality of life.

Lista de Abreviaturas

PT – Prótese Total

FM – Função mastigatória

PM – Performance mastigatória

LD – Limiar de deglutição

PF – Padrão Facial

AP – Ântero-Posterior

OM- Overdenture Mandibular

OHRQoL – Oral health-related quality of life

DIDL- Dental Impact in Daily Living questionnaire

Ponto S (S) – Centro da imagem da sela túrcida do osso esfenóide. Marca-se o entrecruzamento de seus dois longos eixos.

Nasio (N) – Ponto na parte mais anterior da sutura frontonasal.

Orbitário (Or) – Ponto mais inferior da órbita

Pório (Po) – Ponto mais superior na borda externa do meato acústico externo.

Espinha nasal anterior (Ena) – ponto mais anterior da maxila.

Ponto A (A) – é o ponto mais profundo na concavidade que vai da espinha nasal anterior (Spna) até o rebordo alveolar.

Ponto B (B) – é o ponto mais profundo na concavidade que vai do rebordo alveolar até o mento

Pogônio (Pg) – é o ponto mais anterior na imagem da sínfise mandibular.

Gônio (Go) – é o ponto de encontro com a bissetriz do ângulo formado pelas tangentes da borda posterior do ramo e a borda inferior do corpo da mandibular.

Gnátio (Gn) – é o ponto de encontro com a bissetriz do ângulo formado pela tangente à borda inferior do corpo da mandibular e uma perpendicular a este, tangente à parte mais anterior do mento.

Mentoniano (Me) – É o ponto mais inferior da sínfise.

Protuberância Mentoniana (Pm) – Ponto situado na cortical externa da sínfise no local onde a curvatura da borda muda de côncava para convexa.

Pterigóide (Pt) – Ponto póstero-superior da imagem da fossa pterigomaxilar.

Ponto Dc (Dc) – Ponto na linha Basio-Nasio médio aos limites anterior e posterior do colo do côndilo.

Basio (Ba) – Ponto mais inferior da margem anterior do forame magno.

Ponto Xi (Xi) – Ponto localizado no centro do ramo mandibular.

Via aérea supero-anterior (Vsa) – Ponto localizado na metade anterior do palato mole, na região mais próxima da parede posterior da nasofarige,

Via aérea supero-posterior (Vsp) – Ponto mais próximo do "ponto Vsa" localizado na parede posterior da nasofaringe.

Via aérea ínfero-anterior (Via) - Ponto situado na intersecção da borda mandibular com a borda posterior da língua.

Via aérea ínfero-posterior (Vip) – Ponto mais próximo do ponto (Via) localizado na parede posterior da faringe.

Sumário

1. Introdução

O edentulismo total afeta grande parte da população e é considerado um dos principais agravos à saúde bucal. Mesmo com os avanços terapêuticos na reabilitação de pacientes, as próteses totais convencionais ainda são consideradas tratamento base para os pacientes desdentados totais (CARLSSON & OMAR, 2010). Entretanto, os usuários de prótese total muitas vezes apresentam-se insatisfeitos, com dificuldades funcionais de mastigação, dor e ainda consequências na qualidade de vida relacionada à saúde oral (OHRQoL) (GEERTMAN et al., 1996). Isto pode ser justificado pelo fato de que há uma progressiva reabsorção do rebordo residual que ocorre com mais intensidade na mandíbula resultando em dificuldades de se obter próteses com condições adequadas de retenção e estabilidade (MARCELLO-MACHADO et al., 2016). Considerando estes problemas, e com a difusão do uso de implantes, as overdentures mandibulares são indicadas para reabilitação de desdentados totais (THOMASON et al., 2012). Seus benefíciosestão relacionados a melhora na função mastigatória, estabilidade das próteses, satisfação, e OHRQoL (BOVEN et al., 2015).

A função mastigatória e a OHRQoL em usuários de dentaduras podem ser mensurados por métodos que avaliam a eficácia e o impacto do tratamento com próteses totais (MARCELLO-MACHADO et al., 2016, SIVAKUMAR et al., 2015, WITTER et al., 2013, FONTIJN-TEKAMP et al., 2000).Os pacientes usuários de prótese total apresentam uma redução de 50 a 84% da capacidade mastigatória quando comparados com pacientes dentados (HEATH, 1982), o que resulta em um significativo prejuízo ao desempenho mastigatório destes pacientes (FONTIJN-TEKAMP et al., 2000, HELKIMO et al., 1977, VAN DER BILT, 2011). E, ainda, eles utilizam mais ciclos mastigatórios para preparar o alimento para engolir do que os indivíduos com uma dentição natural completa, afim de compensar esta reduzida capacidade mastigatória (FONTIJN-TEKAMP et al., 2000). E ainda, pela dificuldade e desconforto da mastigação, muitos desdentados totais deixam de ingerir alimentos saudáveis com nutrientes

específicos, ou seja, eles deixam de ingerir frutas e vegetais devido a maior consistência que estes apresentam o que pode resultar em risco para vários distúrbios de saúde (BOVEN et al., 2015). Sendo assim, o sucesso do tratamento com prótese total é dependente da retenção, estabilidade e estuturas de suporte adequadas (JACOBSON & KROL, 1983).

O padrão facial e a classificação ântero-posterior podem interferir no desempenho mastigatório do paciente, tendo em vista que a morfologia craniofacial é diretamente relacionada com os músculos da mastigação (THROCKMORTON&BELL, 1980; GARCÍA-MORALES et al., 2003). Para realizar esta comparação, é utilizado o traçado cefalométrico, que é uma ferramenta eficaz para o diagnóstico da forma craniofacial, e é importante pois auxilia no planejamento de futuros tratamentos, principalmente os reabilitadores (OCHIAI et al., 2011). Esta análise permite classificar o paciente de duas formas distintas, quanto ao crescimento facial (dólicofacial, braquifacial, mesofacial)e quanto à classificação ântero-posterior (classe I, classe II, classe III) (DOWNS, 1948).

Fazer a análise cefelométrica para obtenção dos tipos faciaisdos pacientes previamente à reabilitação permite ao clínico uma maior segurança no planejamento e uma melhor previsibilidade do tratamento, uma vez quecada tipo facial e cada classificação ântero-posterior apresentam diferentes dificuldades na execução do tratamento e ainda podem influenciar no desempenho mastigatório (OCHIAI et al., 2011).Ainda não está estabelecido na literatura qual o comportamento da função mastigatória, da OHRQoL e da satisfação de pacientes desdentados totais de acordo com o padrão facial e classificação ântero-posterior enquanto usuários de próteses totais e, durante a transição de tratamento com prótese total convencional para overdenture mandibular. Portanto, o objetivo deste estudo foi avaliar a influência do padrão facial e da classificação ântero-posterior da mandíbula na função mastigatória e na qualidade de vida de pacientes enquanto usuários de próteses totais e após a transição para overdentures mandibulares.

2. Projeto de pesquisa

2.1. Introdução

A perda dentária é um dos principais agravos à saúde bucal devido à sua alta prevalência. A destruição ou perda de dentes por cáries, doença periodontal ou traumatismo ocasiona uma série de problemas no sistema estomatognático, causando problemas funcionais, psicológicos, estéticos que interferem diretamente na qualidade de vida do indivíduo (SANDRES et al., 2007). Essa perda pode ser desde áreas pequenasenvolvendo um ou dois dentes até os casos mais extremos de desdentado total, onde o paciente apresenta ausência completa de dentes.

Este problema permeia diferentes populações, regiões, e classes sociais. As prevalências de uso de prótese total são influenciadas por sexo, raça/cor, escolaridade, necessidade de tratamento e local da última consulta odontológica (AZEVEDO et al., 2015). Apesar de atualmente estar bem estabelecido o preventivismo, de maneira histórica, o tratamento odontológico foi centrado na prática curativa e mutiladora, assim à população adulta e idosa tinha acesso apenas à serviços de urgências odontológicas, resultando usualmente em extrações dentárias. Por consequência disso, a população carrega até os dias de hoje a herança desta prática assistencial, que resultou em um elevado aumento da necessidade de prótese dentária (MOREIRA et al., 2005).

Segundo dados do SB Brasil 2010, divulgados pelo Ministério da Saúde, cerca de 63,1% dos brasileiros com idade entre 65 e 74 anos utilizam prótese total em pelo menos uma das arcadas, tornando esta modalidade reabilitadora a primeira opção para tratamento em casos de edentulismo completo. (BRASIL 2011).

Assim a prótese total é um dos dispositivos que repõe os dentes e o volume alveolar perdidos em uma arcada totalmente edêntula (VOLPATO et al, 2012). As próteses totais convencionais, como forma de reabilitação, compõem

uma das práticas clínicas mais antigas da odontologia, seu propósito é de restabelecer de forma harmônica, a estética e a função perdida devido a ausência dos dentes naturais (DOMITTI et al, 1999). Porém, os usuários de próteses geralmente se queixam de desconforto e dificuldades para mastigar alimentos mais consistentes (ANDRADE & SEIXAS, 2006).

Isto pode ser justificado pelo fato de que com a perda dental há redução significativa da função mastigatória. Em média, os indivíduos com dentição incompleta, e, portanto, com uma performance mastigatória reduzida, utilizam mais ciclos mastigatórios para preparar a comida para engolir do que os indivíduos com uma dentição natural completa (FONTIJN-TEKAMP et al., 2004). Isso se deve ao fato de que eles tentam compensar a sua reduzida capacidade de mastigação, porém isto não os impede de engolir pedaços maiores de alimentos (VAN der BILT et al., 1993). E ainda, pela dificuldade e desconforto da mastigação, muitos desdentados totais deixam de ingerir alimentos saudáveis com nutrientes específicos, devido a maior consistência que eles apresentam o que pode resultar em risco para vários distúrbios de saúde (BOVEN et al., 2015).

Associado a isso, estudos recentes mostram que o padrão facial e a classificação esquelética de maloclusão do indivíduo podem influenciar o desempenho mastigatório (OCHIAI et al., 2011). Para realizar esta comparação, alguns trabalhos relataram utilizar o traçado cefalométrico através da telerradiografia para avaliar o padrão facial e a classificação de maloclusão e sua relação com a função mastigatória em pacientes usuários de prótese total.

A avaliação cefalométrica é uma ferramenta eficaz para o diagnóstico da forma craniofacial, e classificação esquelética de maloclusão, tendo em vista que ela utiliza pontos fixos para mensurar as medidas correspondentes de cada paciente, assim auxiliando no planejamento e tratamento de cada indivíduo (SARVE & PROFFIT, 2005; JACOBSEN, 2006). Os exames cefalométricos são as análises obtidas a partir de radiografias extra bucais de perfil lateral, axial e póstero-anterior da cabeça, em que a cabeça do paciente encontra-se estática e estabilizada através de olivas do aparelho de raio-x.

Para definição do padrão facial a partir da telerradiografia são obtidas medidas angulares, lineares ou, ainda, proporcionais. A classificação do padrão

facial proposto por Ricketts et al. (1983) e amplamente utilizado atualmente é a de que indivíduos com face longa e estreita são classificados como dolicofaciais, indivíduos com face curta e larga são considerados braquifaciais e um tipo intermediário são mesofaciais. Para a classificação esquelética da maloclusão, segundo Angle (1899), as medidas angulares do traçado cefalométrico são mensuradas para representar a relação maxilo-mandibular no sentido antero posterior. A classificação esquelética de maloclusão define como Classe I, o arco dentário inferior está em uma posição normal em relação à base craniana; Classe II, a mandíbula e o arco dentário inferior estão posicionados distalmente em relação à anatomia craniana); e Classe III, a mandíbula e o arco dentário inferior estão posicionados mesialmente em relação à maxila e à anatomia craniana.

Um fator adicional a ser considerado quando se avalia os efeitos da forma facial sobre a função mastigatória em pacientes desdentados totais seria a análise das vias aéreas e avaliação dos tecidos moles, uma vez que se constituem em medidas que podem ser determinadas no traçado cefalométrico. Fisiologicamente, acredita-se que a inserção da prótese total provoca deflexão da língua e do palato mole, o que afeta a permeabilidade das vias aéreas (PADMANABHAN et al., 2015). Somado a isso, a presença ou a ausência de prótese total pode alterar também a anatomia bucal, podendo exercer um papel crítico na manutenção da função da deglutição em pacientes edentados (FURUYA et al., 2015). Em especial, pessoas idosas apresentamexpansão da faringe, devido a redução do tamanho da laringe; este fato resulta em um alongamento da distância e da duração da elevação da laringe durante a deglutição faríngea. Portanto, o envelhecimento pode causar a redução da capacidade de reserva da deglutição (FURUTA et al., 2013; YAMAMOTO et al., 2013).

2.2. Proposição

Na população de desdentados totais ainda são escassos estudos que envolvam uma avaliação aprofundada entre as interações da forma facial, classe esquelética, tratamento protético e resultado funcional. A avaliação mais aprofundada dessas relações facilitaria aa estimativas do impacto clínico para

recomendações de futuros tratamentos, como a indicação de modificação na montagem de dentes ou reabilitações implantossuportadas (OCHIAI et al., 2011). Diante do fato de que estas relações ainda não estão claras em pacientes usuários de prótese totais (OCHIAI et al., 2011), este estudo avaliará o impacto das formas faciais na performance mastigatória e limiar de deglutição em pacientes usuários de prótese total**.** Considera-se importante este estudo devido a escassez de informações desta avaliação em países em desenvolvimento, além disto, os testes utilizados neste estudo para avaliar a função mastigatória são padronizados, diferente de outros que utilizam alimentos como cenoura e amendoim (OCHIAI et al., 2011).

2.3.Objetivos

2.3.1. Objetivo geral

Tendo em vista o elevado número de indivíduos desdentados totais, e o fato de que a perda dental pode influenciar na mastigação, o objetivo deste estudo é avaliar atravésda análise cefalométrica de telerradiografias de perfil as relações entre padrão facial e a classificação esquelética de maloclusão em relação à performance mastigatória e limiar de deglutição em indivíduos tratados com próteses totais.

2.3.2. Objetivos específicos

Avaliar a relação do padrão facial (braquifacial, mesofacial e dólicofacial) na performance mastigatória e limiar de deglutição em pacientes usuários de prótese total atravésda análise cefalométrica de telerradiografias de perfil.

Avaliar a performance mastigatória e limiar de deglutição em pacientes usuários de prótese totais com relações antero-posteriores compatíveis com classificações esqueléticas de maloclusão (Classe I, Classe II e Classe III), atravésda análise cefalométrica de telerradiografias de perfil.

2.4. Materiais e métodos

2.4.1.Tipo de estudo

Um estudo observacional prospectivo será conduzido a partir de dados

secundários dos pacientes atendidos na clínica de Prótese Total da Faculdade de Odontologia da Universidade Federal de Pelotas, Rio Grande do Sul, no período entre 2013 e 2015.

Os dados referentes à 65 pacientes serão avaliados, correspondentes a 18 homens e 47 mulheres, com idade entre 47 e 88 anos. Avaliação cefalométrica será realizada através das telerradiografias de cada indivíduo, após a reabilitação protética, a fim de obter as informações referentes ao tipo de padrão facial (braquifacial, mesofacial e dólicofacial) e padrão de maloclusão esquelético correspondente (Classe I, Classe II e Classe III) de cada paciente. Os testes de performance mastigatória e limiar de deglutição já foram realizados após 3 meses a instalação das próteses totais novas.

2.4.2. Função Mastigatória

2.4.2.1. Confecção do material teste mastigável

O material teste mastigável Optocal foi utilizado eo mesmo apresenta a seguinte composição: 58,3% de peso de Optosil, 7,5% de pasta de dente convencional, 11,5% de vaselina sólida, 10,2% de gesso comum, 12,5% de pó de alginatoe 20,8 $mg.g^{-1}$ de pasta catalisadora(POCZTARUK ET AL., 2008). Após a mistura dos componentes, o material foi depositado em uma encapsuladora, que consiste de um tabuleiro com orifícios de 5mm de diâmetro e 5mm de altura, obtendo-se o material mastigável nestas dimensões, em forma de cubos. Estes cubos depois de confeccionados foram levados diretamente à estufa por 16 horas a 65 °C, para garantir polimerização total e secagem. A seguir, o peso foi aferidoem balança analítica de 10^{-4}. Para cada teste mastigatório, foram utilizadas 3,7 gramas de cubo para cada indivíduo, totalizando o volume de aproximadamente 18 cubos.

2.4.2.2. Procedimento Clínico

Os testes da função mastigatória foram realizados após a instalação e adaptação das novas próteses totais convencionais superior e inferior.Os voluntários foram posi.cionados em cadeiras odontológicas de maneira

confortável, para não ocorrer alteraração no processo de trituração do material-teste. Os testes foram realizados após 3 meses a instalação das próteses totais novas.

2.4.2.3. Teste para Performance Mastigatória

Os pacientes foram orientados a mastigar naturalmente 3,7 gramas do material teste, aproximadamente 18 cubos por 40 ciclos mastigatórios e a não ingerir qualquer fragmento. Em seguida, realizaram bochechos com água e expeliram as partículas mastigadas em um copo com um papel filtro descartável de café.

2.4.2.4. Teste para o Limiar de Deglutição

Os pacientes foram orientados a mastigar naturalmente 3,7 gramas do material teste, aproximadamente 18 cubos até que sintam estar em condições de engolir e não ingerir qualquer fragmento. Em seguida realizaram bochechos com água e então expeliram o material triturado em um copo com um papel filtro descartável de café. Neste teste o tempo e o número de ciclos mastigatórios realizados é levado em consideração.

2.4.2.5. Análise dos testes

O conjunto (copo e filtro) de cada teste passou pelo processo de secagem em temperatura ambiente. Então após a secagem iniciou-se o processo de tamisação com oito peneiras de diâmetros de malha de 5,6, 4,0, 2,8, 2,0, 1,4, 1,0, 710 e 500mm, dispostos em ordem decrescente de abertura e acoplados a um agitador. Os fragmentos foram colocados no primeiro tamis e o conjunto permaneceu sob vibração durante 20 minutos, de maneira que os fragmentos, de acordo com as respectivas dimensões, passassem progressivamente para as peneiras de menor diâmetro. Após a tamisação as partículas retidas em cada peneira foram a pesadas separadamente. Os valores do peso das partículas foram convertidos em volume pela formula de

Rosin-Rammler: $Q_w^-(X) = 1 – (2^{-X/X_{50}})^b$, na qual “Qw”é a porcentagem do peso cumulativo das partículas, ou seja, a porcentagem das partículas com diâmetro menores que X. O ”X” representa a abertura da maior peneira e “X50”a abertura “teórica” da peneira pela qual 50% do peso das partículas mastigadas podem passar. Considerando-se que o diâmetro da malha da peneira se relaciona com o tamanho da particular mastigada, a variável X50 é considerada como determinante do tamanho mediano das partículas mastigadas, que representa a performance mastigatória. Assim, quanto menor o tamanho mediano, melhor é a performance. O “b” é a variável que descreve a amplitude da distribuição das partículas ao longo das peneiras. Os dados referentes aos pesos das partículas retidas em cada peneira foram transferidos ao software de análise estatística “SPSS” para determinação do valor do X50, usando-se o teste de regressão não linear com a inserção da equação de Rosim-Rammler.

2.4.3. Avaliação Cefalométrica

A telerradiografia lateral de cada paciente foi realizada sem as próteses, utilizando o aparelho Rotograph Apparatus Plus, com um sistema de imagem digital através de sensores para o software Dentascan, operada por um técnico. As análises das telerradiografias serão realizadas por um radiologista treinado e calibrado. Esta avaliação utilizará o software CefX (Cefalometria Computadorizada, CDT Informática LTDA, São Paulo, Brasil)versão 4.5.10. Cada imagem será calibrada no programa para o tamanho do software e serão avaliadas em duplicata para diminuição dos possíveis erros. Este software leva em consideração sexo e idade de cada paciente.

2.4.3.1. Determinação do padrão facial

Existem diversas análises disponíveis para determinação do padrão facial, e muitas destas análises apresentam divergências entre si, sugerindo que uma simples variável não é suficiente para compreender as diferenças entre os tipos faciais (Benedicto et al., 2011). Assim, este estudo utilizará três tipos de avaliações, a análise de Ricketts, o método de Riedel e o método de

Tweed, as quais utilizam mensurações e ângulos diferentes para determinação da forma facial.

2.4.3.1.1. Análise de Ricketts

Cinco variáveis angulares são levadas em consideração:

Ângulo do eixo facial (N-Ba).(Pt-Gn)

Ângulo formado pela linha básio-násio com a linha que parte do ponto pterigoide até o gnátio cefalométrico, medido na parte posterior do ângulo. A norma é de 90°, com desvio padrão de ±3°(figura 1).

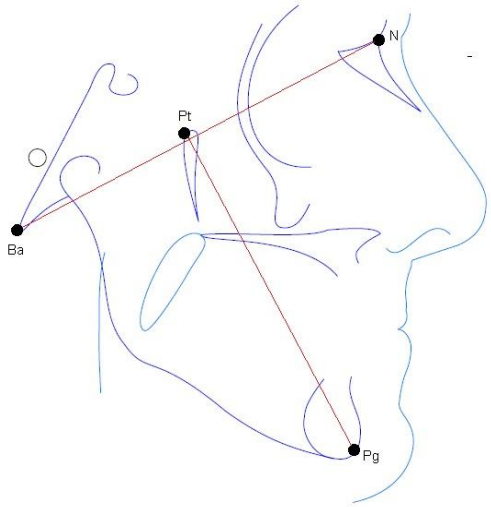

Figura 1. Ângulo do eixo facial, formado pelos planos N-Ba e Pt-Gn.

Ângulo facial ou profundidade facial (Po-Or).(N-Pg)

Ângulo formado pelo plano de Frankfurt (Po-Or) e pelo plano facial (N-Pg). O valor normal é de 87°, com desvio padrão de ±3°(figura 2).

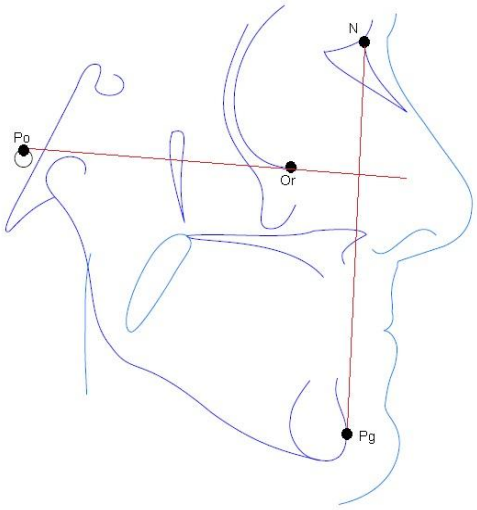

Figura 2. Ângulo facial, formado pelos planos Po-Or e N-Pg.

Ângulo do plano mandibular (Go-Me).(Po-Or)

Formado pelo plano horizozntal de Frankfurt (Po-Or) e pelo plano mandibular (Go-Me); A norma é de 26° com desvio padrão de ±4(figura 3).

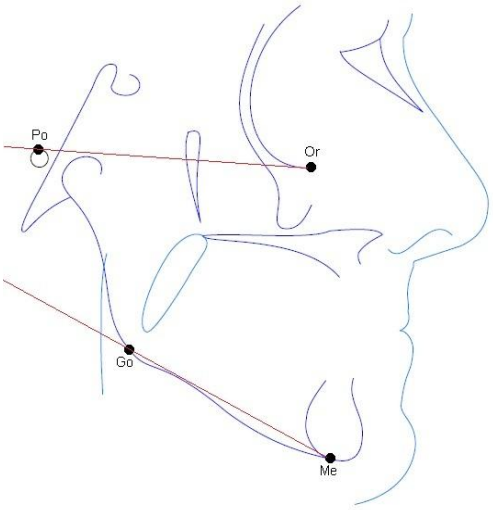

Figura 3**.**Ângulo do plano mandibular, formado pelos planos Go-Me e Po-Or.

Altura do terço inferior da face (Xi-ENA). (Xi-Pm)

Ângulo formado pelos planos Xi-ENA e Xi-PM. A norma é de 47° com desvio padrão de ±4°(figura 4).

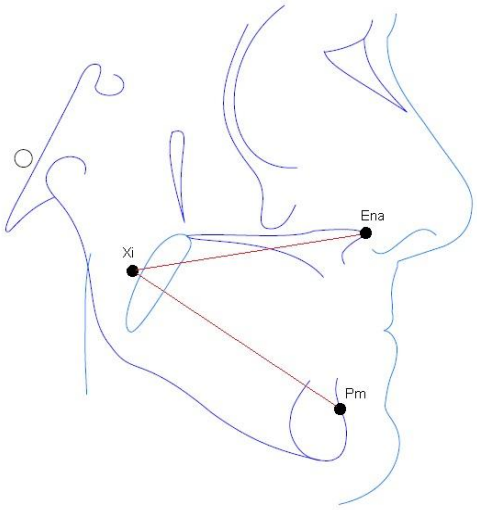

Figura 4. Altura do terço inferior da face, ângulo formado pelos planos Xi-ENA e Xi-Pm.

Arco mandibular (Dc-Xi).(Xi-Pm)

Ângulo formado pelo eixo do corpo mandibular (Xi-Pm) e pelo eixo condilar (Dc-Xi). A norma é de 26°, com desvio padrão de ±4(figura 5).

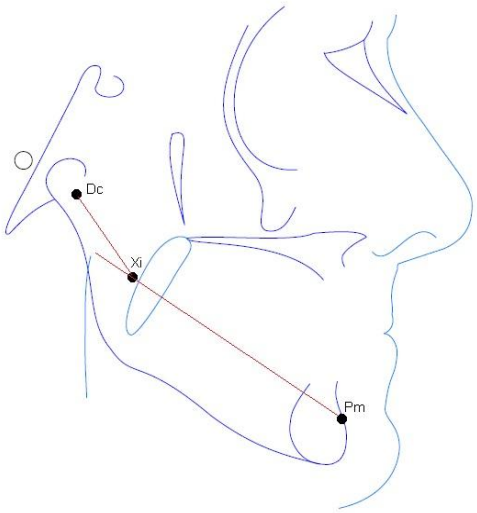

Figura 5. Arco mandibular, ângulo formado pelos planos Dc-Xi e Xi-Pm.

Os tipos faciais dos pacientes serão determinados pelo valor das medias aritiméticas dos desvios-padrão encontrados para estes fatores.Obtidos os valores dos ângulos do paciente pode-se calcular o índice VERT, calculando a norma individualizada para cada ângulo. Depois de estabelecida a diferença entre o valor encontrado e a norma individualizada, divide-se o valor encontrado pelo desvio clínico (que varia de acordo com o ângulo). O resultado é colocado na curva de Gauss e é atribuído um sinal positivo quando o valor

indicar uma tendência braquifacial de crescimento, ou negativo quando o valor encontrado indicar uma tendência dolicofacial (Ricketts, et al., 1983).

2.4.3.1.2. Método de Riedel(S-N).(Go-Gn)

Ângulo formado entre o plano SN e o plano mandibular GoGn. A norma é de 32° com desvio padrão de ±5°(figura 6).

Obtido os valores dos ângulos do paciente temos que se este for menor que 27° o paciente é classificado como braquifacial, de 27° a 37° é considerado mesofacial e maior que 37° é classificado como dólicofacial.

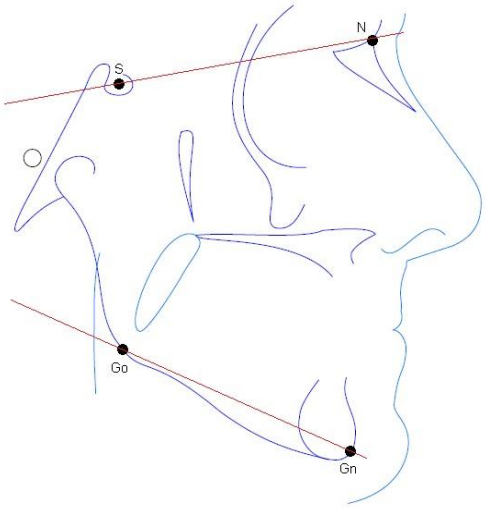

Figura 6. Critério de Riedel, ângulo formado pelos planos S-N e Go-Gn.

2.4.3.1.3. Método de Tweed

FMA (Po-Or).(Go-Me)

Ângulo formado entre o plano de Frankfurt (Po-Or) e o plano mandibular (Go-Me). A norma é 25° com desvio padrão de ±5° (figura 7).

Com os valores dos ângulos obtidos, o paciente que apresentar ângulo menor que 20° é considerado braquifacial, de 20° a 30° mesofacial e maior que 30° é classificado como dólicofacial.

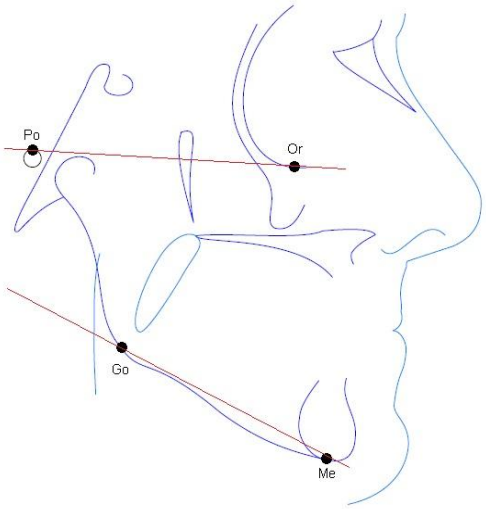

Figura 7. Critério de Tweed, ângulo formado pelos planos Po-Or e Go-Me.

2.4.3.2. Determinação da Classificação esquelética de maloclusão

Será utilizado como base a classificação de Angle, o relacionamento da maxilla e da mandibula em relação à base do crânio, este é o método mais utilizado para avaliar esta associação. Três variáveis de medição dos ângulos através da telerradiografia serão utilizados:

SNA

Ângulo formado entre os planos S-N e N-A. Mostra a posição antero-posterior da maxilla em relação à base do crânio. Com valores abaixo e 80° o paciente apresenta maxilla retruida, valores entre 80° e 84° considera-se normal, e valores maiores que 84° classificam como maxilla protuida. A norma é de 82°, com desvio padrão de ±2°(figura 8).

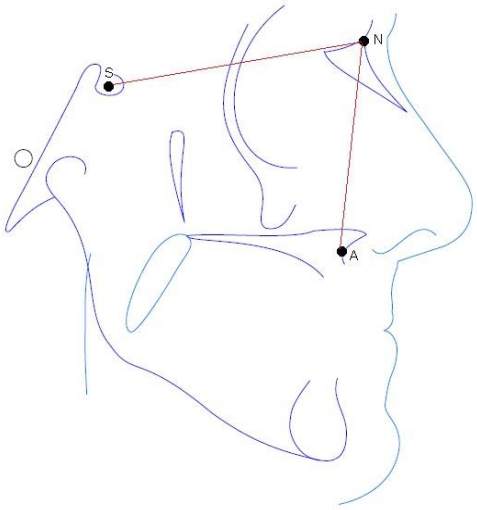

Figura 8. SNA,ângulo formado pelos planos S-N e N-A.

SNB

Ângulo formado entre os planos S-N e N-B. Mostra a posição antero-posterior da mandibular em relação à base do crânio. Angulos menores que 78° são considerados como mandibular retruída, valores entre 78° e 82° são considerados normais e valores acima de 82° são classificados como mandibular protruida. A norma é de 80° com desvio padrão de ±2° (figura 9).

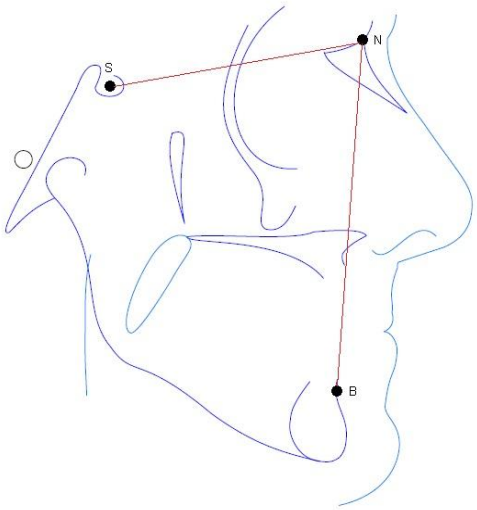

Figura 9. SNB,ângulo formado pelos planos S-N e N-B.

ANB

Ângulo formado entre as linhas N-A e N-B. Representa a relação maxilo-mandibular no sentido antero-posterior. Ângulos menores que 0°

sãoclassificados como Classe III, valores entre 0° e 4° são classificados como Classe I, e valores acima de 4° são classificados como Classe II. A norma é de 2° com desvio padrão de ±2°(figura 10).

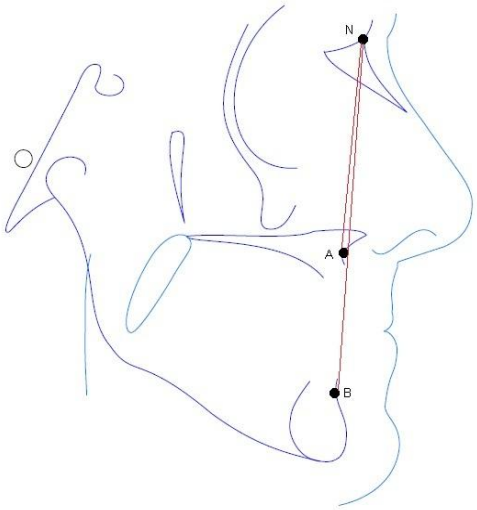

Figura 10. ANB, ângulo formado entre os planos N-A e N-B.

2.4.3.3. Análise das Vias Aéreas

Será avaliado os espaços aéreos nasofaríngeo e bucofaríngeo através da análise cefalométrica. A via aérea superior será mensurada através de uma medida linear para calcular o espaço entre os pontos Vsa e Vsp, a norma padrão é 19,98° com desvio padrão de ±4,3. Para a via aérea inferior a medida linerar será calculada entre os pontos Via e Vip, a norma padrão é 13,5° com desvio padrão de ±4,3. (figura 11).

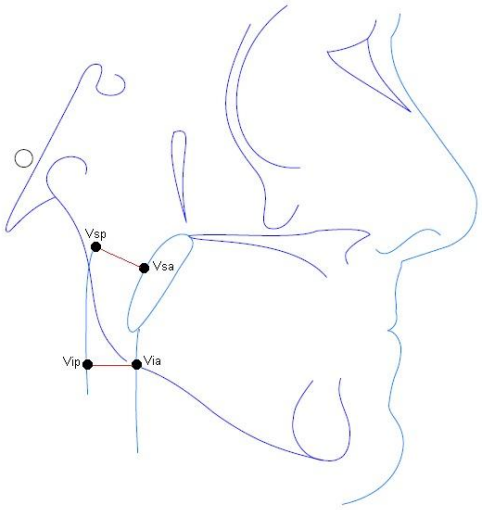

Figura 11. Medidas lineares para calcular as vias aéreas, formado entre os planos Vsa e Vsp e Via e Vip.

2.4.4. Análise Estatística

Os dados serão verificados em relação a normalidade, se estes se apresentarem com distribuição normal de Gauss, serão utilizados testes paramétricos. O Anova One Way com Post Hoc de Bonferroni, será realizado para avaliar o padrão facial e classificação de maloclusão, para verificar se há diferença entre eles e onde encontra esta diferença. Se os dados forem com distribuição anormal, serão utilizados os testes não paramétricos equivalentes.

2.5. Orçamento

Tendo em vista que este estudo é a partir de dados secundários dos pacientes atendidos na clínica de Prótese Total da Faculdade de Odontologia da Universidade Federal de Pelotas, não será necessário auxilio financeiro para ser executado.

2.6. Cronograma

Atividades	Ano/Mês								
	2015		2016						2017
	Ago/Set	Out/Nov/Dez	Jan/Fev	Mar/Abr	Mai/Jun	Jul/Ago	Set/Out	Nov/Dez	Jan/Fev
Revisão da Literatura	X	X	X	X	X	X	X	X	X
Elaboração do Projeto		X	X						
Qualificação			X						
Organização do banco de dados				X					
Análise dos Dados					X	X			
Redação da Dissertação						X	X	X	
Defesa/Submissão do Artigo									X

3. Relatório do trabalho de campo

Neste capítulo estão relatadas as complementações e as alterações baseadas no Projeto de Pesquisa o qual foi aprovado pelo exame de qualificação em 29 de fevereiro de 2016. A execução deste estudo observacional seguiu a metodologia previamente descrita, entretanto foi acrescentado a avaliação da qualidade de vida relacionada a saúde oral (OHRQoL) e satisfação dos pacientes através de uma análise subjetiva aplicada pelo questionário Impacto Dental na vida diária (DIDL). Foi avaliado também pacientes durante a transição de próteses totais convencionais para overdentures mandibulares.

Este estudo gerou a redação de dois artigos científicos intitulados: Influence of facial parameters on masticatory performance and perception of quality of life in patients with complete dentures", e "How the facial patterns can influence the masticatory function in edentulous patients during the transition between CD to MO?", que abrangeu em seus resultados a avaliação dos tipos faciais em relação a função mastigatória, OHRQoL e satisfação de pacientes enquanto usuários de próteses totais e durante a transição para overdentures mandibulares.

Ao total 56 pacientes participaram do estudo, para o artigo da avaliação de pacientes durante a transição para overdentures, todos pacientes foram convidados a participar, porém, apenas 42 entraram nos critérios de inclusão.

Os resultados encontrados mostraram que, enquanto usuários de próteses totais, pacientes dolicofaciais possuem uma performance mastigatória superior aos braquifaciais, os pacientes Classe III apresentam capacidade reduzida de homogeinizar o alimento teste, e o domínio do DIDL que mais impactou foi a aparência. Após a transição para overdentures mandibulares, estas demonstraram impactar positivamente na OHRQoL e satisfação de desdentados totais independentes do padrão facial ou relação ântero-posterior, e quanto à função mastigatória, os pacientes braquifaciais foram os menos beneficiados pela instalação das overdentures mandibulares.

3.1. Comitê de Ética

Oestudo que foi utilizado para obtenção dos dados secundários foi aprovado pelo Comitê de Ética em Pesquisa da Faculdade de Medicina da Universidade Federal de Pelotas sob o parecerN° 69/2013 (Anexo A).

4. Artigo 1

Influence of facial patterns on masticatory performance and quality of life perception in patients with complete dentures

Running title: Masticatory performance according to facial patterns

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[§]Artigo formatado segundo as normas do periódico Journal of Prosthodontics.

Abstract

Purpose: This study evaluated the influence of the Facial Type (FT) and the Anteroposterior (AP) mandible positioning of complete denture (CD) wearers on the Masticatory Performance (MP), oral health-related quality of life (OHRQoL), and satisfaction levels.

Materials and methods: Fifty-six totally edentulous patients (17 men and 39 women) were included in this cross-sectional observational clinical study. The cephalograms were performed prior to rehabilitation, in the physiologic rest position of the mandibula. The FT was determined through Ricketts analysis, while the AP skeletal classification was based on the relationship between the maxilla and the mandible and the base of the skull. The MP was evaluated using the multiple sieves method to determine the following parameters: X50, MPB, EM 5.6. EM 4.0, and EM 2.8. The OHRQoL and the satisfaction of the CD wearers were measured by applying the dental impact on daily living (DIDL) questionnaire. The data were analyzed using the Kruskal-Wallis test ($p<0.05$).

Results: Dolichofacial patients had significantly better MP scores than the brachyfacial ones, showing PMX50 values that were 17% smaller, 40% higher PMB values indicating more homogeneous particle size reduction, and EM 2.8 values that were 55% higher, respectively ($p<0.05$). Class I patients obtained 37% higher PMB values than Class III patients ($p<0.05$). Dolichofacial patients had high OHRQoL scores that displayed a significant difference with the scores of mesofacial patients in the appearance, eating and chewing domains($p<0.05$). The scores in the appearance and general performance domains of the Class III patientsimproved significantly after treatment. The mesofacial patients reported the highest satisfaction levels of the FT groups, with scores of 100% and 95% in the appearance and general performance domains, respectively. The Class III patients reported the highest overall satisfaction levels (89%), and Class I patients reported 83% satisfaction in the general performance domain.

Conclusion: Dolichofacial edentulous patients have a superior MP compared to brachyfacial ones. The Class III patients show a reduced capacity to homogenize the artificial food. The FT classification showed the strongest relation with the appearance and eating and chewing domains, while the AP skeletal discrepancy showed the strongest link with the appearance and general performance domains of the DIDL.

Keywords: cephalograms, dental impact on daily living, edentulous patients, facial types, mandibular position, masticatory performance, satisfaction levels

Introduction

Edentulism has many harmful consequences for oral and general health (1). Even with the recent therapeutic advances in rehabilitation of totally edentulous patients, conventional complete dentures (CD) are still considered the main treatment for those patients (2). However, complete denture wearers experience the adverse effects of edentulism that result in functional deterioration, such as the harm to masticatory function, alteration of the soft tissues profile, pain during functioning of the CD. All these functional alterationsimpact the quality of life of complete denture wearers (1,3). Many studies show that CD wearers evaluate their oral health, functional domains, psychosocial and facial appearance as poor (4–6). These results are reflected by the low satisfaction and quality of life associated with this prosthetic treatment.

The masticatory function and the oral health-related quality of life (OHRQoL) in denture wearers can be measured through methods that evaluate the efficacy and impact of the CD treatment (4,7–9). These methods consist in objective evaluations, such as masticatory function tests with artificial food, and subjective evaluations involving questionnaires. The masticatory capacity of CD wearers is significantly impaired (9–11), and tends to be 50% to 84% lower than in dentate patients (12). Their bite force is also reduced by 20% (13) and they need seven times more masticatory cycles than dentate patientsto reduce the size of their food by half (9). Furthermore, the reduced masticatory function can also generate structural changes in the muscles of mastication (14,15). Thus, the success of the CD rehabilitation depends on adequate retention, stability, and support structures. Their morphology should take into account the shape of the residual ridge, mucous tissue, and the musculature adjacent to the dentures (16).

The facial type of the patient also interferes directly with the stability and support of complete dentures. As the craniofacial morphology is directly related to the masticatory muscles kinetics (18,19), and exercises an important influence on the masticatory capacity (17). Cephalometric analysis using radiographic profiles is important to diagnose the craniofacial form and can help to plan future treatments. Radiographic profiles enable morphologic evaluation of the mandible in the sagittal plane, and allow to determine the mandible’s anteroposterior (AP) position in relation to the base of the skull (17). Chaconas

(20) suggested that the facial type obtained through cephalometric analysis must be observed during installment of artificial teeth; the tongue position must be considered for dolichofacial patients, in order to produce dentures that are stable and operate in harmony with the neuromuscular forces. Likewise, an appropriate vertical dimension must be obtained for brachyfacial patients, as these patients typically have strong masseter activity, and a tendency for mandibular overload and potential temporomandibular dysfunction (20).

During masticatory function, mandible movements can be influenced by the inclination of the occlusal plane (21). The trajectory of the masticatory closing in the sagittal plane maintains a relationship perpendicular to the occlusal plane (21). A smaller angle of the mandibular plane formed by the Frankfurt plane and the mandibular plane thus results in higher muscular activity and bite force for individuals with a brachyfacial profile compared to those with a dolichofacial profile, who have a larger mandibular plane angle (22–25). It is well-established that the bite force and masticatory function are intimately connected, and that patients with higher bite force crush the food better (9).

Anteroposterior misalignment of the mandible may result in faulty mastication, because mastication relies on interocclusal contacts. It is proven that patients with malocclusions have a reduced masticatory performance (26,27). During masticatory performance tests, dentate individuals classified as Class II and Class III showed a 15–34% larger particle size than Class I individuals (27). An improvement in masticatory performance and ability was also observed after orthognathic treatment for dentofacial deformities (Class II and Class III) (17,28,29).

The relationship between facial morphology and oral functions is well-established in specialized literature (6). However, there is still a lack of studies that investigate how the different facial types and the maxillomandibular positioning relate to the functional performance of complete dentures in edentulous patients. These data have substantial importance for planning rehabilitation with complete dentures that are tailored to the characteristics of each facial type. Furthermore, it allows establishment of a more specific prognostic that relates to the masticatory function. Therefore, this study aims to evaluate the influence of the facial type and the AP mandible alignment on the

masticatory performance and quality of life of complete denture wearers. The null hypothesis was that different facial types in vertical and AP skeletal discrepancy do not influence the masticatory function, the OHRQoL and the satisfaction levels of complete denture wearers.

Materials and methods

Experimental design

This cross-sectional observational clinical study was conducted using secondary data from patients that attended the Complete Dentures Clinic at the School of Dentistry in the Federal University of Pelotas between 2013–2016. This study was approved by the Local Ethics Research Committee, protocol number 69/2013. The following inclusion criteria were applied: (1) patients have a good oral and general health, (2) wear new complete dentures for at least 3 months, and (3) are available to attend at the university clinics during prearranged days. All volunteers that agreed with the terms of research signed an informed consent form. Cephalograms exams were then performed in the physiological rest position (30)to categorize the patients according to their facial type(FT) and their AP mandible alignment. The masticatory function test was subsequently performed to determine the masticatory performance, and the Dental Impact in Daily Living (DIDL) questionnaire was applied to evaluate the oral health related quality of life and satisfaction of each patient. The cephalometric analysis allowed categorization of the patients into brachyfacial, mesofacial, and dolichofacial patients according to their FT (31), and into Class I, Class II, and Class III, according to the angle of the mandibular plane and the AP mandible positioning (32).

Cephalometric evaluation

The lateral teleradiography of each patient was conducted with a Rotograph Apparatus Plus instrument equipped with digital imaging sensors and operated by a licensed technician; image processing was performed with the Dentascan software. The radiologic analyses were conducted in duplicate by two trained and calibrated radiologists, using CefX version 4.5.10 (Cefalometria Computadorizada, CDT Informática LTDA, São Paulo, Brasil).

The FT were determined through Ricketts analysis and classified as brachyfacial, mesofacial and dolichofacial according to the following five angles: (1) facial axis, (2) facial depth, (3) mandibular plane, (4) height of the inferior third of the face, and (5) mandibular arch (Fig. 1; 31). The average values of these five angles are combined in the VERT index, found by comparing the obtained values with the individual standard. The result was then divided by the clinical deviation, which varies for the different angles. The obtained value was

inserted in a Gauss curve and received a positive sign when it tended toward brachyfacial, or a negative sign when it tended toward dolichofacial growth (31).

The AP positioning of the mandible was analyzed using the SNA and SNB angles, which characterize the position of the maxilla and mandible in relation to the base of the skull, and the ANB angle that characterizes the maxillomandibular relation in the anteroposterior direction. Patients that showed negative angles were classified as Class III, while values between 0º and 4º were classified as Class I, and values above 4º were classified as Class II (Fig. 2; 32).

Masticatory function

The Masticatory Performance (MP; 9,33)test was conducted to evaluate the masticatory function, through chewing of artificial “Optocal” test food. The test food consisted of a mixture of condensed silicon, alginate, common plaster, dentifrice, Vaseline, and catalyst paste. That mixture was inserted in a cubic stainless-steel mold with sides of 5.6 mm to produce standardized cubes (34). The patients were instructed to chew 3.7 grams of the test material (17 cubes) for 40 masticatory cycles without swallowing any fragment. The chewed material was subsequently expelled in a cup with a paper filter, and the patients rinsed their mouth to recuperate any fragments that got stuck in their dentures. The material was then dried at room temperature for 7 days, and sieved using stacked sieves with meshes between 5.6 mm and 0.5 mm (9).

The particles retained in each of the sieves were weighted separately in a precision balance, and the obtained value was converted through the Rosin-Rammler method, which determines the mean size of the chewed particles based on the theoretical opening of the sieve through which 50% of the chewed particles would pass (X50). The equation also provides a “B” index, (MPB) that describes the amplitude of the particle distribution along the different sieves, and thus indicates the homogeneity of the mastication. The masticatory efficiency was calculated via the volume retained in the 5.6 (EM 5.6), 4.0 (EM 4.0) and 2.8 (EM 2.8) mm meshes.

Dental Impact in Daily Living questionnaire (DIDL)

The analysis of oral health related quality of life (OHRQoL) and patient’s satisfaction was conducted by applying the DIDL questionnaire. The DIDL is composed of 36 question divided across 5 domains: appearance, pain, oral

comfort, general performance, and eating and chewing. This evaluation measured the dental impact of each domain on their daily lives, and the patient's degree of satisfaction (35). The possible answers are agree, neutral or disagree, scored as +1, 0, and -1, respectively. The scores for each domain are then averaged, and the patients are classified as dissatisfied (>0), relatively satisfied (0 – 0.69), or satisfied (0.7 – 1), according to their mean score.

Statistical analysis

The data were initially subjected to descriptive analysis and the normality of the data distribution was tested with the Shapiro-Wilk test. The kurtosis, skewness, and overdispersion of the distribution were also calculated. The data distribution violated the normal distribution, indicating nonparametric tests for data analysis. The Kruskal-Wallis test was used to compare the outcome variables between the different FT and AP classifications. The adopted significance level was 5%, and the analyses were conducted using the Stata 14.1 software (StataCorp., College Station, TX, USA).

Results

The sample population consisted of 56 completely edentulous patients, 17 men and 39 women, with an average age of 67.1 years. The mean time of edentulism was 30 and 24.2 years for the maxilla and the mandible, respectively. The FT classifications indicated that 34% of the patients were dolichofacial (11 women and 8 men), 30% were brachyfacial (12 women and 5 men), and 36% were mesofacial (16 women and 4 men). The sample population consisted of 21% Class I patients (7 women and 5 men), 29% Class II patients (10 women and 6 men), and 50% Class III patients (22 women and 6 men).

Figure 3 shows the results of the evaluated MP outcomes according to the FT classifications. Dolichofacial patients had significantly better MP scores than brachyfacial patients Their X50 was 17% lower and EM 2.8 was 55% higher, indicating more effective particle size reduction, while 40% higher B values indicate a more homogeneous particle size reduction. The masticatory performance outcomes of the mesofacial group were not significantly different from those of the dolichofacial or brachyfacial patients ($p>0.05$).

Figure 4 shows the MP outcomes according to the AP positioning of the mandible. A significant difference ($p>0.05$) can be seen only among Class I and Class III patients for the masticatory outcome b. Class III patients have a b value that is 37% lower. The masticatory outcomes of Class II patients showed no significant differences with the other groups ($p>0.05$).

Table 1 lists the results of the DIDL questionnaire domains according to the FT classifications. The scores of dolichofacial patients in the appearance and in the eating and chewing domains where significantly lower ($p<0.05$) than the scores of mesofacial patients. Brachyfacial patients on the other hand did not show any difference with mesofacial patients in those domains. When comparing the outcomes of the DIDL questionnaire according to the AP positioning of the mandible (Table 1), Class III patients presented significantly higher scores ($p<0.05$) in the appearance and general performance domains than Class I and Class II patients.

Brachyfacial patients showed higher satisfaction indexes in the appearance (71%) and general performance (47%) domains, and more pronounced dissatisfaction in the eating and chewing (41%) and oral comfort

(35%) domains. Mesofacial patients were most satisfied regarding their appearance (100%) and general performance (95%), and dissatisfied with eating and chewing (45%) and oral comfort (50%). Dolichofacial patients had the highest satisfaction scores in the general performance (58%) and appearance (53%) domains and showed dissatisfaction in the eating and chewing (37%) and oral comfort (32%) domains. When comparing satisfaction across the various AP positioning of the mandible(Figure 6), Class I patients were most satisfied with the general performance (83%) and appearance (83%) and most dissatisfied with oral comfort (58%) and eating and chewing (33%). Meanwhile, Class II patients reported the highest satisfaction rates in the general performance (63%) and pain (63%) domains, and were dissatisfied regarding the eating and chewing (38%), appearance (19%), and oral comfort (19%) domains. Lastly, Class III patients were satisfied with the appearance (89%) and general performance (64%) domains, and dissatisfied regarding eating and chewing (43%) and oral comfort (43%).

Discussion

The relationship between the masticatory performance and skeletal classifications in patients using complete dentures is not well-established in the current literature. The results of this study emphasize the importance of those relations for oral functioning, and for the establishment of adequate prognostics during the rehabilitation of these patients. The null hypothesis was rejected, since the difference among facial types, both in vertical and anteroposterior directions, interfered with the masticatory performance and with the OHRQoL of the CD wearers evaluated in this study.

This clinical study showed that dolichofacial patients have a better masticatory performance in terms of X50, PMB and EM 2.8 than brachyfacial patients. Those results differ from the ones found by Ochiai *et al*. (2011), which evaluated the impact of facial forms, skeletal classification, residual ridge height, and masticatory function in patients with conventional complete dentures or implant-supported complete dentures. In their study, the authors did not find significant differences in the masticatory performance of dolichofacial, mesofacial, and brachyfacial patients. However, only approximately 7% of the evaluated patients were classified as dolichofacial and the methodology applied to evaluate the masticatory performance was different than the one used in the present study. Their study results also indicated that patients from the dolichofacial group have a higher alveolar ridge, both in the maxilla and in the mandible. Severe residual ridge resorption is considered to be the main factor causing poor retention and instability of conventional complete dentures (36). As dolichofacial patients have a higher alveolar residual ridge and this directly affects the retention and stability of the complete dentures, this could explain why the dolichofacial patients evaluated in this study have a superior masticatory capacity compared to the other FT types.

Nevertheless, according to Charconas (1986)(20), the dolichofacial patients present more difficulties for rehabilitation with CD. The excessive facial convexity and narrow nose cavities impair breathing of dolichofacial patients. Consequently, those patients have a tendency to breath orally, and push their tongue forward to open the oropharynx, which directly affects retention and stability of the dentures (20). In this study, these functional consequences did not interfere with the masticatory capacity of the patients post rehabilitation, as

the dolichofacial patients had a superior masticatory capacity compared to the brachyfacial group (X50 – 17%, PMB – 36%, EM 2.8 – 120%). The masticatory capacity of dolichofacial patients was also higher than that of the mesofacial patients (PMB – 19%, and EM 2.8 – 40%), although the latter values are statistically indistinguishable. The results could be related to the higher facial axis angle in dolichofacial patients, which generates more space to move the food bolus, resulting in a superior adaptation to the dentures.

It is important to note that the patients in this study, irrespective of the facial type, did not present a masticatory capacity that can be considered satisfactory or normal, according to the standards established by Witter *et al*. (2013). Those standards dictate that masticatory capacity can be considered satisfactory when the masticatory normative indicator (MNI) is ≤ 3.68 mm (8). In this study, the median X50 varied between 4.99 for dolichofacial patients and 6.07 for brachyfacial patients, values that are much higher than the MNI. Thus, it is still necessary to develop treatments to improve the masticatory capacity of CD wearers.

The present study also showed that the masticatory capacity of the patients did not depend on the AP positioning of the mandible , since there was no difference regarding the X50 outcome norregarding the quantity of retained material on the different sieves (EM 5.6, EM 4.0 and EM 2.8). However, Class I patients achieved a more homogeneous particle distribution. These results confirm the results from Ochiai *et al*. (2011), who evaluated treatment of edentulous patients with CD and implant-supported dentures. This study examined the MP through the mean volume of the chewed particles using peanuts and carrots as tests food. The results suggest that Class I patients achieved a smaller mean size for the chewed particles than the other evaluated groups, although this difference was not significant. However, it was noted that the homogenization of the chewed particles was significantly impaired in Class III patients compared to the others groups. Another study by English *et al*. (2002) evaluated the relation between MP and the AP positioning of the mandible, however, in a dentate population and described similar results as found in our study also demonstrating that Class I patients achieved a significantly lower chewed particles sizecompared to Class III patients. Taking into account the few data available to describe the masticatory parameters

related to the mandible misalignment in edentulous patients, we believe that masticatory capacity after CD rehabilitation is independent of the AP mandible misalignment, since the skeletal discrepancy is corrected during the setting of the artificial teeth during the new CD confection. At this stage, successful CD treatment seeks to achieve a Class I type occlusion, when the compensation of the skeletal discrepancy is possible and tolerable for the patient, which allows a better masticatory function.

In the DIDL questionnaire, dolichofacial patients presented inferior scores for the eating and chewing, and appearance domains compared to the mesofacial patients. The dolichofacial patients showed the lowest satisfaction of all groups for the appearance domain (26%). Those results may be explained by the characteristics of the dolichofacial type, as the decrease in muscular strength for the dolichofacial patients can be explained by the frequently occurrence of poor occlusal stability and open bites (37). Even after rehabilitation with dentures and although their MP was superior to the MP of brachyfacial patients, the dolichofacial patients reported a low satisfaction regarding the eating and chewing domain. That result could be related to the prior experience of these patients with CD.

The Class III patients reported the higher DIDL scores for the appearance, and general performance domains than Class I and Class II patients. The Class III group also contained the highest percentage of satisfied individuals (89%) regarding the appearance domain. As described by Ashy *et al*. 2012, edentulous Class III patients require a complex denture rehabilitation due to their skeletal condition. They frequently exhibit considerable occlusal stress over the residual ridge, which results in an excessive resorption of the alveolar ridge (28). Our results suggest that designing CD with adequate confection parameters can result in a considerable improvement in self-perception of their appearance for these patients. This is because adequate treatment results in a considerable improvement in facial aesthetics. The vertical dimension of Class III patients is reduced over time due to wear of the dentures and the continuous resorption of the alveolar ridge, resulting in a protruding mandible during functioning, giving the impression that the nose is too close to the chin (26). Ciftici *et al*. (2005) recommend that Class III patients

are rehabilitated with a Class I maxillomandibular relationship to increase the vertical dimension (26).

It must be highlighted that the results of the OHRQoL of the present study show that while calculating the percentage mean for the satisfaction of all domains of the DIDL survey (Figure 5 and Figure 6), only mesofacial patients showed a mean satisfaction above 59%. Those data are comparable to those of Hantash *et al*. (2011), who show that more than 50% of the complete denture patients are not completely satisfied with their dentures. Furthermore, the oral comfort domain showed lowest satisfaction indexes, irrespective of the anteroposterior and the facial type classifications. The latter domain is thus the one with the strongest negative impact on the self-perceived OHRQoL of CD patients, independently of the facial type.

Cephalometric evaluation is a tool that help optimizing the rehabilitation treatment of edentulous patients. However, even with treatment options that improve the MP of CD users according to the FT and the AP positioning of the mandible, the desired improvement is generally not achieved. The latter could be related to the progressive resorption of the residual ridge, which is more pronounced in the mandible, and causes difficulties in denture retention, stability, and a dissatisfaction with the treatment (36,38). Hence, alternative treatments that can minimize those difficulties should be considered (39). Mandibular overdentures are an alternative treatment for the rehabilitation of patients with severe mandibular ridge resorption that present difficulty to adapt to complete dentures and are dissatisfied with this treatment (40,41). Overdentures can improve masticatory function, bite strength, satisfaction, and the life quality of the patients. In addition, they offer facial support, denture stability, use only a few implants for support, lowering the costs, and are easily removed by the patients, facilitating hygiene maintenance of the abutment and the denture (41–43).

The limitations of this study include the absence of masticatory evaluations such as bite strength, salivary flux, swallowing threshold test, mouth opening capacity, and residual ridge measurements. These analyses are important as they can further constrain the masticatory type of CD users. In order to improve the understanding of the masticatory capacity of complete denture users with different FT and mandible AP misalignment, more studies

are needed that use different methods for MF evaluation, include groups that allow the comparison between MF and OHRQoL outcomes amongst dentate and edentulous patients. Finally, parallel studies that follow patients facing rehabilitation options that modify the retention degree of the dentures, such as overdentures or implant-supported dentures, would also be interesting.

Conclusion

Completely edentulous dolichofacial patients have a masticatory function that is superior to brachyfacial patients in terms of particle size reduction and homogenization. Class III patients show a reduced capacity to homogenize the food bolus. The DIDL questionnaire shows that Class III patients report a larger positive impact on the OHRQoL and satisfaction for the appearance and general performance domains than Class I and Class II patients. Furthermore, dolichofacial patients report lower scores in the appearance and eating and chewing domains than the other groups.

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Table 1. Descriptive distribution of the general and specific data of the DIDL domains according to the Facial Type and the Anteroposterior Classification.

			Facial Type						Anteroposterior Classification					
Domains	NQ	PR	Brachyfacial (n=17)		Mesofacial (n=20)		Dolichofacial (n=19)		Class I(n=12)		Class II(n=16)		Class III(n=28)	
			M(SD)	Me(CI)	M(SD)	Me(CI)	M(SD)	Me(CI)	M(SD)	Me(CI)	M(SD)	Me(CI)	M(SD)	Me(CI)
Appearance	4	-1-1	0.79(0.42)AB	1 (-0.25;1)	0.81(0.51)A	1(-1;1)	0.63(0.52)B	1(-0.5;1)	0.54(0.68)A	1(-1;1)	0.59(0.55)A	1(-0.5;1)	0.91(0.26)B	1(0;1)
Pain	4	-1-1	0.38(0.59)A	0.5 (-1;1)	0.27(0.7)A	0.37 (-1;1)	0.39(0.70)A	-1(-1;1)	0.16(0.77)A	0.25(-1;1)	0.31(0.73)A	0.5(-1;1)	0.44(0.57)A	0.5(-1;1)
Oral Comfort	7	-1-1	-0.02(0.31) A	0.14 (-0.57;0.42)	0.01(0.49)A	0.07 (-1;0.71)	0.14(0.42)A	0.14(-1;1)	-0.08(0.38) A	0(-1;0.42)	0.11(0.42)A	0.14(-1;0.71)	0.06(0.43)A	0.14(-1;1)
General Performance	15	-1-1	0.59(0.49)A	0.8 (-0.73;1)	0.8(0.28)A	0.93 (-0.06;1)	0.72(0.30)A	0.86(-0.2;1)	0.67(0.31)A	0.8(0.06;1)	0.64(0.35)A	0.73(-0.2;1)	0.76(0.41)B	1(-0.73;1)
Eating and Mastication	6	-1-1	0.29(0.71)AB	0.33 (-1;1)	0.35(0.81)A	0.83 (-1;1)	-0.11(0.76)B	-0.33(-1;1)	0.18(0.78)A	0.41(-1;1)	-0.04(0.80)A	0(-1;1)	0.30(0.77)A	0.66(-0.2;1)

Different capital letters mean statistically significant difference on the intergroup comparisons. Abbreviations: NQ – number of questions; PR – possible reach; M – mean; SD – standard deviation; Me – median; IC – confidence interval

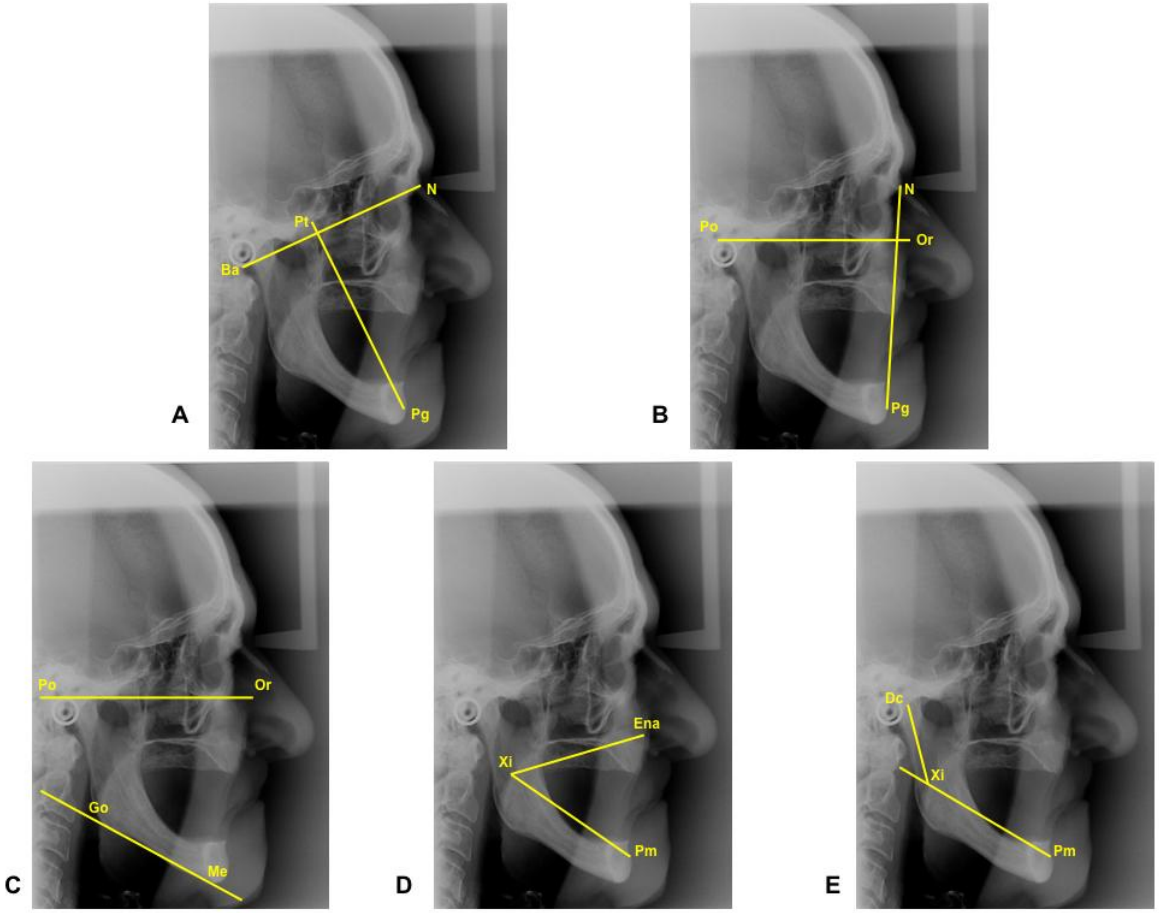

Figure 1. A – Facial axis angle: formed by the N-Ba and Pt-Pg planes; B – Facial depht: formed by the Po-Or and N-Pg planes; C – Mandibular plane angle: formed by the Go-Me and Po-Or planes; D – Facial inferior third height: angle formed by the Xi-ENA and Xi-Pm planes; E – Mandibular arch: angle formed by the Dc-Xi and Xi-Pm planes.

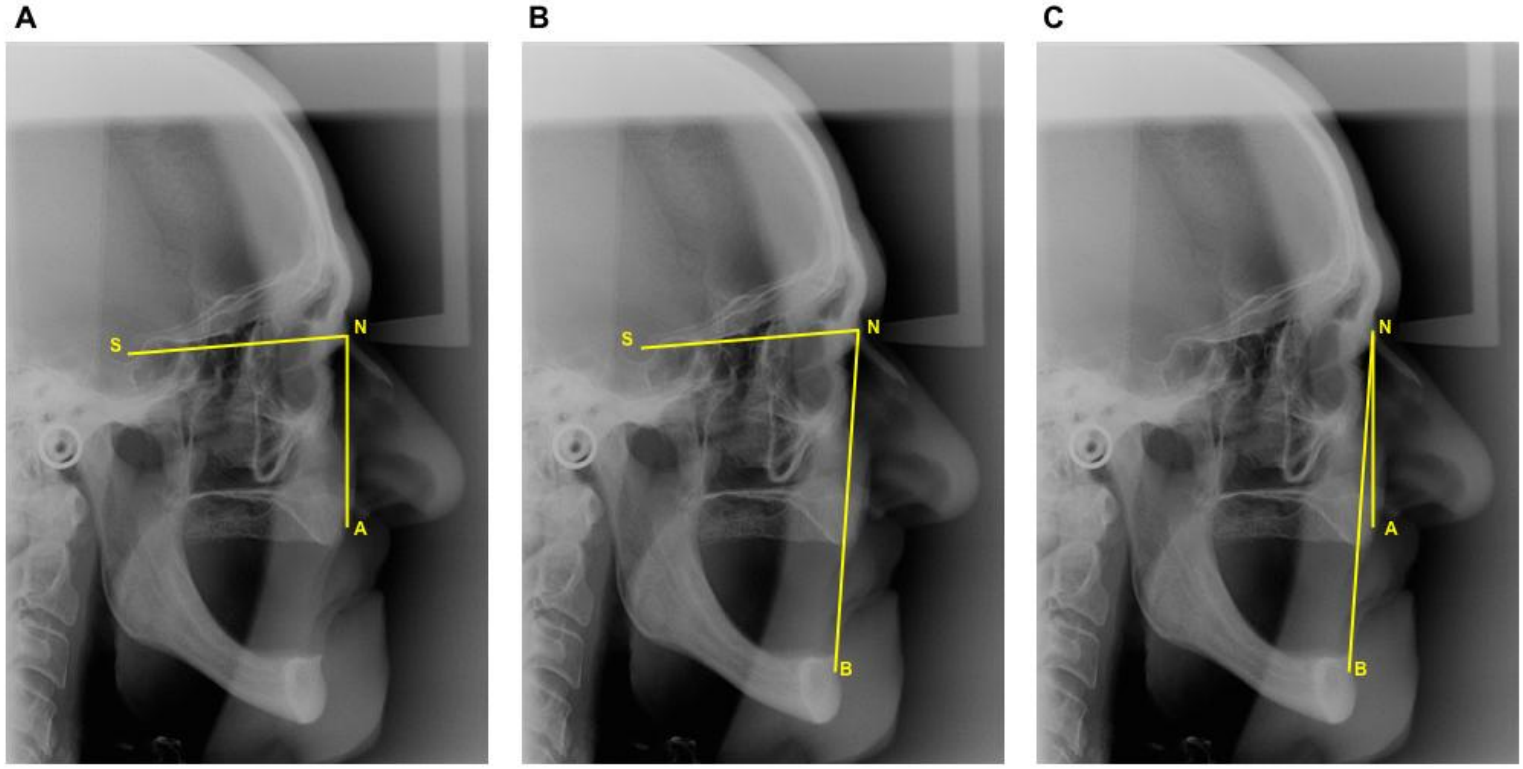

Figure 2. A- SNA: Shows the anteroposterior position of the maxilla in relation to the base of the skull; B – SNB: Shows the anteroposterior position of the mandible in relation to the base of the skull; C – ANB: Representation of the maxillomandibular relationship in the anteroposterior direction.

Facial Type



Masticatory outcomes	Brachyfacial	Mesofacial	Dolichofacial
	Median (CI)	Median (CI)	Median (CI)
MP X50	6.07(2.86;6.86)B	5.57(2.84;6.65)AB	4.99(2.81;7.11)A
MP B	7.11(2.27;26.66)B	5.47(1.98;18.04)AB	3.23(1.69;23.55)A
ME 5.6 (%)	61.82(0;96.58)A	41.14(6.12;88.67)A	46.84(5.72;94.82)A
ME 4 (%)	18.10(0.03;56.7)A	22.03(0.04;47.05)A	22.05(0;63.56)A
ME 2.8 (%)	3.68(0;25.1)B	7.34(0;34.68)AB	15.67(0.07;39.84)A

Figure 3. Median and reach observed for the comparison of the masticatory performance outcomes (X50, B, ME 5.6, ME 4.0 and ME 2.8) with the facial type (brachyfacial, mesofacial and dolichofacial) (Kruskal-Wallis, $p<0.05$ test). Different capital letters indicate statistically significant difference on the intergroup comparisons.

Antero-Posterior Classification



Masticatory outcomes	Class I (n=12)	Class II (n=16)	Class III (n=28)
	Median (CI)	Median (CI)	Median (CI)
MP X50	5.07(3.34;6.5)A	4.97(2.84;7.11)A	5.76(2.81;6.86)A
MP B	3.44(1.98;11.88)A	3.48(2.47;23.55)AB	6.58(1.69;26.66)B
ME 5.6 (%)	40.83(8.25;74.89)A	59.79(5.72;94.18)A	53.51(0;96.58)A
ME 4 (%)	24.28(10.85;40.93)A	19.49(0;63.56)A	20.48(0.03;56.7)A
ME 2.8 (%)	14.01(0;32.61)A	7.81(0.01;39.84)A	6.87(0;34.68)A

Figure 4. Median and observed reach for the comparison of the masticatory performance outcomes (X50, B, ME 5.6, ME 4.0 and ME 2.8) with the anteroposterior classification (Class I, Class II and Class III). (Kruskal-Wallis, $p<0.05$ test). Capital letters indicate statistically significant difference on the intergroup comparisons.

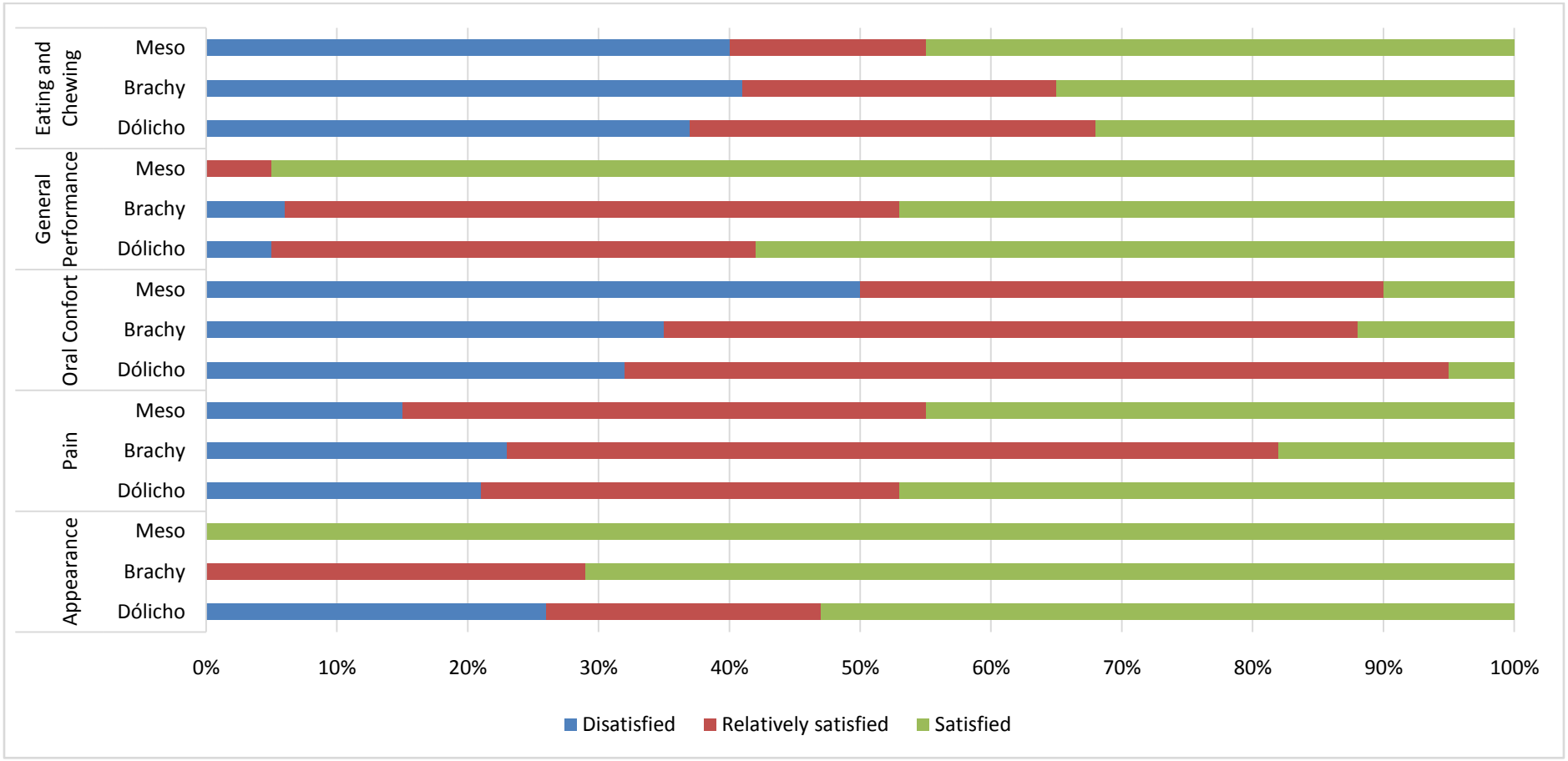

Figure 5. Categorization of the satisfaction level from patients with different facial typess according to each domain in the DIDL survey.

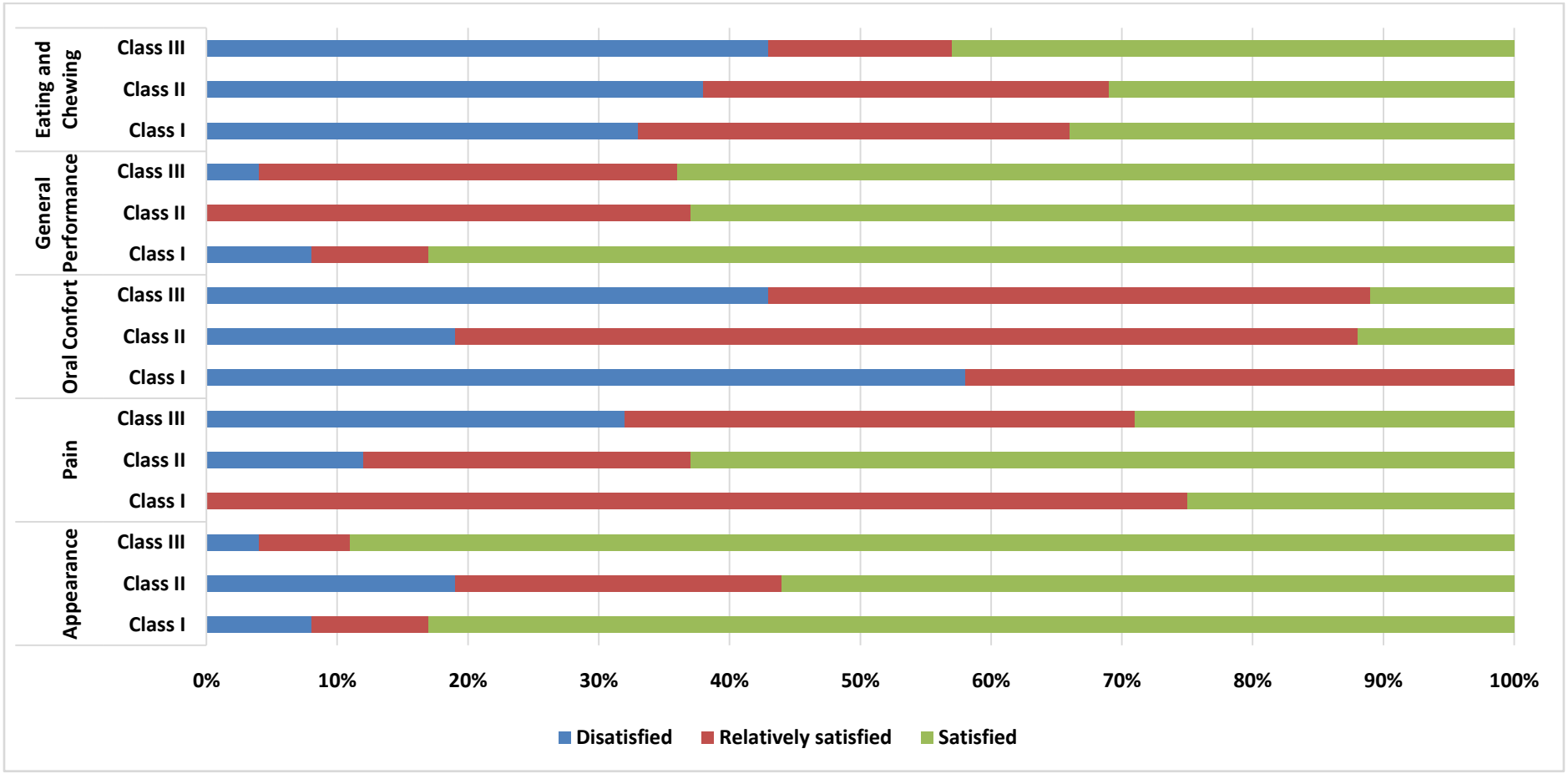

Figure 6. Categorization of the satisfaction level from patients with different anteroposterior classification according to each domain in the DIDL survey.

5. Artigo 2

How the facial patterns can influence the masticatory function in edentulous patients during the transition between CD to MO?

Original Article

Abbreviated title: How the facial patterns can influence the masticatory function?

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Abstract

Purpose: This study evaluated the influence of the Facial Pattern (FP) and the Anteroposterior Classification (APC) in the: i) Masticatory Function (MF), ii) Oral Health Related Quality of Life (OHRQoL), and iii) satisfaction of conventional Complete Dentures (CD) wearers before and after the transition to Mandibular Implant-retained Overdentures (IMO).

Methods: Forty-two patients (13 men and 29 women) were included in the sample. The cephalometric analysis was made through the lateral teleradiography, the FP was determined according to the Ricketts analysis, and the APC through the maxillo-mandibular relationship to the base of the skull. The MF was evaluated performing two different tests i) Masticatory performance (MP): (MP_X50, MPB, ME 5.6, ME 2.8), and ii) Swallowing Threshold (ST) (ST_X50, STB, ME 5.6, ME 2.8). The OHRQoL and satisfaction were evaluated applying the Dental Impact on Daily Living (DIDL) questionnaire. The data was analyzed using the Wilcoxon paired test and the Kruskal-Wallis test.

Results: After the transition to the IMO, the MP was positively impacted ($p<0.05$) especially for mesofacial, Class I and Class III patients, without a significant impact in Class II patients. The ST of mesofacial and dolichofacial patients was improved significantly ($p<0.05$) while for brachyfacial patients there was no significant improvement in any of the masticatory outcomes ($p>0.05$). According to APC, an improvement was observed in some of the ST outcomes in all groups, with a higher impact in Class III patients, who showed a significant improvement in all masticatory outcomes. The OHRQoL and satisfaction were expressively improved ($p<0.05$) for all the patients after the IMO loading.

Conclusion: The IMOs positively impacted in the OHRQoL and satisfaction of completely edentulous patients independently of the FP or APC. On the MF, brachyfacial patients were the ones that least benefited ones due to the IMO installation. The ST was the one that more sensibly detected an improvement to the MF of completely edentulous patients after the IMO installation.

1. Introduction

The cephalometric analysis is a widely used tool in orthodontics and it is very effective to diagnose a craniofacial forms helping in the planning of rehabilitation treatments [1]. According to Downs (1948) [2], this analysis allows the patients classification in two different ways: facial growth and mandibular anteroposterior position. The facial growth can be: mainly vertical (dolichofacial), vertically and horizontally balanced (mesofacial), or mainly horizontal (brachyfacial) [3]. The mandibular anteroposterior position can be defined as one of the following classes: i) Class I: mandible normal positioned in relation to the base of the skull; ii) Class II: mandible distally positioned in relation to the cranial anatomy; iii) Class III: mandible mesially positioned in relation to the cranial anatomy [4]. Besides that, those evaluations are useful in order to determine the facial thirds, and the existing differences in the oral cavity in relation to the determination of the vertical dimension and the attainment of the maxillomandibular relationship. Thus, these data can help in the confection of complete dentures and also avoid problems in the temporomandibular joint [5].

The patients classification before rehabilitation allows to the professional a better planning and predictability for the treatment, since every facial type and every anteroposterior classification show different difficulties during the treatment and can influence the masticatory performance [1]. Mesofacial and Class I patients are considered the comparison patterns, since they present a greater balance for vertical and horizontal growth, and do not show difficulties for prosthetic rehabilitation. Dolichofacial patients have an excessive convexity of the face, narrow nasal cavities and difficulty to breathe. Those patients push the tongue forward in order to improve breathing, which directly affects the complete denture (CD) retention and stability. Brachyfacial patient have a strong muscular activity in the masseter, with a tendency to overload of the mandible and easily displacement of the mandibular CD due to muscular activity, which shows a possible risk of the development of a temporomandibular dysfunction. This set of clinical information determine an unfavorable prognostic for these patients and must be considered, mainly on the determination of their vertical dimension [5].

A significant decrease in the vertical dimension is common for Class III patients that use CD for a prolonged time due to a greater mandibular protrusion. Thus, it is very important to reestablish the correct vertical dimension of those patients in order to achieve

an adequate maxillomandibular relationship like the Class I one [6]. However, although there is the possibility to compensate the AP variance in completely edentulous patients, it is not always possible to reestablish the masticatory function of them through CD. The difficulty in adapting, the mastication, and dissatisfaction with the CDs [7] are still common complaints due to the progressive residual ridge resorption that occurs with a greater intensity in the mandible, resulting in difficulties in order to obtain CDs with adequate retention and stabilityy[8].

Intending to solve those problems and with the diffusion in the use of dental implants, the mandibular overdentures (MO) were determined as the minimum protocol in order to rehabilitate completely edentulous patients [9]. The real benefits that the MO can provide are related to improvements in the masticatory function, satisfaction, and oral health related quality of life (OHRQoL) [10]. Besides that, the use of MO can act in the decrease of future bone resorption [11, 12], offering facial support when there is an advanced resorption of the alveolar ridge, the need of fewer implants for support [13-15], have a relatively low cost, and are easy to remove by the patient for the hygiene of the CD and its abutment [16].

However, even with all those benefits provided by the MO, it is not yet established in the literature what is the behavior of the masticatory function, the OHRQoL, and the satisfaction of completely edentulous patients according to the facial pattern and anteroposterior classification during the transition of treatment from CD to MO. Consequently, the aim of this study was to evaluate the influence of the facial pattern and the anteroposterior classification in the masticatory performance, swallowing threshold, OHRQoL, and satisfaction of CD wearers before and after the transition to MO. The null hypothesis tested was that the different facial patterns, vertical and anteroposterior direction do not influence the masticatory function, OHRQoL, and satisfaction of edentulous patients, before and after the transition to the MO.

2. Methodology

2.1 Experimental Design

This is a prospective observational clinical study was conducted using secondary data of patients treated at the Complete Denture Clinic of the Dentistry School of the Federal University of Pelotas, from 2013 to 2015. This study was conducted according to the Helsinki 2008 declaration, following the Strengthening the Reporting of Observational Studies in Epidemiology Guidelines (STROBE) [17]. All the procedures involving humans, were approved by the ethics committee in local search, protocol (nº 69/2013). In this research were included edentulous patients with good general and oral health, that showed difficulty in adapting to the mandibular CD.

Fifty-six patients were evaluated according to the inclusion criteria, forty-two of them (29 women and 13 men) fulfilling the criteria and agreeing to the term of the study, and signed the written informed consent . Previous to the rehabilitation with the new CD some radiographic exams (lateral teleradiography) were conducted in order to determine the facial pattern and the anteroposterior relationship. After three months of adaptation with the new CD, the masticatory function tests (masticatory performance and swallowing threshold) were conducted and the Dental Impact on Daily Living (DIDL) questionnaire was applied.

Then, two small diameter implants (2.9x10mm – Facility Neodent®) and healing abutments were installed in the anterior region of the mandible, and the CD was relining with soft material. After the three-month (osseointegration period) the healing abutments were replaced for prosthetic abutments (Equator system - Neodent®) and the MO was loaded. Then, after another three-months of patient adaptation to the new condition the masticatory function tests (masticatory performance and swallowing threshold) and the DIDL were applied again.

2.2 Cephalometric Evaluation

For the cephalometric evaluation, were performed a lateral teleradiographies of each patient, using the Rotograph Apparatus Plus, with a digital image system through sensors for the Dentascan software, operated by a licensed technician. The radiologic analyses were made in duplicate, by two trained and calibrated radiologists, through the CefX (Computarized Cephalometry, CDT Informática LTDA, São Paulo, Brazil) software version 4.5.10.

In order to determine the facial pattern, the Ricketts analysis was conducted, in which the facial type was classified as dolichofacial, mesofacial, and brachyfacial according to the measurement of five angles: facial axis angle – formed by the nasion-basion (N-Ba) and the pterigoyd-pogonion (Pt-Pg) planes, with a normal of 90º, and a standard deviation of +3º; facial angle – formed by the porion-orbitale (Po-Or) and the nasion-pogonion (N-Pg) angles, with a norm value of 87º, decreasing 0.3º a year; mandibular plane angle – formed by the gonion-menton (Go-Me) and porion-orbitale (Po-Or) angles; height of the inferior third of the face – angle formed by the planes Xi-anterior nasal spine (Xi-ENA) and Xi-menton protrusion (Xi-Pm) planes, with a norm of 47º and a standard deviation of +4º; mandibular arch – angle formed by the Dc and point XI (Dc-Xi) and Xi and menton protrusion (Xi-Pm), with a norm of 26º, increasing 0,5º a year [3]. According to the obtained values and the standard deviations of each angle he facial types were determined by the VERT index, where the individual norm was calculated for each of the angles. After the establishment of the difference between the found value and the individualized norm, the result was divided by the clinical deviation (which varies according to the angle). The result is then put in the Gauss curve, and receives a positive sign when the value indicates a tendency to the brachyfacial type, or negative when it indicates tendency for the dolichofacial type.

The anteroposterior classification was conducted according to SNA (maxillary position in relation to the base of the skull), SNB (mandible position in relation to the base of the skull), and ANB (maxillomandibular relation in the anteroposterior direction) angles. Patients that showed angles lower than 0º were classified as Class III, those that presented values between 0º and 4º were classified as Class I, and those that presented values above 4º were classified as Class II [4].

2.3 Masticatory Function

The masticatory function was evaluated through of two distinct parameters, the masticatory performance (MP) and the swallowing threshold (ST). In order to evaluate both of them, the “Optocal” artificial test food was used. It is obtained through the mixture of condensate silicon, alginate, common plaster, dentifrice, vaseline, and catalyst paste, which was then inserted in a 5,6mm matrix in order to create standardized cubes [18]. To masticatory tests, the patients were oriented to naturally chew 3,7 grams of artificial food, and do not swallow any of the fragments. For the masticatory performance test, the patients

chewed for 40 fixed cycles, and for the swallowing threshold test, they chewed until they felt to swallow, taking into account the number of cycles and their time [19-21].

Following that, the volunteers were instructed to expel the chewed particles in a cup with a paper filter, and, after that, to mouthwash with water. After that, the material dried in room temperature for 7 days, and the sieving process began, using sieves with 5.6mm and 0.5mm diameter [19]. The retained particles in each of the sieves were weighted separately in a precision balance, and the value of the particles weight was converted in volume through the Rosin-Rammler formula, which determines the mean of the chewed particle size based on the sieve aperture from which 50% of the particles weight was able to pass through (X50) (MP_X50 and ST_X50). Besides that, the formula provides the data of the “b” index (MPB and STB), which is the variable that describes the amplitude of the distribution of the particles through the sieves indicating if the chewing occurred homogeneously [22]. The masticatory efficiency was evaluated through the calculation of the percentage of retained material quantity in the sieves with 5.6 and 2.8 apperture (EM 5.6, EM 4.0 and EM 2.8) [19].

2.4 Dental Impact on Daily Living (DIDL)

The evaluation of oral health related quality of life (OHRQoL) and satisfaction was conducted through the DIDL questionnaire. It is composed of 36 questions grouped in 5 domains: appearance, pain, oral comfort, general performance, and eating and chewing. Through this questionnaire it is possible to measure the dental impact of each domain in daily life, as well as the satisfaction level of the patient with the treatment [23]. The possible answers consist on: agreed, neutral, or disagree, and the possible scores for each question go from +1, 0 to -1. The final scores of each domain are represented by the mean between de sum of the domain score and the number of questions for each domain, and, according to those scores, the patients are classified as dissatisfied (<0), relatively satisfied (0 – 0,69), or satisfied (0,7 – 1) [24].

2.5 Statistical Analysis

The data was first submitted to a descriptive analysis. After that, the norm for the data distribution was verified through the Shapiro-Wilk test. Besides that, the following parameters were observed for the sample distribution: “kurtosis”, “skweness”, and “overdispersion”. Taking that into account, it was verified that the data distribution violated

the normal distribution, indicating non-parametric tests for data analysis. For the evaluation of the impact of the rehabilitation with overdentures (baseline versus 3 months), the Wilcoxon paired test, considering the intra-individual variability. The evaluation among the groups through time was investigated through the Kruskal-Wallis test followed by the Dunn test for multiple comparisons. The significance level was established in 5%. Additionally, the effect size was calculated as the difference in the mean scores amongst the DIDL questionnaire times divided by the standard deviation of the previous period. Based on the final score, the effect size could be classified as: small (ES = 0,2); Moderate (ES = 0,5); and big (ES = 0,8). All analyses were conducted with the Stata 14,1 (StataCorp., College Station, TX, USA) software.

3. Results

The sample for this study was composed by 42 patients, 13 men (31%), and 29 women (69%), with an average age of 66.31 years old, and a mean of mandibular edentulism time of 24.14 years. To analyze the effects according to different facial patterns, the sample was composed by 33% dolichofacial (8 women and 6 men), 31% brachyfacial (9 women and 4 men), and 36% mesofacial (12 women and 3 men) patients. To examine the influence of the anteroposterior classification, the sample was also composed by 26% Class I (6 women and 5 men), 29% Class II (7 women and 5 men), and 45% Class III (16 women and 3 men) patients.

The comparisons between the means and standard deviations of the masticatory performance, intra and inter groups, before and after the MO loading, according to the facial pattern and AP classification are presented, respectively on the Tables 1 and 2. Mesofacial patients showed a significant improvement ($p<0.05$) on their MP for all the outcomes after the MO loading. Brachyfacial patients showed a significant improvement ($p<0.05$) only for the ME 5.6 and ME 2.8 outcomes after the MO installation. And finally, dolichofacial patients showed a significant improvement ($p<0.05$) only for the ME 5.6 outcome. The comparison amongst groups in each evaluated period, showed that dolichofacial patients had a better ($p<0.05$) food homogenization (MPB) than brachyfacial patients while CDs wearers. After the change from CD to MO, the brachyfacial patients still had a lower food homogenization (MPB) ($p<0.05$), differing from mesofacial and dolichofacial ones. The ME 2.8 also presented a significant difference amongst the groups, with dolichofacial patients showing a greater ($p<0.05$) quantity of material retained at the 2.8 sieve when compared to mesofacial ones before the MO installation. After the MO loading, only Class I and III patients showed a significantly improvement ($p<0.05$) in some of the masticatory outcomes; the first in the MP_X50, ME 5.6, and ME 2.8, while the second in the MPB, ME 5.6, and ME 2.8. The comparisons among the groups show significant differences ($p<0.05$) only in the baseline, the period in which the patients are still CDs wearers, showing that Class I patients presented 38,7% better ($p<0.05$) food homogenization (PMB) when compared to Class III, while Class II ones showed a 45,17% greater ($p<0.05$) material quantity retained in the 2.8 sieve when compared also to the Class III ones.

Tables 3 and 4 show the mean and standard deviation of the swallowing threshold, and the comparisons intra and inter groups before and after the MO installation, according

to the facial pattern and the anteroposterior classification. After the MO loading, mesofacial patients showed a significant improvement ($p<0.05$) for all outcomes, except STB, while dolichofacial patients improved ($p<0.05$) their time, ST_X50, ME 5.6, and ME 2.8. Brachyfacial patients did not show significant improvement ($p>0.05$) for any of the swallowing threshold outcomes. In the intergroup comparison, the ST_X50 showed a statistical difference ($p<0.05$) between the brachyfacial and dolichofacial groups only for the baseline. After the MO loading, mesofacial and dolichofacial patients showed a better food comminution when compared to brachyfacial ones, since there was a substantial difference for the ST_X50 and ME 5.6 outcomes. Mesofacial patients showed 16% and dolichofacial patients showed 19.5% better results for ST_X50 when compared to the brachyfacial ones, while for ME 5.6, mesofacial patients showed 44%, and dolichofacial 57.7% less material retained in the 5.6 sieve. On the anteroposterior relation, Class I patients showed a significantly improvement ($p<0.05$) 22.95% and 57.5% for the ST_X50 and ME 5.6 outcomes, respectively, after the MO installation. Class III patients showed a significant improvement ($p<0.05$) for all swallowing threshold outcomes after the MO loading. When the intergroups comparison was made at each different time, a significant statistical difference ($p<0.05$) was seen for the ME 5.6 and ME 2.8 outcomes among the Class II and Class III groups, only after the MO loading, with the Class III patients showing a better food comminution, since 42% less material was retained in the 5.6 sieve, and 11.5% more was in the 2.8 one.

Tables 5 and 6 show the results and the effect size obtained through the DIDL questionnaire according to all domains for the facial pattern and anteroposterior classification, before and after the MO installation. Dolichofacial patients showed a significant improvement ($p<0.05$) for all DIDL domains after the MO loading, with the greater effect sizes for the appearance (ES=1.0), and oral comfort (ES=1.6) domains. Mesofacial patients showed significant improvement ($p<0.05$) in 4 of the 5 DIDL domains (pain, oral comfort, general performance and eating and chewing), with the greater effect size in the oral comfort (ES=3.4) and eating and chewing(ES=3.1) domains. For the brachyfacial patients, there was an improvement only for 3 domains, oral comfort, general performance, and eating and chewing, with a greater effect size for the oral comfort (ES1.6), and eating and chewing(ES=1.2) domains. In the intergroups comparison for each evaluated period, there was a statistically significant ($p<0.05$) difference only for the baseline among all the groups for the appearance domain, while the general performance

one showed difference among brachyfacial X mesofacial and dolichofacial X mesofacial patients. Differently, when the AP relationship was taken into account in the intragroup comparison, all the patients showed a significant improvement after the MO loading, except for the pain domain in Class I patients, and the appearance domain in Class III ones. The three classifications showed a high effect size for the oral comfort domains (Class I ES=2.5; Class II ES=2.3; and Class III ES=1.4). For the intergroup comparison according to the AP, for each evaluated period, it was possible to observe that while CD wearers, the Class II patients showed a worst OHRQoL in relation to the appearance domain (0.44±0.58), which is statistically different ($p<0.05$) from the other groups. For the oral comfort domain, Class I patients showed a worst OHRQoL, which was statistically different ($p<0.05$) of the Class II group. After the MO loading, Class I patients were the ones that showed a worst OHRQoL in relation to the appearance (0.086±0.32), which was statistically different ($p<0.05$) from the other groups.

Figure 1 shows the patients satisfaction level in each domain according to the facial pattern. While CD wearers, appearance was the domain that showed the greatest satisfaction level for the brachyfacial (69%), and mesofacial (100%) groups, with the pain domain being the highest for the dolichofacial (57%) group. The oral comfort domain was the one that showed the lowest level of satisfaction for all groups (brachyfacial 7%, mesofacial 0%, dolichofacial 0%). After the MO installation, the appearance domain was still the highest score for satisfaction (100%) for the brachyfacial group, with general performance (92%) being the highest for the mesofacial, and for the dolichofacial group the appearance (93%), general performance (93%), and eating and chewing domains showing the best results. The lowest satisfaction level after the MO loading were oral comfort (77%), and eating and chewingdomains (85%) for the brachyfacial group, and pain (87%) (86%), and oral comfort (87%) (86%) for the mesofacial and dolichofacial groups, respectively.

Figure 2 shows the satisfaction percentage in each domain according to the anteroposterior classification. While CD wearers, the appearance was the domain that showed the highest level of satisfaction for the Class I (91%), and Class III (79%) groups, while the pain domain was the highest for the Class II (67%); the oral comfort domain was the one with the lowest level of satisfaction for all Class I (0%), Class II (8%), and Class III (10%) groups. After the MO installation, the appearance domain was the one with the highest satisfaction level for the Class II (100%), and Class III (100%) groups, while the

general performance domain had the highest satisfaction level for the Class I (100%) group. The domains that showed the lowest satisfaction level after the MO loading were oral comfort for the Class I (82%), and Class III (79%) groups, and the eating and chewing domain for the Class II group.

4. Discussion

The benefits provided by the mandibular overdentures, and the idea that they should be the minimally offered treatment for completely edentulous people is already very much accepted in specialized literature [9, 19, 25]. However, little is known on the behavior of the masticatory function and the subjective perception of completely edentulous people, when classified according to the facial pattern or the anteroposterior classification during the transition from the complete denture to mandibular overdenture [1]. To answer those questions, it can be seen that the MO improved the MP, especially for mesofacial, Class I and Class III patients, without a significant effect for Class II ones. Similarly, the MO also improved the ST for mesofacial and dolichofacial patients, although no improvement could be seen for brachyfacial ones; and, according to the AP classification, an improvement could be detected for some of the outcomes in all of the three groups, but with a greater impact on Class III patients. For the oral health related quality of life and patients' satisfaction it is possible to assert that, no matter which classification is used, the MO provide an improvement. Still, each domain was impacted in a different way due to the treatment. Oral comfort was the one that suffered the greatest impact no matter what facial pattern and anteroposterior classification the patient had. The eating and chewingdomain was the second to present changes, being more marked for the brachyfacial and mesofacial patterns and for Class III patients.

Masticatory performance is defined as the median particle size obtained after a fixed number of chewing cycles [19]. Through those masticatory function tests (MP and ST) it was decided to evaluate the material through two distinct ways, first, through the multiple sieves method (MP_X50/ST_X50 and MPB/STB) and secondly, through the single sieve method (ME 5.6 and ME 2.8), as described by Van der Bilt *et al*. (2004) [22]. Analyzing the obtained results for the MP, it is possible to assert that the MO have a greater positively impact in the PM of mesofacial patients, since after the MO loading they have a significant decrease, about 20% in the general particle size (MP_X50) and 54% in the particle homogenization (MPB). Besides that, the material quantity retained in the 5.6 sieve (ME 5.6) decreased by 40% and an increase of 59% in the material quantity retained in the 2.8 sieve (ME 2.8) one was also observed. For brachyfacial patients, there was only a significant difference for the ME 5.6 and ME 2.8 outcomes, which showed an improvement in the initial food comminution with a decrease of 33% in the particles retained in the ME

5.6. In this way, the particles were able to reach in greater quantity, about 54%, the sieve with medium opening (ME 2.8). Dolichofacial patients only improved significantly the initial food comminution, since only a decrease of 47% was observed for the ME 5.6.

Van der Bilt *et al*. (2004) [22] states that the single sieve method provides reliable data if the chosen sieve has a size close to the mean particle size that all the individuals crushed, however, they say that the multiple sieves method is more sensible in order to evaluate the effects of a treatment in the MP. Thus, those statements confirm the hypothesis of the present study of the MO being more beneficial for the MP of mesofacial patients, since it can be observed that there was a significant improvement in four MP outcomes for this group. When the groups were compared in different periods it was observed that dolichofacial patients showed a better food homogenization when compared to brachyfacial ones before and after the MO installation, and they also showed a greater material quantity retained in the 2.8 sieve when compared to the other groups while CD wearers. This may be due to the fact that dolichofacial patients have a longer inferior third of the face, which makes possible for them to more widely move the food bolus during mastication, allowing a more homogenous food comminution. Ochiai *et al*. (2011) [1] observed that dolichofacial patients showed a slightly smaller MP when compared to brachyfacial and mesofacial ones. In specialized literature, it is known that brachyfacial patients show a higher bite force and muscular activity, and those facts are closely related to a better mastication [5, 19, 26, 27]. However, in this study, it was noted that even after the MO loading, brachyfacial patients still had the worst food homogenization, which can confirm the hypothesis that a greater space for organization and homogenous comminution is needed.

While evaluating the MP results according to the anteroposterior classification it is possible to state that the MO positively impacted the mastication for Class I and Class III patients, since both were able to achieve 50% of the particles in the ME 2.8 sieve, while Class II patients did not have benefit at all, since none of the outcome variables showed significant improvement. A study also evaluated the MP for malocclusion patients showing that the Class III ones had greater difficulties to food comminution, followed by Class II ones, with Class I patients being the ones that more easily decreased the particles size to a medium size [28]. When the evaluations were observed in the different time periods in this study, the results are similar to the ones found by English *et al*. (2002) [28], since it can be

observed that Class III patients, while CD wearers, showed a worse (39%) food homogenization (MPB) when compared to Class I ones. Besides that, the first ones showed a worse comminution, with 45% less material retained in the ME 2.8 sieve when compared to Class II patients.

The swallowing threshold is defined as the moment in which individuals feel the desire to swallow or naturally swallow the food. It is expressed by a determined number of masticatory cycles before swallowing [20]. In the present study, it is possible to state that the MO positively impacted the swallowing threshold for mesofacial and dolichofacial patients, since they showed an improvement in five and four, respectively, of the ST outcomes. On the other hand, brachyfacial patients were not positively impacted by the MO, even though there was an improvement for the ST outcomes, the greater one being for the ME 5.6 (28%). Fontijim-Tekamp *et al*. (2000) [19], observed that patients with overdentures need 1,5 to 3,6 less masticatory cycles than complete denture wearers in order to obtain a similar reduction in the food particles size. In the present study, it was also observed that a significant improvement (26%) in the quantity of masticatory cycles only for mesofacial patients after the MO loading. When the groups were compared in different evaluated periods it was possible to observe that brachyfacial patients showed a worst masticatory capacity when compared to the other groups, since when they still CD wearers their ST_X50 was 13% worse than dolichofacial patients. Furthermore, after the MO loading, brachyfacial patients were not able to improve their own mastication and, consequently, were not able to achieve the same mastication level of the other groups. Whereas it was possible to observe differences among the groups after the MO loading, and brachyfacial patients still presented the worst food comminution, since they had a ST_X50 16% inferior and a ME 5.6 42% worst when compared to mesofacial patients. And in relation to dolichofacial ones the percentages were of 19.5% worst in the ST_X50 and 37% worst for the ME 5.6. Thus, it shows that even though it is well known in the literature that brachyfacial patients have a higher bite force [19, 27], it does not always directly interfere in the mastication.

When the AP classification and the swallowing threshold are compared, after the transition to the MO, it can be observed that Class III patients where the most benefited by the MO installation, because they presented a significant improvement for all the outcomes. On the other hand, Class I patients had an improvement only for two outcomes (ST_X50

and ME 5.6), while Class II ones had in four of them (ST_X50, STB, ME 5.6 and ME 2.8. Ochiai *et al*. (2011) and English *et al*. (2002) [1, 28], did not find significant differences in the number of masticatory cycles need to chew the food in the swallowing threshold test. However, in the present study, Class III patients showed a significant difference after the transition to MO, which reinforce the idea that even though those patients are considered hard to rehabilitate [28], can show significant improvements in their masticatory function when they have their CD installed in a Class I functional position and stabilized by implants. For the intergroups evaluation, Class III patients had a decrease in the quantity of material retained in the ME 5.6 sieve (42%), and, consequently, an increase in the ME 2.8 sieve (11%) after the transition to MO when compared to Class II patients. Those results differ from the study by Ochiai *et al*. (2011) [1], which said that there was a significant difference in the swallowing threshold between Class I and Class II patients. Possibly, that difference can be explained due to the study by Ochiai [1] was conducted with different groups, CD wearers and MO wearers, while the present study follow the MF evolution of edentulous patients during the transition of treatment CD to MO.

For the OHRQoL taking into account the facial pattern, it was possible to observe that dolichofacial patients were positively impacted by the MO for domainsof DIDL questionnaire. Only the appearance domain remained unaltered for mesofacial ones after the MO. And lastly, brachyfacial patients showed an improvement only for the oral comfort, general performance, and eating and chewing domains. Nevertheless, a common element for all the groups was that the comfort domain obtained the greatest clinical effect observed, being even greater (ES=3,4) for mesofacial patients. Some studies [10, 25, 29] show many benefits and the positive impact of the MO for the OHRQoL, although they do not use any skeletal classification as a way to classify the impact of the treatment for the OHRQoL. Besides evaluation the impact of the MO in each group, the present study analyzed what was different for the subjective perception of the patients. That way it was possible to observe that the MO were able to equalize the perception of all of them. While, when CD wearers, they showed very different perceptions, since there was a significant difference for the appearance domain in all of the groups and also difference in the general performance domain between mesofacial and the other two groups. For the satisfaction, before and after the MO loading, it was possible to see that, no matter what facial pattern, the patients are more dissatisfied with the oral comfort provided by the CD. Thus, through the effect size, it was possible to demonstrate that the greatest clinical effect provided by

the MO for the patients was in the oral comfort. In the same way, Marcello-Machado *et al*, 2016 [8] also found that CD wearers are more dissatisfied with oral comfort. However, even after the stabilization provided by the MO, was not possible that all patients were satisfied in relation to the oral comfort, eating and chewing, and pain domains. That may happen due to the little adaptation time with the new condition, since the questionnaire was applied three months after the MO loading. However, Schuster *et al*. 2017 [25] states that after three months, it is already possible to observe the positive impact of the MO treatment in the OHRQoL and satisfaction of edentulous patients. Hantash *et al*. 2011 [30], pointed out that elderly patients seem more satisfied with their appearance, and less satisfied with oral comfort and general performance.

For the anteroposterior classification, the OHRQoL showed that for Class I patients the MO positively impacted all of the domains except for the pain domain, although the mean improved by 35%, but was not considered significant. The Class II patients, there was the most impact with the MO, since there was improvement in every evaluated domain. For Class III patients, the appearance domain was the only one that remained unaltered after the MO installation, because those patients already presented a high mean for that domain even when CD wearing. The Oral comfort domain was still the greatest clinical effect, especially for Class I patients. According to Ash *et al*. 2012 [31], completely edentulous Class III patients result in a complex treatment situation. Thus, when those patients are rehabilitated in an Class I occlusal functional position, they present the correct reestablishment of the vertical dimension and, consequently, a significant improvement in aesthetics. Reinforcing the idea from English *et al*. 2002 [28], that the teeth arrangement for Class III patients must aim for a Class I functional position, which is the ideal for that group. Due to the results for satisfaction in relation to the anteroposterior classification, Class III patients already presented a high satisfaction score for the appearance domain (79%) even before the treatment, thus, the data complements and emphasizes the idea that the teeth arrangement should aim for a result similar to a Class I. In general, the oral comfort domain, before and after the MO loading, was the one that showed a higher dissatisfaction level. That shows that, just as the study from Marcello-Machado *et al*., 2016 [8], completely edentulous patients are the ones that worry most with the comfort that the rehabilitating treatment must provide, when compared to the other domains. Al-Omiri *et al*., 2011 [23], also pointed out the positive impact of the implant-supported prostheses in the OHRQoL and satisfaction of the patients.

Finally, even though we have not performed some tests such as bite force and salivary flow that may interfere in the masticatory function of the patients, we have also not evaluated the atrophy degree of the alveolar ridge, the denture-bearing tissue, or even the CD retention and stability. According to Marcello-Machado *et al*. [8], the CD retention is possibly related to the MF parameters. Nevertheless , this study provided quiteinteresting and new results about the completely edentulous behavior during the transition from CD to MO, classified according to the facial pattern and the anteroposterior classification. It can be highlighted the idea that Class II patients had more difficulties to adapt to a Class I teeth arrangement, since they had no improvement in the MP and a decrease of only 4% in the number of cycles executed after the the MO installation. Brachyfacial patients showed minimal improvement in the MF after the MO loading, because they only presented an improvement for the ME 5.6 and ME 2.8 outcomes in the MP test. Besides that, it was possible to highlight that even though the oral comfort domain showed the lowest satisfaction level after the MO loading, it is the domain that most shows a clinical effect noted by the patients during the treatment.

5. Conclusion

The MO impacted positively in the OHRQoL and in the satisfaction of the completely edentulous patients, no matter what was the adopted classification. Oral comfort is the greatest worry of the edentulous patients independently of the treatment and the adopted classification. In addition, oral comfort is the domain that most highlights the perceived clinical impact by the patients in relation to the treatment. The MF of completely edentulous patients improves after the MO installation, with the ST test being the most sensible in order to detect that, since the improvement provided by the MO for Class II patients was only noted through that test. Brachyfacial patients were the less benefited in their MF after the MO loading.

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Table 1. Mean, standard deviation, median and confidence interval for the outcomes in Masticatory Performance (MP_X50, MPB. ME 5.6, and ME 2.8) according to the facial pattern and after the installation of mandibular overdentures (paired Wilcoxon and Kruskal-Wallis tests).

	Brachyfacial (n= 13)				**Mesofacial (n=15)**				**Dolichofacial (n= 14)**			
	Before		**After**		**Before**		**After**		**Before**		**After**	
	Mean/SD	**Median/CI**	**Mean/SD**	**Median/CI**	**Mean/SD**	**Median/CI**	**Mean/SD**	**Median/CI**	**Mean/SD**	**Median/CI**	**Mean/SD**	**Median/CI**
MP_X50	5.57(1.19)A	5.40(2.84;6.53)A	4.78(1.44)A	4.78(3.18;6.12)A	5.28(0.97)*A	4.83(2.47;6.69)*A	4.23(1.1*)A	3.73(1.96;5.62)*A	4.83(1.34)A	4.53(2.44;7.09)A	4.17(1.26)A	3.58(2.42;5.69)A
MPB	8.96(6.82)B	4.65(2.71;11.08)B	4.77(2.69)B	3.19(1.97;19.80)B	7.08(4.87)*AB	3.28(1.58;12.05)*AB	3.27(1.35)*A	2.55(1.64;5.66)*A	5.80(5.84)A	3.3(1.85;28.87)A	3.99(3.87)A	2.85(2.05;6.75)A
ME 5.6 (%)	57.42(35.08)*A	45.10(0.01;86.32)*A	38.38(28.32)*A	35.19(2.92;66.95)*A	43.61(24.2)*A	30.19(12.11;90.99)*A	26.05(20.97)*A	16.95(0;48.36)*A	47.88(28.61)*A	28.60(0.44;97.07)*A	25.23(25.54)*A	8.52(0;51.60)*A
ME 2.8 (%)	7.97(9.29)*B	8.49(0.01;33.14)*B	17.28(12.97)*A	18.37(0.52;33.21)*A	9.33(9.98)*B	13.58(0.55;27.72)*B	22.81(8.54)*A	23.22(5.20;33.56)*A	16.73(12.08)A	16.68(0;32.99)A	21.4(9.49)A	27.09(3.53;34.29)A

Capital letters show the intergroup differences in each evaluated time period (same letter without statistical difference – P>0.05; different letters with statistical difference – P<0.05. The asterisks (*) show the variables that display intragroup differences before and after the installation of the overdentures (P<0.05).

Table 2. Mean, standard deviation, median and confidence interval for the outcomes in Masticatory Performance (MP_X50, MPB, ME 5.6, and ME 2.8) according to the anteroposterior classification before and after the installation of the mandibular overdentures (paired Wilcoxon and Kruskal-Wallis test).

	Class I (n=11)				Class II (n=12)				Class III (n=19)			
	Before		After		Before		After		Before		After	
	Mean/SD	Median/CI	Mean/SD	Median/CI	Mean/SD	Median/CI	Mean/SD	Median/CI	Mean/SD	Median/CI	Mean/SD	Median/CI
MP_X50	5.23(0.79)*A	4.69(3.20;6.69)*A	4.28(1.15)*A	3.68(1.96;5.57)*A	4.85(1.53)A	4.92(2.44;7.09)A	4.20(1.28)A	3.58(2.78;5.69)A	5.51(1.14)A	4.83(2.47;6.53)A	4.55(1.36)A	4.35(2.81;6.12)A
MPB	5.35(3.58)A	2.74(1.91;12.05)A	3.34(0.70)A	2.55(1.91;8.37)A	6.86(6.35)AB	3.35(1.85;28.87)AB	4.16(4.19)A	2.88(2.05;6.75)A	8.73(6.39)*B	3.65(1.58;11.08)*B	4.23(2.57)*A	2.91(1.64;19.80)*A
ME 5.6 (%)	47.46(17.29)*A	37.86(9.77;90.99)*A	25.12(19.97)*A	14.37(0;46.33)*A	51.09(33.38)A	32.45(0.44;97.07)A	23.63(17.31)A	8.52(2.88;51.60)A	49.86(33.37)*A	34.48(0.01;86.32)*A	34.33(27.01)*A	19.48(2.92;66.95)*A
ME 2.8 (%)	10.34(7.34)*AB	16(1.02;25.82)*AB	21.45(10.16)*A	22(1.86;33.56)*A	15.59(14.14)A	17.33(0;32.99)A	19.58(10.76)A	28.01(3.53;34.29)A	8.55(10.11)*B	12.13(0.01;33.14)*B	19.34(11.34)*A	19.51(0.52;33.21)*A

Capital letters show the intergroup differences in each evaluated time period (same letter without statistical difference – P>0.05; different letters with statistical difference – P<0.05. The asterisks (*) show the variables that display intragroup differences before and after the installation of the overdentures (P<0.05).

Table 3. Mean, standard deviation, median and confidence interval for the outcomes in Swallowing Threshold (MP_X50, MPB, ME 5.6, and ME 2.8) according to the facial pattern before and after the installation of the mandibular overdentures (paired Wilcoxon and Kruskal-Wallis test).

	Brachyfacial (n=13)				**Mesofacial (n=15)**				**Dolichofacial (n=14)**			
	Before		**After**		**Before**		**After**		**Before**		**After**	
	Mean/SD	**Median/CI**	**Mean/SD**	**Median/CI**	**Mean/SD**	**Median/CI**	**Mean/SD**	**Median/CI**	**Mean/SD**	**Median/CI**	**Mean/SD**	**Median/CI**
Time	76.35(52.04)A	62.58(26.45;220.58)A	56.14(23.59)A	51.07(24.19;92.05)A	90.31(64.01)*A	61.19(30.07;241.2)*A	59.48(31.03)*A	48.38(25.16;134.56)*A	89.87(44.14)*A	83.61(40.57;189)*A	62.98(19.09)*A	62.21(33.33;104.58)*A
Nº of cycles	64.46(26.68)A	56.0(33;125)A	60.31(23.61)A	55.0(25;115)A	94.33(66.74)*A	67(27;251)*A	69.73(37.73)*A	54(27;155)*A	81.50(41.18)A	69.0(38;173)A	73.71(29.36)A	69(30;130)A
ST_X50	5.16(1.29)A	5.40(2.84;6.53)A	4.53(0.98)A	4.78(3.18;6.12)A	4.76(1.09)*AB	4.83(2.47;6.69)*AB	3.81(0.98)*B	3.73(1.96;5.62)*B	4.5(1.36)*B	4.53(2.44;7.09)*B	3.65(0.89)*B	3.58(2.42;5.69)*B
STB	5.27(2.83)A	4.65(2.71;11.08)A	4.93(4.83)A	3.19(1.97;19.80)A	4.37(3.02)A	3.28(1.58;12.05)A	2.88(0.93)A	2.55(1.64;5.66)A	6.55(8.44)A	3.3(1.85;28.87)A	3.12(1.21)A	2.85(2.05;6.75)A
ME 5.6 (%)	44.93(28.74)A	45.10(0.01;86.32)A	32.34(19.29)A	35.19(2.92;66.95)A	36.94(23.01)*A	30.19(12.11;90.99)*A	18.11(14.64)*B	16.95(0;48.36)*B	33.52(31.09)*A	28.60(0.44;97.07)*A	13.69(14.04)*B	8.52(0;51.60)*B
ME 2.8 (%)	13.24(11.50)A	8.49(0.01;33.14)A	18.26(11.39)A	18.37(0.52;33.21)A	13.95(8.43)*A	13.58(0.55;27.72)*A	22.88(7.88)*A	23.22(5.20;33.56)*A	15.82(10.55)*A	16.68(0;32.99)*A	24.3(7.98)*A	27.09(3.53;34.29)*A

Capital letters show the intergroup differences in each evaluated time period (same letter without statistical difference – P>0.05; different letters with statistical difference – P<0.05. The asterisks (*) show the variables that display intragroup differences before and after the installation of the overdentures (P<0.05).

Table 4. Mean, standard deviation, median and confidence interval for the outcomes in Swallowing Threshold (MP_X50, MPB, ME 5.6, and ME 2.8) according to the anteroposterior classification before and after the installation of the mandibular overdentures (paired Wilcoxon and Kruskal-Wallis test).

	Class I (n=11)				**Class II(n=12)**				**Class III (n=19)**			
	Before		**After**		**Before**		**After**		**Before**		**After**	
	Mean/SD	**Median/CI**	**Mean/SD**	**Median/CI**	**Mean/SD**	**Median/CI**	**Mean/SD**	**Median/CI**	**Mean/SD**	**Median/CI**	**Mean/SD**	**Median/CI**
Time	89.87(44.14)A	72.47(30.33;128.59)A	62.98(19.09)A	48.36(25.16;104.58)A	76.35(52.04)A	77.05(40.51;189.37)A	56.14(23.59)A	62.21(33.33;73.28)A	90.31(64.01)*A	65,03(26,45;220,58)*A	59.48(31.03)*A	51.07(24.19;134.56)*A
Nº of cycles	81.50(41.18)A	72(27;141)A	73.71(29.36)A	53(27;123)A	64.46(26.68)A	59.0(38;173)A	60.31(23.61)A	69.0(30;130)A	94.33(66.74)*A	67(25;251)*A	69.73(37.73)*A	55(25;155)*A
ST_X50	4.50(1.36)*A	4.69(3.20;6.69)*A	3.65(0.89)*A	3.68(1.96;5.57)*A	5.16(1.29)*A	4.92(2.44;7.09)*A	4.53(0.98)*A	3.58(2.78;5.69)*A	4.76(1.09)*A	4,83(2,47;6,53)*A	3.81(0.98)*A	4.35(2.81;6.12)*A
STB	6.55(8.44)A	2.74(1.91;12.05)A	3.12(1.21)A	2.55(1.91;8.37)A	5.27(2.83)*A	3.35(1.85;28.87)*A	4.93(4.83)*A	2.88(2.05;6.75)*A	4.37(3.02)*A	3,65(1,58;11,08)*A	2.88(0.93)*A	2.91(1.64;19.80)*A
ME 5.6 (%)	33.52(31.09)*A	37.82(9.77;90.99)*A	13.69(14.04)*AB	14.37(0;46.33)*AB	44.93(28.74)*A	32.45(0.44;97.07)*A	32.34(19.29)*A	8.52(2.88;51.60)*A	36.94(23.01)*A	34.48(0.01;86.32)*A	18.11(14.64)*B	19.48(2.92;66.95)*B
ME 2.8 (%)	15.82(10.55)A	16(1.02;25.82)A	24.30(7.98)AB	22(1.86;33.56)AB	13.24(11.50)*A	17.33(0;32.99)*A	18.26(11.39)*A	28.01(3.53;34.29)*A	13.95(8.43)*A	12.13(0.01;33.14)*A	22.88(7.88)*B	19.51(0.52;33.21)*B

Capital letters show the intergroup differences in each evaluated time period (same letter without statistical difference – P>0.05; different letters with statistical difference – P<0.05. The asterisks (*) show the variables that display intragroup differences before and after the installation of the overdentures (P<0.05).

Table 5. Mean, standard deviation, median and confidence interval for the outcomes in the DIDL survey (MP_X50, MPB, ME 5.6, and ME 2.8) according to the facial pattern before and after the installation of the mandibular overdentures (paired Wilcoxon and Kruskal-Wallis test).

		Before		After		
	Domains	**Mean/SD**	**Median/CI**	**Mean/SD**	**Median/CI**	**Effect Size**
	Appearance	0.9(0.34)B	1(-0.25-1)B	0.92(0.27)A	1(0-1)A	0.7
	Pain	0.63(0.44)A	1(0-1)A	0.84(0.42)A	1(-0.5-1)A	1.1
Brachyfacial	**Oral Comfort**	-0.05(0.38)*A	-0.14(-1-0.42)*A	0.84(0.34)*A	1(-0.14-1)*A	1.6
	General Performance	0.84(0.27)*A	1(0.06-1)*A	0.98(0.03)*A	1(0.86-1)*A	0.8
	Eating and Chewing	0.23(0.77)*A	0.5(-1-1)*A	0.94(0.18)*A	1(0.33-1)*A	1.2
	Appearance	0.66(0.51)C	1(-0.5-1)C	0.96(0.12)A	1(0.5-1)A	0.1
	Pain	0.48(0.5)*A	0.5(-0.5-1)*A	0.86(0.29)*A	1(0-1)*A	0.8
Mesofacial	**Oral Comfort**	0.085(0.36)*A	0.14(-0.57-0.71)*A	0.68(0.25)*A	0.71(0.14-1)*A	3.4
	General Performance	0.56(0.48)*B	0.66(-0.73-1)*B	0.94(0.11)*A	1(0.6-1)*A	0.1
	Eating and Chewing	-0.02(0.9)*A	-0.33(-1-1)*A	0.83(0.51)*A	1(-1-1)*A	3.1
	Appearance	0.46(0.66)*A	0.75(1-1)*A	1(0)*A	1(1-1)*A	1.0
	Pain	0.42(0.6)*A	0.5(-1-1)*A	1(0)*A	1(1-1)*A	0.6
Dolichofacial	**Oral Comfort**	0.06(0.48)*A	0.14(-1-0.71)*A	0.77(0.22)*A	0.71(0.28-1)*A	1.6
	General Performance	0.63(0.38)*A	0.83(0.06-1)*A	0.92(0.23)*A	1(0.13-1)*A	0.9
	Eating and Chewing	-0.01(0.72)*A	0(-1-1)*A	0.92(0.19)*A	1(0.33-1)*A	0.9

Capital letters show the intergroup differences in each evaluated time period (same letter without statistical difference – $P>0.05$; different letters with statistical difference – $P<0.05$. The asterisks (*) show the variables that display intragroup differences before and after the installation of the overdentures ($P<0.05$).

Table 6. Mean, standard deviation, median and confidence interval for the outcomes in the DIDL survey (MP_X50, MPB, ME 5.6, and ME 2.8) according to the anteroposterior classification before and after the installation of the mandibular overdentures (paired Wilcoxon and Kruskal-Wallis test).

		Before		After		
	Domains	**Mean/SD**	**Median/CI**	**Mean/SD**	**Median/CI**	**Effect Size**
Class I	**Appearance**	0.22(0.74)*A	0.5(-1-1)*A	0.95(0.15)*A	1(0.5-1)*A	0.2
	Pain	0.56(0.47)A	0.5(-0.5-1)A	0.86(0.32)A	1(-0.5-1)A	1.0
	Oral Comfort	0.03(0.4)*A	0.14(-1-0.42)*A	0.77(0.25)*A	0.71(0.14-1)*A	2.5
	General Performance	0.61(0.37)*A	0.73(-0.2-1)*A	0.97(0.05)*A	1(0.86-1)*A	0.5
	Eating and Chewing	0.07(0.84)*A	0(-1-1)*A	0.81(0.6)*A	1(-1-1)*A	0.9
Class II	**Appearance**	0.66(0.44)*B	1(0-1)*B	1(0)*B	1(1-1)*B	1.0
	Pain	0.39(0.65)*A	0.5(-1-1)*A	1(0)*A	1(1-1)*A	0.6
	Oral Comfort	0.04(0.43)*B	0.14(-1-0.71)*B	0.73(0.23)*A	0.71(0.28-1)*A	2.3
	General Performance	0.58(0.37)*A	0.63(0.06-1)*A	0.9(0.24)*A	1(0.13-1)*A	0.8
	Eating and Chewing	0.04(0.83)*A	0(-1-1)*A	0.9(0.2)A*	1(0.33-1)A*	0.9
Class III	**Appearance**	0.93(0.23)A	1(0-1)A	0.94(0.22)B	1(0-1)B	0.5
	Pain	0.55(0.46)*A	0.5(-0.5-1)*A	0.86(0.36)*A	1(-0.5-1)*A	0.8
	Oral Comfort	0.22(0.41)*A	0.14(-1-0.71)*A	0.77(0.32)*A	1(-0.14-1)*A	1.4
	General Performance	0.76(0.43)*A	1(-0.73-1)*A	0.97(0.09)*A	1(0.6-1)*A	0.7
	Eating and Chewing	0.11(0.78)*A	0(-1-1)*A	0.94(0.16)*A	1(0.33-1)*A	1.2

Capital letters show the intergroup differences in each evaluated time period (same letter without statistical difference – $P>0.05$; different letters with statistical difference – $P<0.05$. The asterisks (*) show the variables that display intragroup differences before and after the installation of the overdentures ($P<0.05$).

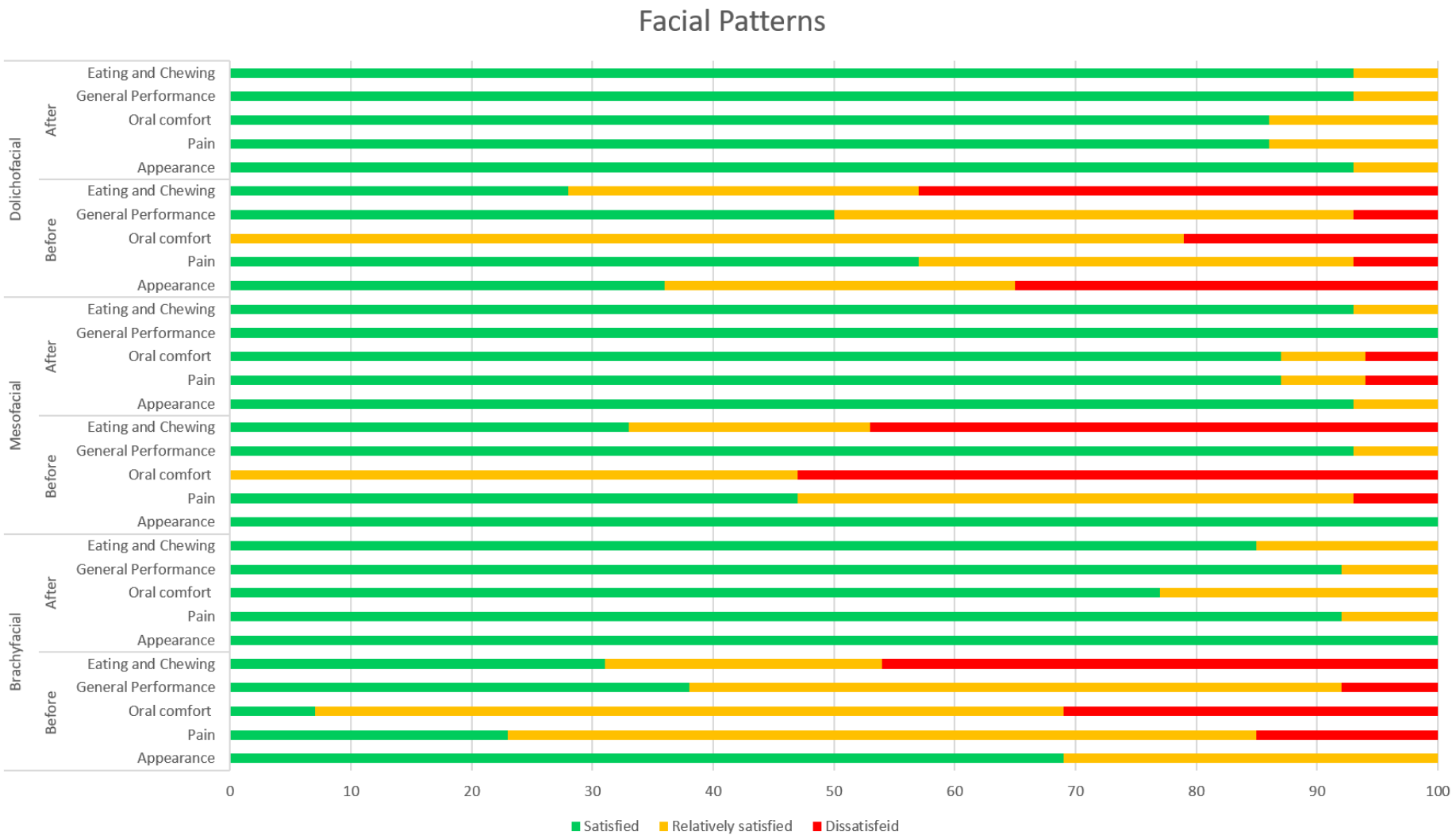

Figure 1: Satisfaction degree (in percentage) for the patients according to the facial pattern before and after the installation of the mandibular overdentures.

Figure 2: Satisfaction degree (in percentage) for the patients according to the anteroposterior classification before and after the installation of the mandibular overdentures.

6. Considerações finais

Poucos estudos comparam os tipos faciais com a função mastigatória e OHRQoL e satisfação de pacientes usuários de prótese total e pacientes com overdentures mandibulares. Este é o primeiro estudo que avalia esta relação de pacientes usuários de prótese total durante a transição para overdentures mandibulares. Na avaliação dos pacientes usuários de próteses totais convencionais, nossos resultados mostram que pacientes classificados como dólicofaciais possuem uma performance mastigatória superior aos pacientes braquifaciais, porém na avaliação da OHRQoL e satisfação, são os que apresentaram maior impacto negativo dos domínios aparência e alimentação e mastigação. Quanto à classificação ântero-posterior, os pacientes Classe III apresentaram capacidade reduzida em homogeinizar o bolo alimentar, entretanto na avaliação subjetiva da percepção da OHRQoL e satisfação são os que mostraram maior impacto positivo nos domínios aparência e performance geral.

Após a transição do tratamento, obteve-se que as overdentures mandibulares impactaram positivamente na OHRQoL e na satisfação dos pacientes desdentados totais independente da classificação apresentada. A função mastigatória é melhorada pela instalação das OM, sendo que o teste de limiar de deglutição foi o mais sensível para detectar este fato, pois a melhora proporcionada pelas overdentures mandibulares aos pacientes classe II só foi notada por este teste. Os pacientes braquifaciais foram os menos beneficiados pela instalação das overdentures mandibulares, visto que não apresentaram quase melhora na função mastigatória.

Para uma planejamento prévio da reabilitação, seria de grande valia para o profissional prever o comportamento de cada tipo facial em relação a função mastigatória, obtendo assim um prognóstico mais específico para cada paciente. Portanto, a análise cefalométrica previamente ao tratamento reabilitador deve ser cosiderada.

Porém mais estudos devem ser conduzidos com diferentes métodos de avaliação,como força de mordida e fluxo salivar que podem interferir na função mastigatória, afim de se obter maiores evidências da relação dos diferentes tipos faciais com a mastigação.

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8. Apêndices

Apêndice A – Termo de Consentimento Livre e Esclarecido

Título da pesquisa: Efeito de overdentures mandibulares na evolução da função mastigatória de desdentados totais com atrofia óssea.

Pesquisadores Responsáveis: Professora Dra. Fernanda Faot
Doutoranda Raissa Micaella Marcello Machado
Mestranda Amália Machado Bielemann

Justificativa: O(A) senhor(a) está sendo convidado(a) participar desta pesquisa porque foi verificado que o(a) senhor(a) possui uma grande atrofia óssea mandibular, diagnosticada pela avaliação radiográfica realizada para iniciar a confecção de sua nova prótese total e pela detecção clínica da dificuldade de estabilidade e retenção da sua prótese inferior. Para melhoria de sua mastigação e para providenciar maior conforto durante o uso de sua prótese total inferior é possível a instalação de dois implantes osseointegrados na região anterior da sua mandíbula para melhorar estes problemas. Esta pesquisa será realizada para verificar a importância de se adicionar implantes osseointegrados na função mastigatória e na qualidade de vida global.

Objetivo: Esta pesquisa está sendo realizada para monitorar o processo de cicatrização do tecido peri implantar e a osseointegração de mini-implantes para ancorar overdentures que possuem a finalidade de aumentar a retenção e estabilidade de sua prótese total mandibular. Além disso, esta pesquisa irá mostrar quanto as overdentures mandibulares, ou seja, por meio da presença de 2 implantes na região anterior de sua mandíbula, podem alterar positivamente a função mastigatória e a qualidade de vida global depois de sua instalação durante o primeiro ano do uso de suas próteses.

Procedimentos: Para alcançarmos nossos objetivos precisamos de sua participação. Se o(a) senhor(a) decidir participar desta pesquisa receberá dois implantes mandibulares de diâmetro estreito (Facility, 2.9x10mm). Após o período de cicatrização será instalado encaixes do tipo Equator nos seus implantes e conectores na sua prótese total inferior para que estes aumentem a adaptação de sua prótese fornecendo maior retenção, estabilidade e consequentemente gerando menor deslocamento durante as funções diárias.

Durante o período de participação na pesquisa será necessário o comparecimento as consultas previamente agendadas em que serão feitos testes para mensurar a saúde de seu implante durante a fase de cicatrização através de um equipamento (Osstell mentor) que fornece informações do quanto existe de contato entre o osso e o implante. Além disso, a saúde dos tecidos peri-implantares (mucosa ao redor do implante) será avaliada neste período através da coleta do fluido peri-implantar na região do implantes. Este procedimento será feito através da inserção de uma fita de papel absorvente ao lado de cada 1 dos 2 implantes por 30 segundosEstas avaliações serão realizadas em cinco diferentes tempos: “baseline” (T0 – no dia da instalação do implante) e 7, 15, 30,90 e 180 dias após a instalação dos implantes.
A sua capacidade mastigatória será avaliada nos seguintes tempos: T0 – com suas próteses totais convencionais; T1 – 30 dias após a instalação da overdenture mandibular; T2 – 3 meses após a instalação da overdenture mandibular; T3 – 6 meses após a instalação da overdenture mandibular; T4 – 1 ano após a instalação da overdenture mandibular. Para isso, o(a) senhor(a) deverá mastigar normalmente alguns cubos pequenos de um material borrachóide e depois o(a) senhor(a) deverá cuspir todos os pedacinhos mastigados em um cone de papel absorvente. O(A) senhor(a) também deverá bochechar um pouco de água e cuspir neste filtro de papel até que não reste mais nenhum pedaço em sua boca.
Estas avaliações serão realizadas nos períodos descritos anteriormente num total de 5 avaliações de acompanhamento. Cada avaliação demorará aproximadamente 30 minutos. Adicionalmente, o(a) senhor(a) também será convidado(a) a responder 3 questionários sobre sua satisfação com o tratamento antes e após a instalação das overdentures mandibulares. Caso o(a) senhor(a) sinta-se constrangido em relação a alguma pergunta terá garantido o direito de não respondê-la.

Benefícios e vantagens ao voluntário: O(A) senhor(a) terá o benefício de receber o diagnóstico e tratamento odontológico geral necessário, e também a colocação de dois implantes para encaixe de sua prótese inferior. O tratamento odontológico geral, bem como o seu tratamento protético serão realizados pelos pesquisadores responsáveis: Profa. Dra. Fernanda Faot, Cirurgiã-Dentista Raissa Micaella Marcello Machado, Cirurgiã-Dentista Amália Machado Bielemann

Grupo Placebo ou Controle: Não existe grupo placebo neste estudo.

Métodos alternativos e benefícios: As avaliações a serem realizadas representam o método menos invasivo para a avaliação da sua mastigação.

Desconfortos e riscos previsíveis: Pode haver um desconforto durante e após o procedimento operatório, como inchaço na região operada; desconforto durante a alimentação. Não existe risco previsível durante o exame clínico, mastigação dos cubinhos de borracha, preenchimento da entrevista e avaliação de seus implantes osseointegrados. Desta forma, sua participação neste estudo não oferece risco previsível à sua saúde. Além disso, o tratamento odontológico geral e protético que você irá receber é idêntico àqueles que você estaria recebendo se não fizesse parte da pesquisa.

Forma de acompanhamento e garantia de esclarecimento: O(A) senhor(a) será acompanhado durante toda a pesquisa e qualquer problema observado deverá ser relatado. O(A) senhor(a) tem a garantia de que receberá respostas a qualquer pergunta, ou esclarecimento a qualquer dúvida relacionada à pesquisa. Os pesquisadores responsáveis assumem o compromisso de proporcionar toda a informação necessária e acompanharão e assistirão todos os voluntários em qualquer momento durante a pesquisa. Se o(a) senhor(a) tiver qualquer dúvida, o(a) senhor(a) deverá entrar em contato com os pesquisadores.
Telefone das pesquisadoras: Profa. Dra. Fernanda Faot, pessoalmente ou por telefone (53) 81001166, Raissa (53) 92419778, Amália (53) 81093954.
Endereço: Rua Gonçalves Chaves, 470. 2º Andar Prótese Total - Faculdade de Odontologia UFPel.

Garantia de sigilo: Os pesquisadores responsáveis se comprometem a resguardar todas as informações da pesquisa. Nunca será revelada a identidade do(a) senhor(a). Os dados desta pesquisa serão utilizados para fins estritamente científicos.

Liberdade para se recusar em participar da pesquisa: *A decisão de fazer parte ou não desta pesquisa é voluntária. O(A) senhor(a) pode escolher se quer ou não participar dela, e da mesma maneira, o(a) senhor(a) é livre para desistir dela em*

qualquer momento. Caso o senhor(a) não possa participar ou se retire da pesquisa por qualquer motivo, o senhor(a) não sofrerá nenhum tipo de prejuízo, assim como sua decisão não afetará seu tratamento odontológico na Faculdade de Odontologia – UFPel.

Caso o(a) senhor(a) aceite livremente participar desta pesquisa, o(a) senhor(a) receberá uma segunda via assinada do Termo de Consentimento Livre e Esclarecido, ficando a primeira via com a Prof[a]. Responsável pela pesquisa, sendo que as duas vias poderão ser anuladas em qualquer momento do desenvolvimento da pesquisa, segundo sua livre decisão.

Eu, _____certifico que tendo lido e entendido todas as informações acima descritas, estou de acordo com a realização do estudo e aceito participar voluntariamente do mesmo.

Pelotas,_____de_____de 20___.

_____ _____
Nome do voluntário / RG Assinatura do voluntário

_____ _____
Nome do pesquisador Assinatura do pesquisador

Qualquer dúvida sobre este pesquisa, por favor comunicar-nos, a fim de responder a suas perguntas:

-Prof[a.] Fernanda Faot- Pesquisador responsável

E-mail: fernanda.faot@gmail.com Telefone: (53) 81001166

- Amália Machado Bielemann- Estudante de Mestrado FO/UFPel

E-mail: amaliamb@gmail.com Telefone: (53) 81093954

-Raissa Micaella Marcello Machado – Estudante de Doutorado FOP/UNICAMP

E-mail: raissammm@gmail.com Telefone: (53) 92419778

A sua participação em qualquer tipo de pesquisa é voluntária. Em caso de dúvidas quanto aos seus direitos como voluntário de pesquisa entre em contato com:

Comitê de Ética em Pesquisa da Faculdade de Odontologia de Pelotas: Rua Gonçalves Chaves, 470 CEP 96015-560, Pelotas – RS. Fone/Fax (53) 32256741/ (53) 32224162

Apêndice B – Nota daDissertação

Impacto das formas faciais na função mastigatória e qualidade de vida de usuários de próteses

Impact of facial forms on masticatory function and quality of life of denture users

A presente dissertação de mestrado teve como objetivo avaliar a influência do padrão faciale da classificação ântero-posteriorna função mastigatóriae na qualidade de vida relacionada a saúde oral (OHRQoL) de pacientes enquanto usuários de próteses totais convencionais e após a transição para overdentures mandibulares. Ao total, 56 pacientes participaram do estudo. Foram realizados exames de telerradiografia lateral para a análise cefalométrica, onde o padrão facial foi determindo através da análise de Ricketts, e a classificação ântero-posterior pelo relacionamento da maxila e da mandíbula em relação à base do crânio. A função mastigatóriafoi avaliada pelo método das múltiplas peneiras. A OHRQoL e a satisfação foram avaliadas através do questionário de impacto dental na vida diária (DIDL). Os resultados encontrados mostram que, enquanto usuários de próteses totais, pacientes dolicofaciais possuem uma performance mastigatória superior aos braquifaciais, os Classe III apresentam capacidade reduzida de homogeinizar o alimento teste, e o domínio do DIDL que mais impactou foi a aparência. Após a transição para overdentures mandibulares, estas demonstraram impactar positivamente na OHRQoL e satisfação de desdentados totais independentes do padrão facial ou relação ântero-posterior, e quanto à função mastigatória, os pacientes braquifaciais foram os menos beneficiados pela instalação das overdentures mandibulares. Esta pesquisavisa justificar a importância da classificação das formas faciais previamente ao tratamento reabilitador, assim, possibilitando uma maior segurança no planejamento e no estabelecimento de um prognóstico mais específico em relação à melhoria da função mastigatória.

Campo da pesquisa: Clínica Odontológica, Prótese Dentária.

Candidato: Ana Paula Pinto Martins,Cirurgiã-dentista pela Universidade Federal dePelotas (2015)

Data da defesa e horário: 31/07/2017

Local: Auditório do Programa de Pós-graduação em Odontologia da Universidade Federal de Pelotas. 5º andar da Faculdade de Odontologia de Pelotas. Rua Gonçalves Chaves, 457.

Membros da banca:
Prof.Dr. Douver Michelon: Doutor em Odontologia (Área de concentração Ortodontia) pela Universidade Estadual de Campinas, UNICAMP.

Prof. Dr. Mateus Bertolini Fernandes dos Santos: Doutor em Clínica Odontológica (Área de concentração Prótese Dentária) pela Universidade Estadual de Campinas, UNICAMP.

Prof. Dr. Natália Marcumini Pola (suplente): Doutora em Odontologia (Área de concentração Periodontia) pela Universidade Estadual Paulista Júlio de Mesquita Filho, UNESP.

Orientador: Prof. Dra. Fernanda Faot: Doutora em Clínica Odontológica, Área de Prótese Dentária, pela Universidade Estadual deCampinas, UNICAMP.
Co-orientadores: Prof. Dra. Luciana de Rezende Pinto: Doutor em Clínica Odontológica, Área de Prótese Dentária, pela Universidade Estadual deCampinas, UNICAMP.

Informação de contato: Ana Paula Pinto Martins, aanapaulamartins@hotmail.com, Gonçalves Chaves, 457.

Apêndice C – Súmula do currículo do candidato

Súmula do currículo

Ana Paula Pinto Martins nasceu em 04 de agosto de 1990, em Dourados, Mato Grosso do Sul. Completou o ensino fundamental e médio em Escola privada na mesma cidade. No ano de 2010 ingressou na Faculdade de Odontologia da Universidade Federal de Pelotas (UFPel), tendo sido graduada cirugiã-dentista em 2015. No mesmo ano ingressou no Mestrado do Programa de Pós-graduação em Odontologia da Universidade Federal de Pelotas (UFPel), área de concentração Prótese Dentária, sob orientação da Profª. Drª. Fernanda Faot. Durante a graduação, com o objetivo de aprimorar seus conhecimentos, sempreesteve envolvida em projetos de extensão e de pesquisa nas diferentes áreas daodontologia. Durante o período do mestradotrabalhou em duas clínicas privadas da cidade de Pelotas e desenvolvou trabalhos na área da prótese dentária.

Publicações:

POSSEBON, A. P. R. ; MARTINS, A. P. ; DENIGNO, J. ; LANGLOIS, C. ; SILVA, A. . Sense of Coherence and Oral Health in Older Adults in Southern Brazil.. GERODONTOLOGY, 2017.

BARBON, F. J.; MARTINS, A. P. P. ; BERTOLINI, M. ; BERGOLI, C. D. ; MORAES, R. R. ; BOSCATO, N. . Reestabelecimento Funcional e estético com coroas e facetas laminadas. PróteseNews, v. 3, p. 276-287, 2016.

9. Anexos

Anexo A –Carta de aprovação doComitê de Ética em Pesquisa

MINISTÉRIO DA EDUCAÇÃO

UNIVERSIDADE FEDERAL DE PELOTAS

FACULDADE DE ODONTOLOGIA

COMITÊ DE ÉTICA E PESQUISA

PELOTAS, 18 de dezembro de 2013

PARECER Nº 69/2013

O projeto de pesquisa intitulado **"Efeito de overdentures mandibulares na evolução da função mastigatória de desdentados totais com atrofia óssea severa"** está constituído de forma adequada, cumprindo, nas suas plenitudes preceitos éticos estabelecidos por este Comitê e pela legislação vigente, recebendo, portanto, PARECER **APROVADO**.

Prof. Dr. Renato Fabrício de Andrade Waldemarin

Coordenador do CEP- FOP/UFPel

Anexo B- Questionário Impacto na Vida Diária– DIDL

1. Eu estou satisfeito com meus dentes em geral.
☐ Concordo ☐ Discordo ☐ Neutro

2. Eu estou satisfeito com a aparência dos meus dentes.
☐ Concordo ☐ Discordo ☐ Neutro

3. Eu estou satisfeito com a cor dos meus dentes.
☐ Concordo ☐ Discordo ☐ Neutro

4. Eu estou satisfeito com a posição dos meus dentes.
☐ Concordo ☐ Discordo ☐ Neutro

5. Eu sinto dor espontânea em meus dentes.
☐ Concordo ☐ Discordo ☐ Neutro

6. Eu sinto dor de dente quando como ou bebo algo quente ou frio.
☐ Concordo ☐ Discordo ☐ Neutro

7. Eu mudo minha alimentação por causa da dor.
☐ Concordo ☐ Discordo ☐ Neutro

8. Eu sinto dor em minha articulação mandibular.
☐ Concordo ☐ Discordo ☐ Neutro

9. Eu tenho preocupação com os dentes.
☐ Concordo ☐ Discordo ☐ Neutro

10. Eu sofro com alimentos entre os dentes.
☐ Concordo ☐ Discordo ☐ Neutro

11. Eu tenho halitose e mau hálito.
☐ Concordo ☐ Discordo ☐ Neutro

12. Eu tenho dentes soltos.
☐ Concordo ☐ Discordo ☐ Neutro

13. Eu não estou satisfeito com minhas gengivas
☐ Concordo ☐ Discordo ☐ Neutro

14. Eu tenho sangramento gengival.
☐ Concordo ☐ Discordo ☐ Neutro

15. Eu tenho sensibilidade com quente ou frio por causa da recessão gengival.
☐ Concordo ☐ Discordo ☐ Neutro

16. Minha capacidade de trabalho é afetada pela aparência dos meus dentes.
☐ Concordo ☐ Discordo ☐ Neutro

17. Minha capacidade de trabalho é afetada pela minha capacidade para comer e falar.
☐ Concordo ☐ Discordo ☐ Neutro

18. Meu contato com as pessoas é afetado pela aparência de meus dentes.
☐ Concordo ☐ Discordo ☐ Neutro

19. Meu contato com as pessoas é afetado pela minha capacidade para comer e falar.
☐ Concordo ☐ Discordo ☐ Neutro

20. Meu contato com as pessoas é afetado pela dor de dente.

☐ Concordo ☐ Discordo ☐ Neutro

21. Meu relacionamento é afetado pela dor de dente.

☐ Concordo ☐ Discordo ☐ Neutro

22. Meu relacionamento é afetado pela minha habilidade para comer e falar.

☐ Concordo ☐ Discordo ☐ Neutro

23. Minha autoconfiança é afetada pela aparência de meus dentes.

☐ Concordo ☐ Discordo ☐ Neutro

24. Eu sinto vergonha por causa dos meus dentes.

☐ Concordo ☐ Discordo ☐ Neutro

25. Meu relacionamento é afetado pela aparência de meus dentes.

☐ Concordo ☐ Discordo ☐ Neutro

26. Eu tento evitar mostrar meus dentes quando sorrio.

☐ Concordo ☐ Discordo ☐ Neutro

27. Eu não estou satisfeito com meu sorriso

☐ Concordo ☐ Discordo ☐ Neutro

28. Minha capacidade de trabalho é afetada pela dor.

☐ Concordo ☐ Discordo ☐ Neutro

29. Eu me sinto estressada por causa da dor.

☐ Concordo ☐ Discordo ☐ Neutro

30. Eu durmo mal por causa da dor.

☐ Concordo ☐ Discordo ☐ Neutro

31. Eu estou satisfeito com minha capacidade para mastigar.

☐ Concordo ☐ Discordo ☐ Neutro

32. Eu estou satisfeito com minha mastigação em geral.

☐ Concordo ☐ Discordo ☐ Neutro

33. Eu estou satisfeito com minha capacidade para morder.

☐ Concordo ☐ Discordo ☐ Neutro

34. Eu estou satisfeito com minha mordida em geral.

☐ Concordo ☐ Discordo ☐ Neutro

35. Eu não mudo a forma de preparar os alimentos por causa dos dentes.

☐ Concordo ☐ Discordo ☐ Neutro

36. Eu não mudo o tipo de alimento por causa dos dentes.

☐ Concordo ☐ Discordo ☐ Neutro