UNIVERSIDADE DE SÃO PAULO
FACULDADE DE ODONTOLOGIA DE BAURU

GUILHERME HIDEKI DE LIMA TOYOSHIMA

Avaliação comparativa do perfil facial através de estereofotogrametria após reabilitação de pacientes desdentados

Facial changes evaluation after rehabilitation treatment in edentulous patients by 3D Stereophotogrammetry

BAURU
2021

GUILHERME HIDEKI DE LIMA TOYOSHIMA

Avaliação comparativa do perfil facial através de estereofotogrametria após reabilitação de pacientes desdentados

Facial changes evaluation after rehabilitation treatment in edentulous patients by 3D Stereophotogrammetry

Dissertação constituída por artigo apresentada à Faculdade de Odontologia de Bauru da Universidade de São Paulo para obtenção do título de Mestre em Ciências no Programa de Ciências Odontológicas Aplicadas, na área de concentração Reabilitação Oral.

Orientador: Profª. Drª. Simone Soares

Versão Corrigida

BAURU

2021

Toyoshima, Guilherme Hideki de Lima
Avaliação comparativa do perfil facial através de estereofotogrametria após reabilitação de pacientes desdentados/ Guilherme Hideki de Lima Toyoshima. -- Bauru, 2021.
73p. : il. ; 31 cm.

Dissertação (mestrado) -- Faculdade de Odontologia de Bauru, Universidade de São Paulo, 2021.

Orientadora: Profa. Dra. Simone Soares

Nota: A versão original desta dissertação encontra-se disponível no Serviço de Biblioteca e Documentação da Faculdade de Odontologia de Bauru – FOB/USP.

Comitê de Ética da FOB-USP
Protocolo nº: 99721718.6.0000.5417
Data: 15/02/2019

ERRATA

FOLHA DE APROVAÇÃO

DEDICATÓRIA

Dedico esse trabalho de forma especial aos **pacientes** que contribuíram por todo meu crescimento profissional desde a Graduação até aqui. São eles o motivo pela minha sede de conhecimento e pela vontade de cada dia ser um profissional melhor.

AGRADECIMENTOS

A ***Deus***, por me dar a oportunidade de estar aqui hoje, iluminando meu caminho e por permitir receber todas as graças ao longo dessa incrível jornada. Essa conquista só foi possível devido a uma graça divina, a qual me faltam palavras para expressar minha gratidão.

Considerar como sorte o fato de tantas pessoas brilhantes terem estado ao meu lado nesses últimos anos, e que contribuíram para minha formação não apenas como profissional, mas também como ser humano, não passa de muita ingenuidade...

Agradeço e louvo a meus pais, ***Milton e Uysdimeire***, sempre ao meu lado, me educando para que eu nunca recuasse frente a um novo desafio. Vocês são meus maiores exemplos e palavras não são suficientes para resumir meu amor por vocês. Obrigado por me ajudarem a alcançar meus sonhos e pelo incentivo ao estudo.

À minha irmã, **Rafaela**, pelo companheirismo e por compartilhar do mesmo interesse: o bem do próximo. Desejo que sua trajetória na Odontologia traga tantas alegrias quanto me foram agraciadas.

Aos meus avós, **Aiko, Akio, Izaura e Hermes** (*in memorian*), pelo carinho, cuidado e preocupação eternos. De vocês não esqueço jamais!

À minha noiva e companheira de vida **Gabriela**, que é meu refúgio, que enche meu mundo de alegria, que me faz olhar para frente e que está ao meu lado sempre, para enfrentar os desafios do dia a dia. Estendo meus agradecimentos aos meus sogros, **Fátima e Ricardo** e cunhado, **Junior**, pelo apoio e acolhimento.

À minha orientadora e mãe no mundo acadêmico, Prof.ª Drª **Simone Soares**, por ser exemplo e inspiração, pelo incentivo, pela paciência e por me acolher como aluno desde os tempos de Graduação. Que sorte a minha ter nossos caminhos cruzados.

Ao Prof. Dr. **Paulo Sérgio da Silva Santos**, pela oportunidade de trabalhar e conviver com um profissional tão compromissado e atencioso. Foi uma honra aprender com o senhor.

Aos colegas do Programa de Pós-graduação de Reabilitação Oral, Prótese o qual sinto orgulho e sou grato todos os dias em ter feito parte. Aos meus colegas **Lucas Fracassi, Isadora, Carol, Izabel, Pedro, Jefferson, Karina, Anna, Lucas Azevedo, Mariana, Dyanne e Jorge**, pela convivência nesses últimos anos. Com vocês tive momentos de alegrias, aprendizados, apoio, incentivos e o dia a dia se tornou mais leve. A vocês desejo todo o sucesso profissional e pessoal.

Ao meu amigo **Lucas Fracassi de Oliveira Lino**, pela amizade e companheirismo, que veio a calhar como um dos maiores privilégios que obtive durante a Pós-Graduação e que espero preservar pela vida toda.

À amiga **Isadora Prado Cano**, pela amizade construída ao longo dos anos, sendo um exemplo de amiga. Obrigado, também, por abraçar a causa e aceitar sem hesitação o convite para desenvolver os projetos de pesquisa junto ao Centro de Pesquisas Clínicas da Faculdade de Odontologia de Bauru, sendo tão atenciosa e dedicada aos pacientes.

À amiga **Maria Giulia Rezende Pucciarelli**, por toda parceria, disponibilidade e atenção. Considero-a minha irmã no mundo acadêmico.

À amiga **Brunna Mota Ferrairo**, não apenas pela duradoura amizade, mas por todo suporte oferecido para enfrentar a Pós Graduação.

Aos amigos **Giovanna, Cecy e Gerson**, por provarem que amizades sinceras duram mesmo com a distância.

*A todos os **Professores e servidores do curso de Pós-Graduação** em Reabilitação Oral da Faculdade de Odontologia-USP, pela paciência, carinho, dedicação, companheirismo e pela inspiração. Em especial:*

À Profª. Drª. **Karin Hermana Nepellenbroek**, por ser tão atenciosa e por facilitar e disponibilizar todo seu conhecimento.

Ao Prof. Dr. **Vinicius Carvalho Porto**, por seu conhecimento contagiante e que inspira nós, alunos, ao atendimento de nossos pacientes.

Ao Prof. Dr. **Estevam Augusto Bonfante**, pela imensa sabedoria e todos os conselhos sobre a vida acadêmica.

À Prof.ª Dr.ª **Ana Lúcia Pompéia Fraga de Almeida**, pela determinação e preocupação ao transmitir todo o conhecimento.

Ao Prof. Dr. **Luís Fernando Pegoraro**, por toda inspiração e conhecimento fornecidos.

Ao Prof. Dr. **José Henrique Rubo**, pela dedicação ao ensino teórico e clínico que reflete no cuidado com os pacientes.

Ao Prof. Dr. **Accácio Lins do Valle**, por transmitir seu conhecimento teórico e clínico de uma maneira tão natural e amistosa.

Aos funcionários e servidores do setor de Prótese e Periodontia da Faculdade de Odontologia de Bauru-USP: **Débora, Reivanildo, Ziley, Val, Marcela, Edilaine e Ivânia,** pela ajuda em nosso dia a dia, por todo carinho e companheirismo.

À funcionária do setor de Clínica de Pós-Graduação **Hebe**, por todo carinho e disponibilidade, nos ajudando a receber e cuidar de nossos pacientes.

Ao **Centro de Pesquisas Clínicas da Faculdade de Odontologia de Bauru-USP**, por representar uma das experiências mais ricas e gratificantes de toda minha. Em especial, agradeço aos funcionários **Sueli, Poliane, Anderson, Marcelo e Luciana**, por nos acolher e transformar a rotina em dias mais leves.

Aos **pacientes** da Clínica de Pós Graduação e do Centro de Pesquisas Clínicas da Faculdade de Odontologia de Bauru-USP: a vocês, meu eterno agradecimento pela confiança em mim depositada e por permitirem meu crescimento profissional e pessoal.

À **Faculdade de Odontologia de Bauru-USP**, em nome do Sr. Diretor Prof. Dr. Carlos Ferreira dos Santos, por me oferecer os anos de maior aprendizado e ampliar meus horizontes.

À **Banca Avaliadora** desta Dissertação de Mestrado, por dispor de tempo e atenção a uma atividade que é um marco em minha vida profissional.

À **Seção de Pós-Graduação** da Faculdade de Odontologia de Bauru, pelo empenho e gentileza em todos os momentos.

À Fundação de Amparo à Pesquisa do Estado de São Paulo que por meio do Auxílio Pesquisa Regular FAPESP 2016/14942-6, tivemos acesso ao instrumento para pesquisa Vectra H1

O presente trabalho foi realizado com o apoio da Coordenação de Aperfeiçoamento de Pessoal de Nivel Superior – Brasil (CAPES) – Código de Financiamento 001.

“Por vezes sentimos que aquilo que fazemos não é senão uma gota de água no mar. Mas o mar seria menor se lhe faltasse uma gota.”

Madre Teresa de Calcutá

RESUMO

A necessidade de próteses totais no Brasil ainda é relevante. E pode-se afirmar que o perfil facial do paciente edêntulo é recomposto utilizando-se deste tipo de tratamento. Existem poucos estudos objetivos que se dedicam a caracterizar e avaliar as mudanças proporcionadas por esse tipo de reabilitação protética dental. Uma forma objetiva de se avaliar estes pacientes é a utilização da estereofotogrametria facial, a qual possibilita essa avaliação com precisão. Foram selecionados 30 pacientes reabilitados por próteses totais duplas, 7 homens e 23 mulheres, os quais foram submetidos à estereofotogrametria (Vectra H1) em 2 tempos: sem e com as próteses totais. As imagens foram avaliadas utilizando-se de software específico (VAM Canfield Inc.), aferindo medidas lineares e angulares a partir de pontos craniométricos pré-determinados antes das tomadas fotográficas. Ambos os grupos foram submetidos ao Teste t pareado para a estatística, com poder de teste 0,80 e nível de significância de 0,05. Como resultados, obtivemos diferença estatisticamente significante em 7 das 13 medidas lineares e 7 das 9 medidas angulares avaliadas. Destaca-se um acréscimo nas medidas lineares: Sn-Gn (terço inferior da face) de 64,568 ± 4,802mm a 66,137 ± 4,6949mm, Ls-Li (altura do vermelhão do lábio) de 7,770±2,547mm a 10,411±2,070mm e Chesq-Chdir (largura da boca) de 44,16±5,66mm a 49,66±4,40mm. Também se observa a redução em Sn-Ls (altura do filtro nasal) de 18,084±3,221mm a 17,525±3,109mm. Tratando-se de medidas angulares, destaca-se o acréscimo em Sn-St-Pg (convexidade facial inferior) de 157,01±12,46mm a 166,52±9,00mm e a redução nos ângulos Prn-Sn-Ls (ângulo nasolabial) de 131,61±11,63mm para 124,46±10,75mm e Godir-Pg-Goesq (convexidade da mandíbula) de 76,285±4,982mm para 75,463±5,116mm. Foi possível observar alterações relevantes no perfil facial de pacientes recém reabilitados com próteses totais duplas, sendo encontrados padrões como aumento do terço facial inferior, maior expressão de lábios, suporte aos lábios superior e inferior, e a alteração na convexidade facial, sendo essas características importantes a serem determinadas e seguidas pelo cirurgião-dentista durante as etapas do tratamento protético.

Palavras-chave: Prótese Total. Estereofotogrametria. Reabilitação Bucal.

ABSTRACT

Facial changes evaluation after rehabilitation treatment in edentulous patients by 3D Stereophotogrammetry

The need for complete dentures in Brazil is still relevant. And it can be said that the facial profile of the edentulous patient is recomposed using this kind of treatment. There are few objective studies dedicated to characterizing and evaluating the changes brought about by this type of dental prosthetic rehabilitation. An objective way of evaluating these patients is using facial stereophotogrammetry, which makes this assessment possible with precision. Thirty patients were selected who were rehabilitated using double full dentures, 7 men and 23 women. They were submitted to stereophotogrammetry (Vectra H1) in 2 stages: with and without the complete dentures. The images were evaluated using a specific software (Vam Canfield), measuring linear and angular measurements from pre-determined craniometric points before taking the photographs. Both groups were submitted to the paired t-test for statistics, with a test power of 0.80 and a significance level of 0.05. As a result, we obtained a statistically significant difference in 7 of the 13 linear measures and 7 of the 9 angular measures evaluated. We highlight an increase in linear measurements: Sn-Gn (lower third of the face) from 64.568 ± 4.802mm to 66.137 ± 4.6949mm, Ls-Li (lip vermilion height) from 7.770 ± 2.547mm to 10.411 ± 2.070mm and Chesq-Chdir (mouth width) from 44.16 ± 5.66mm to 49.66 ± 4.40mm. As well as the reduction in Sn-Ls (nasal filter height) from 18.084 ± 3.221mm to 17.525 ± 3.109mm. In the case of angular measurements, we observed an increase in Sn-St-Pg (lower facial convexity) from 157.01 ± 12.46mm to 166.52 ± 9.00mm and the reduction in the Prn-Sn-Ls angles (angle nasolabial) from 131.61 ± 11.63mm to 124.46 ± 10.75mm and Godir-Pg-Goesq (jaw convexity) from 76.285 ± 4.982mm to 75.463 ± 5.116mm. It was possible to observe relevant changes in the facial profile of newly rehabilitated patients with double full dentures, with patterns such as an increase in the lower facial third, greater expression of lips, support for the upper and lower lips, and changes in facial convexity, these being important characteristics to be determined and followed by the dentist during the prosthetic treatment stages.

Keywords: Complete Denture. Stereophotogrammetry. Mouth Rehabilitation.

LIST OF ILLUSTRATIONS

Figures

Figure 1 - Linear measures obtained using the Vectra Analysis Module software (VAM elaboration, Canfield Scientific Inc.)..... 47

Figure 2 - Angular measures obtained using the Vectra Analysis Module software (VAM elaboration, Canfield Scientific Inc.)..... 48

Figure 3 - Facial changes between T1 (left image) and T2 (right image)..... 49

Figure 4 - Image of facial analysis in overlapping T1 and T2 profiles 49

LIST OF TABLES

Table 1 - Description of the morphometric points marked on the face for analysis 46

Table 2 - List of abbreviations and definition of linear measures..... 47

Table 3 - Abbreviations and description of angles formed by linear measures..... 48

Table 4 - Comparative analysis of linear measures (mm) in the two times, T1: without complete dentures and T2: with conventional complete dentures (upper and lower) in all patients (n = 30) 51

Table 5 - Comparative analysis of angles (degrees) in both times, T1: without complete dentures and T2: with conventional complete dentures (upper and lower) in all patients (n = 30). 52

LISTA DE ABREVIATURA E SIGLAS

ST	Stereophotogrammetry
CD	Complete Denture
RMI	Nuclear Magnetic Resonance
LS	Laser Scanner
CT	Computed Tomography

SUMMARY

1 INTRODUCTION 35

2 ARTICLE 41

3 REFERENCES 63

ATTACHMENT 71

Introduction

1 INTRODUCTION

Human beings are inevitably involved in the social context, influencing the understanding and perception of their own corporeal image. This interaction establishes their personal identity, which is an important part of each individual's face, being responsible for conveying and transposing sensations that vary from pleasant to unpleasant, according to the balance of its constituent parts.

Due to the chronic nature of edentulism, many patients may have social[1] and psychological[2] problems caused by chewing difficulties,[3] speech[4,5] and socialization.

Three elements participating in facial expressions that are commonly associated with facial attraction and esthetics must be considered: the eyes, facial musculature, and oral cavity. It is well known that the last two are affected by the loss of dental elements.[6]

Bringing the aesthetic concept to the fore, the importance of framing individuals in these standards grows that, according to the social situation, “more attractive” people are considered, even if by prejudice, more qualified and reliable and, in general, receive better treatment.[7]

By 2040 it is expected 64 million edentulous arches among individuals aged 64 to 75 years in Brazil.[8-9] Even with studies reporting a reduction in the number of edentulous individuals in each generation, a higher life expectancy, high-sugar diet, and Western lifestyle contribute to sustaining the number of edentulous people worldwide.[10]

Considering these factors, the dentist plays a role as a rehabilitator of the esthetic function of the teeth and face, as well as in its replacement during the recovery of the identity of edentulous individuals with complete dentures (CD). In addition, it is known that the manufacturing of these prostheses in terms of the recommended esthetic parameters can be subjective,[11-13] considering the clinical stages of CD, such as the individualization of the upper and lower orientation plan, which is influenced by the precision technique used, experience, and the social, esthetic standard to which the dentist is involved.

Over time, two-dimensional analysis has been used as a standard. With the advent of 3D technology, new forms of assessment, treatment establishment, diagnosis and preservation have been shown to be more reliable and with data storage capacity without the need for physical space.

3D images can be considered an adequate form of facial evaluation and are increasingly inserted in the clinical and research routine.[14-16] There are several ways to obtain them, such as computed tomography (CT),[17-19] nuclear magnetic resonance (MRI),[20,21] laser scanner (LS),[22,23] and stereophotogrammetry (ST).[24-26] Comparing these acquisition methods, some positive and negative points of each one are highlighted. CT, for example, has a biological cost, exposing the patient to radiation,[14,27,28] which opposes the possibility of evaluating both soft and hard tissues simultaneously.[29]

As for MRI, there is a change in the disposition and relationship between the soft tissues of the face, due to the fact that it is obtained in a supine position.[30]

The use of LS has proven to be a precise and comparable way to measurements using traditional methods such as compass and millimeter measuring tape.[14,23] However, the time required for laser facial scanning is too long, which can bring unwanted artifacts to the image, due to the patient's involuntary movements.[31,32]

ST is a safe and non-invasive method, bringing a superior quality image of the face surface, providing color, texture and relief when pairing the facial image with a 3D mesh coming from the analyzed object. On the other hand, it is limited to the superficial analysis of the soft tissues of the face.[14, 24, 33] This method works using a light source and the set of 2 or more synchronized cameras that photograph the patient in different points of view. These images are joined and transformed into a 3D representation of the patient's facial surface.[24-26] Its precision and reproducibility have already been amply attested, surpassing traditional methods with calipers.[24, 34-36]

Portable ST instruments such as Vectra H1 (Canfield Scientific, Inc, Fairfield, NJ, USA), are a compact device and have become more present and available, facilitating the handling and portability of the system compared to composite devices by multiple cameras.[33,37]

These more recent instruments prove to be as accurate and reliable as stationary stereophotogrammetry with multiple cameras and have been validated for use in facial research and analysis.[33, 37, 38] This technology must be used with caution during the acquisition of the 3D image, because its weak point is the need for sequential photographic shots, while static systems obtain them all at once. This fact can increase the possibility of error in the generation of the 3D image due to involuntary movements of the patient's head and face.[33, 37]

EF as a facial assessment tool is widely used in studies involving linear, angular and surface area measurements,[25, 33, 34] enabling studies in Dentistry that encompass the analysis of facial aspects mainly in the areas of Orthodontics[39, 40], Oral and Maxillofacial Surgery[40, 41] and Dental Prosthesis.[42-45]

The literature is scarce in studies that assess, through ST, the quantitative difference promoted in the face of individuals rehabilitated with removable dentures. More objective investigations of the rehabilitating effect of CDs are necessary to assess what, in fact, occurs on the face, before and after treatment with CDs, since most studies that evaluate the face of this type of patient are subjective.[43, 46, 47]

The aim of the study was to perform a comparative analysis of rehabilitated patients with removable full dentures to assess the positioning and reconstitution of the lower facial third and soft tissue of the face.Através da EF, os pacientes foram avaliados em dois momentos distintos.

Morphometric points on the face were established and the hypothesis to be tested was that there is no difference in the established measurements (linear and angular) before and after the installation of total dentures.

Article

The article in this Dissertation was written according to the instructions and guidelines of the journal Clinical Oral Investigations

2 ARTICLE

Guilherme Hideki de Lima Toyoshima[1], Maria Giulia Rezende Pucciarelli[1], Karin Hermana Neppelenbroek[2], Chiarella Sforza[3], Márcio de Menezes[4] Thaís Marchini Oliveira[5], Simone Soares[6]

Tittle: Facial changes evaluation after rehabilitation treatment in edentulous patients by 3D Stereophotogrammetry

[1]Postgraduate student, Department of Prosthodontics and Periodontology, Bauru School of Dentistry, University of São Paulo, Alameda Dr. Octávio Pinheiro Brisolla 9-75, 17012-901, Bauru, São Paulo, Brazil

[2]Department of Prosthodontic and Periodontology, Alameda Dr. Octávio Pinheiro Brisolla 9-75, 17012-901, Bauru, São Paulo, Brazil

[3]Department of Biomedical Sciences for Health, Università degli Studi di Milano
Via Luigi Mangiagalli 31, 20133 Milano, Italy ORCID 0000-0001-6532-6464

[4]School of Health Sciences - State University of Amazonas, Av. Carvalho Leal, 1777, Cachoeirinha. 69065-001, Manaus, Amazonas, Brazil

[5]Department of Pediatric Dentistry, Orthodontics and Public Health, Alameda Dr. Octávio Pinheiro Brisolla 9-75, 17012-901 and Hospital for Rehabilitation of Craniofacial Anomalies, Bauru, São Paulo, Brazil

[6]Department of Prosthodontic and Periodontology, Alameda Dr. Octávio Pinheiro Brisolla 9-75, 17012-901 and Hospital for Rehabilitation of Craniofacial Anomalies, Bauru, São Paulo, Brazil ORCID 0000-0003-0811-7302

Abstract

Objective: This research aimed to evaluate facial proportions before and after oral rehabilitation with double full dentures, quantifying the changes promoted on the face through stereophotogrammetry.

Materials and methods: 30 rehabilitated patients with a pair of complete dentures, 7 men and 23 women, aged between 50 and 75 years were selected. All individuals were submitted to photographic taking using a stereophotogrammetry camera (VECTRA H1, Canfield Scientific Inc.) in 2 different times: T1, before oral rehabilitation and T2, after the installation of double full dentures. The images were analyzed using the Vectra Analysis Module software (VAM elaboration, Canfield Scientific Inc.). The facial evaluation was based on linear and angular measurements, from predetermined morphometric points. The paired t-test was used to establish the comparison between the times with a significance level of 0.05 and test power of 0.80.

Results: There were statistically significant differences in 7 linear measurements, with increased facial proportions after oral rehabilitation: Sn-Gn (lower third of the face, $p = 0.003$), N-Pg (central facial height, $p = 0.013$), Sn- Pg (lower facial height, $p = 0.003$), Ls-Li (vermilion height of the lip, $p = 0.00$), Chesq-Chdir (mouth width, $p = 0.00$) and Acdir-Acesq (width between the wing inserts of the nose, $p = 0.040$). There was also a reduction in Sn-Ls (nasal filter height, $p = 0.008$). The evaluated angles showed statistical difference in 7 measurements, with an increase in the angles: Sn-St-Pg (lower facial convexity, $p = 0.000$), Tdir-Godir-Pg and Tesq-Goesq- Pg (right and left gonic angle, $pdir = 0.046$; $pesq = 0.024$, respectively) and reduction in the Prn-Sn-Ls angles (nasolabial angle, $p = 0.000$), Tdir-Pg-Tesq (horizontal lower facial convexity, $p = 0.006$), Godir-Pg-Goesq (mandible convexity, $p = 0.023$) and N-Sn-Pg (average facial convexity, $p = 0.000$).

Conclusions: Oral rehabilitation with complete dentures is able to restore facial proportion and harmony between the facial thirds.

Clinical relevance: Quantifying the changes that occur on the face after oral rehabilitation with conventional full dentures using 3D technology makes it possible to understand the importance of this treatment modality, since it modifies becoming ill as facial proportions and allows to establish more precise parameters in decision-making.

INTRODUCTION

Human beings are inevitably involved in the social context, influencing the understanding and perception of their own corporeal image. This interaction establishes their personal identity, which is an important part of each individual's face, being responsible for conveying and transposing sensations that vary from pleasant to unpleasant, according to the balance of its constituent parts. Three elements participating in facial expressions that are commonly associated with facial attraction must be considered: the eyes, facial musculature, and oral cavity. It is well known that the last two are affected by the loss of dental elements [1].

Because of the chronic nature of edentulism, many patients have social and psychological problems caused by difficulties in chewing, speaking, and socializing [2,3]. Another important factor is the loss of the residual alveolar ridge causing changes in the face [4,5]. This corroborates the collapse of the lower facial third and causes facial disharmony, culminating in the reduction of the vertical dimension of occlusion, defined as the distance between the anatomical features selected or marked (usually one on the tip of the nose and the other on the chin), when in the position of maximum intercuspation [6].

Even with studies reporting a reduction in the number of edentulous individuals in each generation, a higher life expectancy, high-sugar diet, and Western lifestyle contribute to sustaining the number of edentulous people worldwide [7]. According to the Ministry of Health, the need for complete dentures in Brazil is still relevant [8]. The number of edentulous arches in Brazil among individuals aged 64 to 75 years would increase by 2040, reaching 64 million [9].

Considering these factors, the dentist plays a role as a rehabilitator of the esthetic function of the teeth and face, as well as in its replacement during the recovery of the identity of edentulous individuals with complete dentures (CD). In addition, it is known that the manufacturing of these prostheses in terms of the recommended esthetic parameters can be subjective [10-12], considering the clinical stages of CD, such as the individualization of the upper and lower orientation plan, which is influenced by the precision technique used, experience, and the social, esthetic standard to which the dentist is involved.

It is common to find studies in the literature that seek to assess patient satisfaction after recovery of facial proportions through oral rehabilitation with CD [13,14], using tools such as OHIP-EDENT to determine the impact on the quality of life in edentulous patients [15–17]. However, there is still a scarcity of studies that objectively and quantitatively assess this change.

Stereophotogrammetry has been widely used to assess the esthetic aspects of the face [18–20] and other parts of the body, assisting in decision-making and enabling the visualization

of increased volume and area in procedures that have been shown to be feasible over time but based on empiricism. In addition, another modality to which it is being applied is confronting the facial aspects before and after orthognathic surgery and surgical maxillary expansion [21–23]. This method has already been recommended, validated, and accepted for clinical and research purposes [21–25]. Thus, its use in measuring facial dimensions is recent, with few studies related to rehabilitation in general and mainly regarding changes before and after the installation of complete dentures.

The present study aimed to compare rehabilitated patients with complete dentures and to evaluate the positioning and reconstitution of the soft tissue and lower third of the face. Through stereophotogrammetry, the patients were evaluated at two different times. Morphometric points on the face were established, and the hypothesis tested was that there is no difference in linear and angular measurements before and after the installation of total dentures.

MATERIALS AND METHODS

Approval by the Research Ethics Committee

The study was approved by the ethics committee of the institution where the study was conducted under protocol number CAAE: 99721718.6.0000.5417, following the ethical standards prescribed in the Declaration of Helsinki. All patients provided written informed consent prior to their inclusion in the study.

Sample Selection

The sample size calculation was based on a pilot study, according to the paired t-test adopted in the present study. Considering a minimum relevant difference of at least 2.2 mm in the alteration of the soft tissues (standard deviation, 3.98 mm) as previously evaluated in the studied population, adopting a significance of 0.05, and test power of 0.80, the sample size obtained was 28 patients.

The study selected 30 Caucasian individuals aged between 50 and 75 years, in routine care at the educational institution where the work was performed. Inclusion criteria were individuals of both sexes, toothless (maxilla and mandible) for at least 5 years, and at most 15 years. All clinical steps for the manufacture of complete dentures were performed under the supervision of two specialists in oral rehabilitation, and the laboratory steps were performed by a dental prosthesis technician. The exclusion criteria included edentulous patients in only one

of the dental arches, and/or submitted to recent extractions, and patients who did not sign the consent form.

Acquisition of 3D images (Stereophotogrammetry)

Two calibrated operators conducted the image acquisitions by stereophotogrammetry using the portable system with the aid of the VECTRA H1 camera (Canfield Scientific, Inc.), described in the literature as a reliable and accurate method [26]. The acquisition using this system consists of capturing three images at intervals of a few seconds under the specific conditions suggested by the manufacturer: the first capture took place with the camera at 45° to the volunteer's right and approximately 20–30 cm below his face; the second capture occurred in the frontal position; and the third capture occurred with the camera 45° to the left side of the volunteer, in a condition similar to the first capture. All procedures were performed in accordance with the manufacturer's guidelines [26]. After the acquisition of the photographs, the device was connected to a laptop in order to check the accuracy of the 3D reconstructions, which the software performed automatically.

The patients were instructed to remain seated, to look at a fixed point before the beginning of the sequence of taking photographs and were all instructed to remove earrings and wear a cap to expose the frontal region and the external auditory pavilion.

A series of 28 morphometric points (Table 1) were marked on the face using an eyeliner (Make B., O Boticário, Paraná, Brazil) while the patient was using complete dentures. These points were scored by the examiners that were previously calibrated.

Table 1. Description of the morphometric points marked on the face for analysis.

Morphometric points	Definition
Gnátio (Gn)	The lowest median landmark on the lower border of the mandible;
Cheilion (Ch)	The point located at each labial commissure (left and right);
Glabella (G)	The most prominent midline point between the eyebrows;
Crista philtri (Cph)	The point on each elevated margin of the philtrum just above the vermilion line (left and right);
Labiale superius (Ls)	The midpoint of the upper vermilion line;
Stomion (St)	The imaginary point at the crossing of the vertical facial midline and the horizontal labial fissure between gently closed lips;
Labiale inferius (Li)	The midpoint of the lower vermilion line;
Endocanthion (En)	The point at the inner commissure of the eye fissure (left and right);
Exocanto (Ex)	The point at the outer commissure of the eye fissure (left and right);
Nasion (N)	The point in the midline of both the nasal root and the nasofrontal suture;
Pogonion (Pg)	The most anterior of the chin;
Pronasale (Prn)	The most protruded point of the apex nasi;
Subnasale (Sn)	The midpoint of the angle at the columella base where the lower border of the nasal septum and the surface of the upper lip meet;
Alare (Al)	The most lateral point on each alar (left and right);
Tragion (T)	The notch on the upper margin of the tragus (left and right);
Trichion (Tr)	The point on the hairline in the middle of forehead;
Alar curvature (Ac)	The most lateral point in the curved base line of each ala;

The acquisition of the images by stereophotogrammetry was performed twice on the same day, such that the markings of the morphometric points were performed only once on the individual's face to reduce the bias between the times. The first moment (T1) characterizes the patient's initial condition: edentulous without complete dentures in the mouth, and the second moment (T2) is the result of rehabilitation, with the total dentures already installed in the mouth, reestablishing esthetics, function, and phonetics.

Image analysis

Using the Vectra Analysis Module software (VAM elaboration, Canfield Scientific Inc.), 28 morphometric points marked on the patient's face were identified by a previously calibrated operator. With the points identified, linear measurements (Figure 1) described in Table 2 were obtained. Angular measurements (Figure 2), described in Table 3, were also obtained.

Figure 1. Linear measures obtained using the Vectra Analysis Module software (VAM elaboration, Canfield Scientific Inc.).

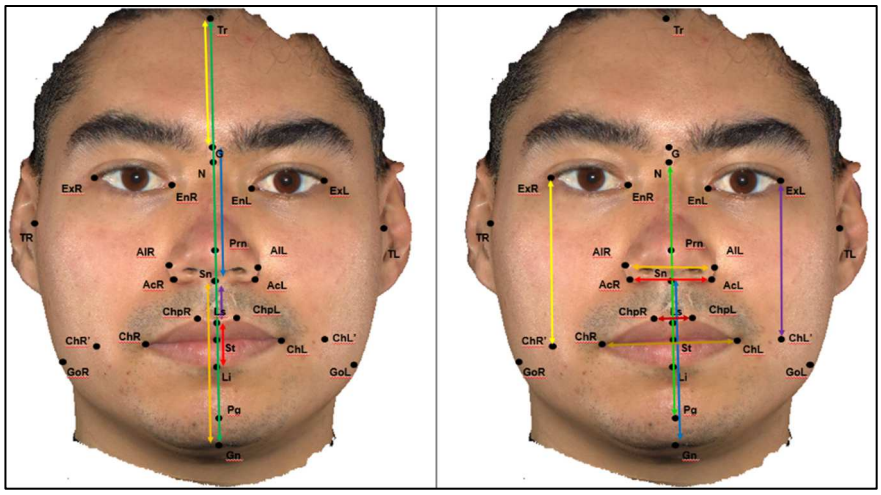


Table 2. List of abbreviations and definition of linear measures.

Linear Measures	Definition
Tr – G	Distance between trichion and glabella;
G – Sn	Distance between glabella and subnasale;
Sn – Gn	Distance between subnasale and gnathion;
N – Pg	Distance between nasion and pogonion;
Sn – Pg	Anterior lower facial height;
Ls - Li	Height of the upper and lower vermilion;
Sn - Ls	Height of the cutaneous upper lip;
Ex (R) - Ch' (R)	Distance between exocanthion and cheilon' (right);
Ex (L) - Ch' (L)	Distance between exocantion and cheilon' (left);
Ac (R) – Ac (L)	The width between the facial insertion points of alar base;
Al (R) – Al (L)	Width of the nose;
Ch (R)- Ch (L)	Mouth width;
Cph (R) – Cph (L)	Width of the philtrum;

Abbreviation: L: left side; R: right side.

Figure 2. Angular measures obtained using the Vectra Analysis Module software (VAM elaboration, Canfield Scientific Inc.).

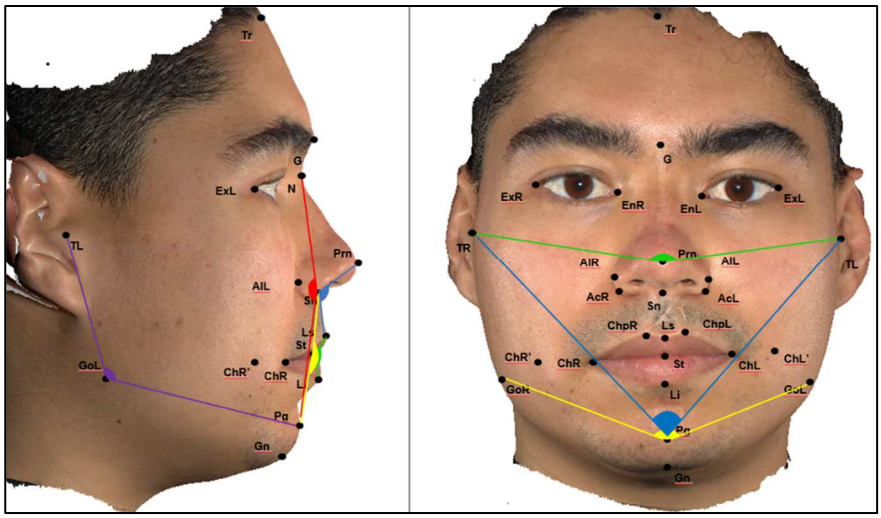


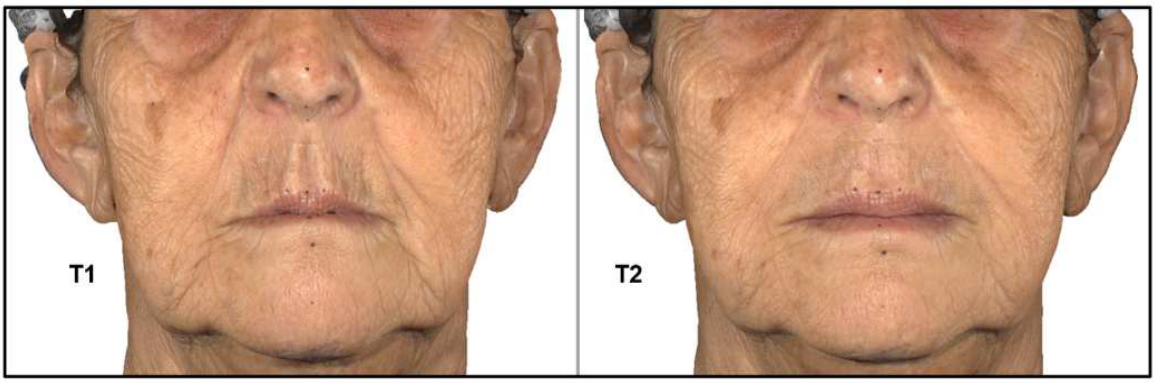
Table 3. Abbreviations and description of angles formed by linear measures.

Angular Measures	Definition
Prn-Sn-Ls	Nasolabial Angle;
Ls-St-Li	Sealed lips angle;
Sn-St-Pg	Lower facial convexity;
T(R) – Prn – T(L)	Middle facial convexity;
T(R) – Pg – T(L)	Lower facial convexity;
Go(R) – Pg - Go(L)	Mandibular convexity;
N–Sn–Pg	Facial convexity (excluding nose);
T(R)-Go(R)-Pg	Right gonial angle;
T(L)-Go(L)-Pg	Left gonial angle;

Abbreviation: L: left side; R: right side.

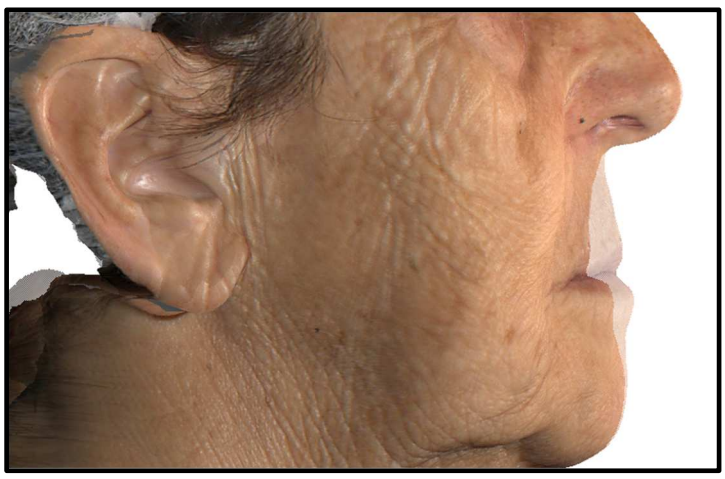
The analysis was based on the pertinent literature about the evaluation of facial metrics following the anthropometric points described by Farkas in 1994 [27], considering that linear and angular measures were selected to quantify the noticeable facial changes after oral rehabilitation (Figure 3).

Figure 3. Facial changes between T1 (left image) and T2 (right image).



The image overlay method was performed using the software to achieve a satisfactory alignment between the images acquired at T1 and T2. Registration of surfaces in the two 3D images was carried out by manually marking a known and unchanged area in the images: in the present work, the upper frontal region (between Tr and N) and two points in front of the tragus were used, one on the right side and one on the left side (TR and TL) of the individuals, as a reference for the overlap. This method was used to visibly check facial changes, highlighting the lower third of the face, which the prostheses indicated had a great influence on the restoration of facial aesthetics (Figure 4).

Figure 4. Image of facial analysis in overlapping T1 and T2 profiles.



Method error

The markings of the morphometric points were made on the face of the individuals, by two experienced evaluators, in an analogical way, using an eyeliner and the marking was made only once in each individual, to obtain the two photographic shots at the proposed moments. In the linear and angular measurements, from the determined points, the intraoperator calibration was also verified in 1/3 of the sample by the evaluators with an interval of 15 days between the measurements, submitted to paired t-test and Dahlberg to check the systematic error and random between measurements ($p \geq 0.05$).

Statistical analysis

The paired t-test was used for the quantitative assessment of the change in facial metrics in all individuals at the two times proposed at work (T1 and T2), with a significance level of 0.05 and test power of 0.80. All statistical analysis was performed with Minitab software version 19 (Minitab, Inc., State College, PA, USA).

RESULTS

Thirty patients rehabilitated with CD (upper and lower) were selected; seven were males and 23 were females, aged between 50 and 75 years, and edentulous time between 5 and 15 years. All the selected patients were included in the study.

The agreement between the operators was assessed by the Kappa coefficient (0.82 for the analog measurements and 0.84, for the digital measurements), determining inter-examiner reproducibility about landmarks in patients. In the linear and angular measurements, the intraoperative calibration was submitted to paired t-test and Dahlberg to verify the systematic and random error between the measurements, respectively, demonstrating that both examiners were considered calibrated ($p \geq 0.05$).

Comparative analysis of linear measurements (mm) in T1 (without CD) and T2 (with CD)

The results obtained can be seen in Table 4 below.

Table 4. Comparative analysis of linear measures (mm) in the two times, T1: without complete dentures and T2: with conventional complete dentures (upper and lower) in all patients (n = 30).

Linear measures (13)	T1 (Mean±St)	T2 (Mean±St)	p≤0,05
Tr-G	54,35±8,54	54,51±8,60	0,300
G-Sn	63,036±5,153	62,836±5,294	0,200
Sn-Gn	64,568±4,802	66,137±4,694	**0,003***
N-Pg	101,79±7,13	103,30±6,87	**0,013***
Sn-Pg	51,210±5,284	52,868±4,931	**0,003***
Ls-Li	7,770±2,547	10,411±2,070	**0,000***
Sn-Ls	18,084±3,221	17,525±3,109	**0,008***
ExR-Ch'R	65,78±5,70	66,58±5,57	0,062
ExL-Ch'L	66,075±5,105	66,287±5,464	0,599
ChR-ChL	44,16±5,66	49,66±4,40	**0,000***
CphR-CphL	10,80±1,88	13,08±7,77	0,126
AcR-AcL	36,170±3,827	36,680±3,981	**0,040***
AlR-AlL	35,483±4,087	36,161±4,808	0,095

Paired t-test, * Statistically significant difference

Linear measurements were analyzed objectively, and statistically significant differences were found ($p \leq 0.05$) in 7 of the 13 measures evaluated, with an increase in facial proportions after rehabilitation with the complete denture in Sn-Gn (lower third of the face) from 64.568 ± 4.802 mm to 66.137 ± 4.6949 mm, N-Pg (central facial height) from 101.79 ± 7.13 mm to 103.30 ± 6.87 mm, Sn-Pg (lower facial height) of 51.210 ± 5.284 mm to 52.868 ± 4.931 mm, Ls-Li (height of vermilion of the upper and lower lip) from 7.770 ± 2.547 mm to 10.411 ± 2.070 mm, ChR-ChL (mouth width) from 44.16 ± 5, 66 mm to 49.66 ± 4.40 mm, AcR-AcL (width between the facial insertions of the nose wing) from 36.170 ± 3.827 mm to 36.680 ± 3.981 mm. The linear measure of the nasal filter height (Sn-Ls) decreased from 18.084 ± 3.221 mm to 17.525 ± 3.109 mm.

Comparative analysis of angular measurements (degrees) in T1 (without CD) and T2 (with CD):

The results obtained can be seen in Table 5 below.

Table 5. Comparative analysis of angles (degrees) in both times, T1: without complete dentures and T2: with conventional complete dentures (upper and lower) in all patients (n = 30).

Angular Measures (9)	T1 (Mean±St)	T2 (Mean±St)	p≤0,05
Prn-Sn-Ls	131,61±11,63	124,46±10,75	**0,000***
Ls-St-Li	121,6±20,1	154,9±190,7	0,353
Sn-St-Pg	157,01±12,46	166,52±9,00	**0,000***
TR-Prn-TL	65,881±3,214	65,972±3,518	0,763
TR-Pg-TL	63,853±2,509	63,165±2,017	**0,006***
GoR-Pg-GoL	76,285±4,982	75,463±5,116	**0,023***
N-Sn-Pg	170,81±7,92	168,60±8,22	**0,000***
TR-GoR-Pg	127,159±5,150	127,652±5,320	**0,046***
TL-GoL-Pg	125,42±5,70	126,09±5,84	**0,024***

Paired t-test, * Statistically significant difference

Angular measurements were made from angles formed by 3 distinct craniometric points, and a statistically significant difference ($p \leq 0.05$) was observed in 7 of the 9 measures analyzed, which found an increase in the Sn-St-Pg angle (convexity from 157.01 ± 12.46 mm to 166.52 ± 9.00 mm, TR-GoR-Pg (right gonic angle) from 127.159 ± 5.150 mm to 127.652 ± 5.320 mm, and TL-GoL-Pg (left gonic angle) from 125.42 ± 5.70 mm to 126.09 ± 5.84 mm. In addition, a reduction in the Prn-Sn-Ls (nasolabial angle) angles from 131.61 ± 11.63 mm to 124.46 ± 10.75 mm, TR-Pg-TL (horizontal lower facial convexity) from 63.853 ± 2.550 mm to 63.165 ± 2.017 mm, GoR-Pg-GoL (jaw convexity) from 76.285 ± 4.982 mm to 75.463 ± 5.116 mm, and N-Sn-Pg (average facial convexity) from 170.81 ± 7.92mm to 168.60 ± 8.22mm was found.

DISCUSSION

The present study evaluated changes in the facial profile before and after the installation of conventional double-full dentures using 3D stereophotogrammetry as a measurement tool in edentulous patients. The tested hypothesis was partially rejected because, in the measurements, there was a difference before and after the delivery of the total prostheses in seven of 13 linear measurements and in seven of nine angular measurements.

Changes promoted by rehabilitation

In toothed individuals, the vertical dimension of occlusion is established by the contact between the upper and lower teeth. As a consequence of edentulism, there is a need to re-establish the vertical dimension of occlusion, which changes the lower third of the face and can manifest in the frontal plane as an inappropriate facial contour, narrow upper and lower lip edges, and a contracted commissure, revealing that there is a "closure" in the region, denoting an inverted aspect [28]. Sagittal facial analysis can reveal mandibular pseudo-prognathism and mandibular closure [29–31], thereby impairing masticatory and phonetic functions [32]. Thus, the changes observed in the linear measurements showed that the lower third of the face (Sn-Gn), central facial height (N-Pg), and lower facial height (Sn-Pg) were strongly influenced by the installation of the total prosthesis (upper and lower). lower), indicating changes in the vertical dimension of the occlusion.

The verified results (Sn-Pg) corroborate the results previously reported by other authors [33,34], that such measures increased after the installation of the prostheses, with the proviso that the study by Tartaglia et al. [34] evaluated total implant-supported prostheses. The lower third of the face (Sn-Gn) increased with statistical relevance in the present study and is in line with what was reported in a previous study [34] (64.56 · ± 4.80 in T1 and 66.12 ± 4.69 in T2; and 60.13° ± 3.91° (before treatment) and 62.27 ± 3.82% (after treatment).

The significant differences in the increase in values observed in the lips in Ls-Li (distance between vermilion of the upper and lower lip) reveal that there is tissue gain, an important analysis to be considered, especially in the female sex, which over time, due to dental wear, tooth loss, and decreased collagen synthesis, tissues have less elasticity and mobility [36, 37]. The study by Ushijima et al., (2013) [38] confirmed the changes that occur with the upper and lower lips, especially when the vertical dimension of occlusion is decreased or increased, revealing that the new prosthesis helps in resuming an adequate positioning of the lips with increased linear measurements, as observed in the present study (7.70 2.54 T1 10.41 2.07 T2). It is worth mentioning that the work by Menezes et al. (2011 [39) showed that in a group of patients aged between 45 and 65 years, the thickness of the lips was significantly less, even in the presence of teeth in the mouth (at least 24 dental elements), which shows that age causes the tissues to become less elastic and flabbier.

The height of the lip filter (Sn-Ls) showed a decrease, because when inserting an upper total prosthesis, the distances between the base of the nose (Sn) and the upper limit of the upper lip (Ls) became closer, revealing smaller measurement values after delivery of the total prosthesis.

The width of the mouth (ChR-ChL) was shown to be significantly greater in the horizontal direction, demonstrating that the total prosthesis can support the orbicularis musculature by changing the naso-genial sulcus, returning aspects of youthfulness to the individuals who use them. Our results (44.16 ± 5.66 in T1 and 49.66 ± 4.40 in T2) proved to be contrary to the study by Tartaglia et al. [34], with a significant increase in vertical dimensions without a variation in the width of the mouth. However, it must be considered once again that the study by Tartaglia et al. [34] was developed based on implant-supported total prostheses that do not have the buccal flange, which supports the musculature of the lips.

The significant differences in the linear measurements indicated that the degree of lip support changes not only the lip contour but also the shape of the nasal base, which is in agreement with the results of Fanibunda et al. [40], who reported a forward displacement of the upper and lower lips after the insertion of full dentures and the dominant effect of upper dentures.

A remarkably interesting aspect to be discussed is the difference observed in the width between the facial insertions of the wings of the nose (AcR-AcL), a measure that increased after the delivery of the total prosthesis, as the prosthesis provides support to the upper lip tissues and supports the inserts of the wings of the nose. However, when analyzing the measurements of the width of the base of the nose, it is important to note that the values increased, without a statistical difference, but it was expected that they would decrease because, when bringing support the tissue, the nose rises, and the width tends to decrease.

Linear measurements that did not show a statistically significant difference throughout the rehabilitation process, such as ExR-Ch'R and ExL-Ch'L, revealing stability and especially the importance of these anatomical structures in helping to take the vertical rest dimension to reach the vertical dimension of occlusion in edentulous patients. Protestants and dentists are constantly challenged in determining the vertical dimension, as the literature does not offer any universal and accepted scientific method for the precise determination of this measure of greatness [41]. Helal and Hassan [42] observed that in dentate patients, the distance from the base of the chin (Gn) to the base of the nose (Sn) showed no statistically significant difference in relation to the measurement of the exocanto (ExR and ExL) to the corner of the mouth (ChR and Chl).

In the angular measurements, the nasolabial angle (Prn-Sn-Ls) was smaller after the delivery of the total prostheses (T1: 131.61 ± 11.63° and T2: 124.46° ± 10.75°) with statistical relevance ($p = 0.000$), showing that this type of rehabilitation treatment promotes tissue support and is in accordance with the literature [33,34]. Brunton and McCord [43] showed that in

toothed and toothless individuals, the average nasolabial angle was 109.67° and 96.20°, respectively, which reveals that we should look for values between 95° and 110° to establish facial harmony.

The lower facial convexity (Sn-St-Pg), evaluated in the sagittal plane, increased significantly, as the teeth installed in the total prosthesis and the base of the prosthesis provided support to the tissues surrounding the mouth, which presented themselves before the rehabilitation prosthetic treatment, with facial flaccidity and decreased skin elasticity, in addition to the general decrease in volume due to increasing age [44]. In contrast, in the frontal plane, the angle corresponding to the lower horizontal facial convexity (TR-Pg-TL) decreased in the horizontal direction, resulting in a reduction in the angular measurements.

The convexity of the mandible (GoR-Pg-GoL) was reduced after the rehabilitation treatment with the conventional double-full denture, and the soft tissues prior to the treatment were more spread out; after the treatment, they showed greater support.

In the evaluation of the angle that demonstrates the average facial convexity (N-Sn-Pg), the reduced values after the installation of the prosthesis revealed that before the treatment, the face was less convex, and it was possible to obtain a more convex profile afterward. Also, the greater the convexity of the face, the smaller the angle formed between N-SN-Pg and the lower the convexity, and the greater the angle formed.

The angles TL-GoL-Pg (left gonic angle) and TR-GoR-Pg (right gonic angle) in an evaluation in the sagittal plane showed an increase, again revealing that the total prosthesis can improve the profile of patients.

Stereophotogrammetry

3D technology has brought new possibilities for measurement measurements, and stereophotogrammetry is a reality that has proven to be reliable, valid, and reproducible. Its use will allow measures that were taken as absolute truths, such as reestablishing the vertical dimension, to be reevaluated, and paradigms broken. Thus, more precise studies have been presented in comparison with anthropometric studies that used calipers and calipers [19, 35, 45].

Limitations

The present study has limitations related to facial changes, which may be subject to subjectivity as to the esthetic proportion related to the professional and patients' socio-cultural context. It must also be considered that the patients evaluated were Caucasian, which limits the

results obtained. Another issue to be raised is the fact that the authors determined the race of the selected research subjects, as the study was carried out in a country with racial diversity in which miscegenation is quite common.

Compliance with ethical standards

Conflict of interest

The authors declare that they have no conflict of interest.

Ethical aproval

The study was carried out in compliance with all ethical requirements, being approved by the Research Ethics Committee - Faculty of Dentistry of Bauru / University of São Paulo (CAAE registration: 99721718.6.0000.5417).

Informed consent

Informed consent was obtained from patients according to the standards required by the Research Ethics Committee of all patients involved in the study.

References

1. Telles D (2013) Prótese Total – Convencional e sobre implantes. Santos, São Paulo
2. Papadaki E, Anastassiadou V (2012) Elderly complete denture wearers: a social approach to tooth loss. Gerodontology 29(2):e721-e727. https://doi.org/10.1111/j.1741-2358.2011.00550.x
3. Roumanas ED (2009) The social solution-denture esthetics, phonetics, and function. J Prosthodont 18(2):112-115. https://doi.org/10.1111/j.1532-849X.2009.00440.x
4. Tallgren A (1966) The reduction in face height of edentulous and partially edentulous subjects during long-term denture wear. A longitudinal roentgenographic cephalometric study. Acta Odontol Scand 24(2):195-239. https://doi.org/10.3109/00016356609026127
5. Martone AL (1964) Effects of complete dentures on facial esthetics. The Journal of Prosthetic Dentistry 14(2):231-55. https://doi.org/10.1016/0022-3913(64)90084-8
6. The Glossary of Prosthodontic Terms: Ninth Edition (2017). J Prosthet Dent 117(5S):e1-e105. https://doi.org/10.1016/j.prosdent.2016.12.001
7. Cooper LF (2009) The current and future treatment of edentulism. J Prosthodont. 18(2):116-122. https://doi.org/10.1111/j.1532-849X.2009.00441.x

8. Brasil. Ministério da Saúde (MS) (2011) Projeto SB Brasil 2010: Pesquisa Nacional de Saúde Bucal. Resultados Principais. Ministério da Saúde. https://bvsms.saude.gov.br/bvs/publicacoes/pesquisa_nacional_saude_bucal.pdf. Accessed 16 February 2021
9. Cardoso M, Balducci I, Telles DM, Lourenço EJV, Nogueira JL (2016) Edentulism in Brazil: trends, projections and expectations until 2040. Ciênc. saúde coletiva 21(4):1239-1246. http://dx.doi.org/10.1590/1413-81232015214.13672015
10. Frush JP, Fisher RD (1956) How dentogenics interprets the personality factor. J Prosthet Dent 6(4):441-449. https://doi.org/10.1016/0022-3913(56)90089-0
11. Souza CP, Tamaki ST (1996) Estudo das posicoes do labio superior, sub-nasio, tuberculo do labio e exposicao gengival em dentados e desdentados com vista a estetica facial. Dissertation, Universidade de São Paulo
12. Rufenacht C (1990) Fudamentals of esthetics. Quintesse, Chicago.
13. Ellis JS, Thomason JM, McAndrew R (2010) A pilot study examining the effects of enhanced aesthetics on oral health related quality of life and patient's satisfaction with complete dentures. Eur J Prosthodont Restor Dent 18(3):116-122.
14. Ellis JS, Pelekis ND, Thomason JM (2007) Conventional rehabilitation of edentulous patients: the impact on oral health-related quality of life and patient satisfaction. J Prosthodont 16(1):37-42. https://doi.org/10.1111/j.1532-849X.2006.00152.x
15. Duale JMJ, Patel YA, Wu J, Hyde TP (2018) A Systematic Review and Meta-Analysis of Baseline Ohip-Edent Scores. Eur J Prosthodont Restor Dent 26(1):17-23. https://doi.org/10.1922/EJPRD_01753Duale07
16. Allen PF, McMillan AS (2003) A longitudinal study of quality of life outcomes in older adults requesting implant prostheses and complete removable dentures. Clin Oral Implants Res 14(2):173-179. https://doi.org/10.1034/j.1600-0501.2003.140206.x
17. Locker D, Allen F (2007) What do measures of 'oral health-related quality of life' measure?. Community Dent Oral Epidemiol 35(6):401-411. https://doi.org/10.1111/j.1600-0528.2007.00418.x
18. Pucciarelli V, Gibelli D, Barni L, Gagliano N, Dolci C, Sforza C (2018) Assessing Normal Smiling Function Through 3D-3D Surfaces Registration: An Innovative Method for the Assessment of Facial Mimicry. Aesthetic Plast Surg 42(2):456-463. https://doi.org/10.1007/s00266-017-1028-3

19. de Menezes M, Rosati R, Allievi C, Sforza C (2009) A photographic system for the three-dimensional study of facial morphology. Angle Orthod 79(6):1070-1077. https://doi.org/10.2319/111008-570
20. Rosati R, De Menezes M, da Silva AM, Rossetti A, Lanza Attisano GC, Sforza C (2014) Stereophotogrammetric evaluation of tooth-induced labial protrusion. J Prosthodont 23(5):347-352. https://doi.org/10.1111/jopr.12135
21. Chortrakarnkij P, Lonic D, Lin HH, Lo LJ (2017) Establishment of a Reliable Horizontal Reference Plane for 3-Dimensional Facial Soft Tissue Evaluation Before and After Orthognathic Surgery. Ann Plast Surg 78(3 Suppl 2):S139-S147. https://doi.org/10.1097/SAP.0000000000001020
22. Dindaroğlu F, Duran GS, Görgülü S (2016) Effects of rapid maxillary expansion on facial soft tissues: Deviation analysis on three-dimensional images. J Orofac Orthop 77:242–250. https://doi.org/10.1007/s00056-016-0033-5
23. Altorkat Y, Khambay BS, McDonald JP, Cross DL, Brocklebank LM, Ju X (2016) Immediate effects of rapid maxillary expansion on the naso-maxillary facial soft tissue using 3D stereophotogrammetry. Surgeon 14(2):63-68. https://doi.org/10.1016/j.surge.2014.04.005
24. Kook MS, Jung S, Park HJ, et al. (2014) A comparison study of different facial soft tissue analysis methods. J Craniomaxillofac Surg 42(5):648-656. https://doi.org/10.1016/j.jcms.2013.09.010
25. Othman SA, Ahmad R, Mericant AF, Jamaludin M (2013) Reproducibility of facial soft tissue landmarks on facial images captured on a 3D camera. Aust Orthod J 29(1):58-65.
26. Gibelli D, Pucciarelli V, Cappella A, Dolci C, Sforza C (2018) Are Portable Stereophotogrammetric Devices Reliable in Facial Imaging? A Validation Study of VECTRA H1 Device. J Oral Maxillofac Surg 76(8):1772-1784. https://doi.org/10.1016/j.joms.2018.01.021
27. Farkas LG (1994) Anthropometry of the Head and Face. Raven Press, New York
28. Crothers AJ (1992) Tooth wear and facial morphology. J Dent 20(6):333-341. https://doi.org/10.1016/0300-5712(92)90019-9
29. Johansson A, Johansson AK, Omar R, Carlsson GE (2008) Rehabilitation of the worn dentition. J Oral Rehabil 35(7):548-566. https://doi.org/10.1111/j.1365-2842.2008.01897.x
30. Kaidonis JA (2008) Tooth wear: the view of the anthropologist. Clin Oral Investig 12 Suppl 1(Suppl 1):S21-S26. https://doi.org/10.1007/s00784-007-0154-8

31. Cawood JI, Howell RA (1988) A classification of the edentulous jaws. Int J Oral Maxillofac Surg 17(4):232-236. https://doi.org/10.1016/s0901-5027(88)80047-x
32. Allen PF, Jepson NJ, Doughty J, Bond S (2008) Attitudes and practice in the provision of removable partial dentures Br Dent J 204(1):E2. https://doi.org/10.1038/bdj.2007.568
33. Kamashita Y, Kamada Y, Kawahata N, Nagaoka E (2006) Influence of lip support on the soft-tissue profile of complete denture wearers. J Oral Rehabil 33(2):102-109. https://doi.org/10.1111/j.1365-2842.2006.01575.x
34. Tartaglia GM, Dolci C, Sidequersky FV, Ferrario VF, Sforza C (2012) Soft tissue facial morphometry before and after total oral rehabilitation with implant-supported prostheses. J Craniofac Surg 23(6):1610-1614. https://doi.org/10.1097/SCS.0b013e31825af109
35. Tang J, Wang Y, Wang Z, Guo Y, Wang C (2020) Facial aesthetic evaluation of rehabilitation effects in edentulous patients with varying degrees of residual ridge resorption by 3D stereophotogrammetry. J Oral Rehabil 47(9):1095-1102. https://doi.org/10.1111/joor.13035
36. Van der Geld P, Oosterveld P, Kuijpers-Jagtman AM (2008) Age-related changes of the dental aesthetic zone at rest and during spontaneous smiling and speech. Eur J Orthod 30(4):366-373. https://doi.org/10.1093/ejo/cjn009
37. Sforza C, Grandi G, Binelli M, Dolci C, De Menezes M, Ferrario VF (2010) Age- and sex-related changes in three-dimensional lip morphology. Forensic Sci Int 200(1-3):182.e1-182.e1827. https://doi.org/10.1016/j.forsciint.2010.04.050
38. Ushijima M, Kamashita Y, Nishi Y, Nagaoka E (2013) Changes in lip forms on three-dimensional images with alteration of lip support and/or occlusal vertical dimension in complete denture wearers. J Prosthodont Res 57(2):113-121. https://doi.org/10.1016/j.jpor.2012.11.003
39. De Menezes M, Rosati R, Baga I, Mapelli A, Sforza C (2011) Three-dimensional analysis of labial morphology: effect of sex and age. Int J Oral Maxillofac Surg 40(8):856-861. https://doi.org/10.1016/j.ijom.2011.03.004
40. Fanibunda KB, Allcock GC, Thomason JM (2002) Changes in the facial profile following insertion of complete dentures. Eur J Prosthodont Restor Dent 10(4):143-149.
41. Strajnić L, Sinobad DS (2012) [Application of cephalometric analysis for determination of vertical dimension of occlusion--a literature review]. Med Pregl 65(5-6):217-222. https://doi.org/10.2298/mpns1206217s

42. Helal MA, Hassan AH (2016) Evaluation of lower facial heights as related to different anthropometric measurements in dentate and completely edentulous subjects. Quintessence Int 47(1):51-60. https://doi.org/10.3290/j.qi.a34976
43. Brunton PA, McCord JF (1993) An analysis of nasolabial angles and their relevance to tooth position in the edentulous patient. Eur J Prosthodont Restor Dent 2(2):53-56.
44. Ezure T, Hosoi J, Amano S, Tsuchiya T (2009) Sagging of the cheek is related to skin elasticity, fat mass and mimetic muscle function. Skin Res Technol 15(3):299-305. https://doi.org/10.1111/j.1600-0846.2009.00364.x
45. de Menezes M, Rosati R, Ferrario VF, Sforza C (2010) Accuracy and reproducibility of a 3-dimensional stereophotogrammetric imaging system. J Oral Maxillofac Surg 68(9):2129-2135. https://doi.org/10.1016/j.joms.2009.09.036

Referências

REFERÊNCIAS

1. Roberto LL, Crespo TS, Monteiro-Junior RS, et al. Sociodemographic determinants of edentulism in the elderly population: A systematic review and meta-analysis. *Gerodontology*. 2019;36(4):325-337.

2. Polzer I, Schimmel M, Müller F, Biffar R. Edentulism as part of the general health problems of elderly adults. *Int Dent J*. 2010;60(3):143-155.

3. Figueredo OMC, Câmara-Souza MB, Carletti TM, de Sousa MDLR, Rodrigues Garcia RCM. Mastication and oral sensory function in frail edentulous elderly: a case-control study. *Int Dent J*. 2020;70(2):85-92.

4. Stelzle F, Ugrinovic B, Knipfer C, et al. Automatic, computer-based speech assessment on edentulous patients with and without complete dentures - preliminary results. *J Oral Rehabil*. 2010;37(3):209-216.

5. Bulycheva EA, Trezubov VN, Alpateva UV, Bulycheva DS. Sound Production in Totally Edentulous Patients Before and After Prosthetic Treatment. *J Prosthodont*. 2018;27(6):528-534.

6. Telles D. Prótese Total – Convencional e sobre implantes. 1. ed. São Paulo: Santos: Grupo Gen – Livraria Santos Editora; 2009. 492 p.

7. Papadaki E, Anastassiadou V. Elderly complete denture wearers: a social approach to tooth loss. *Gerodontology*. 2012;29(2):e721-e727.

8. Brasil. Ministério da Saúde (MS). Projeto SB Brasil 2010: Pesquisa Nacional de Saúde Bucal. Resultados Principais [Internet]. Brazil: MS; 2011 [cited 2021 Feb 16]. 116 p. Available from: https://bvsms.saude.gov.br/bvs/publicacoes/pesquisa_nacional_saude_bucal.pdf

9. Cardoso Mayra, Balducci Ivan, Telles Daniel de Moraes, Lourenço Eduardo José Veras, Nogueira Júnior Lafayette. Edentulism in Brazil: trends, projections and expectations until 2040. Ciênc. saúde coletiva [Internet]. 2016 Apr [cited 2021 Feb 16] ; 21(4): 1239-1246.

10. Cooper LF. The current and future treatment of edentulism. *J Prosthodont*. 2009;18(2):116-122.

11. Frush JP, Fisher RD. How dentogenics interprets the personality factor. *J Prosthet Dent.* 1956;6(4):441-449.

12. Souza CP; Tamaki ST. Estudo das posicoes do labio superior, sub-nasio, tuberculo do labio e exposicao gengival em dentados e desdentados com vista a estetica facial [dissertation]. São Paulo: Faculdade de Odontologia, Universidade de São Paulo; 1996. 71 p.

13. Rufenacht CR. Fudamentals of esthetics. 1. ed. Chicago: Quintessence; 1990. 373 p.

14. Sforza C, de Menezes M, Ferrario V. Soft- and hard-tissue facial anthropometry in three dimensions: what's new. *J Anthropol Sci*. 2013;91:159-184.

15. Hammond P, Hutton TJ, Allanson JE, et al. 3D analysis of facial morphology. *Am J Med Genet A*. 2004;126A(4):339-348.

16. Gibelli D, Dolci C, Cappella A, Sforza C. Reliability of optical devices for three-dimensional facial anatomy description: a systematic review and meta-analysis. *Int J Oral Maxillofac Surg*. 2020;49(8):1092-1106.

17. Hammond P, Suttie M. Large-scale objective phenotyping of 3D facial morphology. *Hum Mutat*. 2012;33(5):817-825.

18. Lee WJ, Wilkinson CM, Hwang HS. An accuracy assessment of forensic computerized facial reconstruction employing cone-beam computed tomography from live subjects. *J Forensic Sci*. 2012;57(2):318-327.

19. Kogou T, Takaki T, Shibahara T. Three-dimensional Analysis and Evaluation in Orthognathic Surgical Cases with Facial Asymmetry. *Bull Tokyo Dent Coll*. 2018;59(3):147-161.

20. Penna V, Stark G-, Eisenhardt SU, Bannasch H, Iblher N. The aging lip: a comparative histological analysis of age-related changes in the upper lip complex. *Plast Reconstr Surg*. 2009;124(2):624-628.

21. Iblher N, Kloepper J, Penna V, Bartholomae JP, Stark GB. Changes in the aging upper lip--a photomorphometric and MRI-based study (on a quest to find the right rejuvenation approach). *J Plast Reconstr Aesthet Surg*. 2008;61(10):1170-1176.

22. Friess M. Scratching the Surface? The use of surface scanning in physical and paleoanthropology. *J Anthropol Sci*. 2012;90:7-31.

23. Joe PS, Ito Y, Shih AM, Oestenstad RK, Lungu CT. Comparison of a novel surface laser scanning anthropometric technique to traditional methods for facial parameter measurements. *J Occup Environ Hyg*. 2012;9(2):81-88.

24. de Menezes M, Rosati R, Ferrario VF, Sforza C. Accuracy and reproducibility of a 3-dimensional stereophotogrammetric imaging system. *J Oral Maxillofac Surg*. 2010;68(9):2129-2135.

25. Schimmel M, Christou P, Houstis O, Herrmann FR, Kiliaridis S, Müller F. Distances between facial landmarks can be measured accurately with a new digital 3-dimensional video system. *Am J Orthod Dentofacial Orthop*. 2010;137(5):580.e1-581.

26. Heike CL, Upson K, Stuhaug E, Weinberg SM. 3D digital stereophotogrammetry: a practical guide to facial image acquisition. *Head Face Med*. 2010;6:18. Published 2010 Jul 28.

27. Hwang HS, Kim K, Moon DN, Kim JH, Wilkinson C. Reproducibility of facial soft tissue thicknesses for craniofacial reconstruction using cone-beam CT images. *J Forensic Sci*. 2012;57(2):443-448.

28. Bliss DP Jr, Vaughan NA, Walk RM, Naiditch JA, Kane AA, Hallac RR. Non-Radiographic Severity Measurement of Pectus Excavatum. *J Surg Res*. 2019;233:376-380.

29. Bechtold TE, Göz TG, Schaupp E, et al. Integration of a maxillary model into facial surface stereophotogrammetry. *J Orofac Orthop*. 2012;73(2):126-137.

30. See MS, Roberts C, Nduka C. Age- and gravity-related changes in facial morphology: 3-dimensional analysis of facial morphology in mother-daughter pairs. *J Oral Maxillofac Surg*. 2008;66(7):1410-1416.

31. Zhuang Z, Benson S, Viscusi D. Digital 3-D headforms with facial features representative of the current US workforce. *Ergonomics*. 2010;53(5):661-671.

32. Fourie Z, Damstra J, Gerrits PO, Ren Y. Evaluation of anthropometric accuracy and reliability using different three-dimensional scanning systems. *Forensic Sci Int*. 2011;207(1-3):127-134.

33. Gibelli D, Pucciarelli V, Cappella A, Dolci C, Sforza C. Are Portable Stereophotogrammetric Devices Reliable in Facial Imaging? A Validation Study of VECTRA H1 Device. *J Oral Maxillofac Surg*. 2018;76(8):1772-1784.

34. Aynechi N, Larson BE, Leon-Salazar V, Beiraghi S. Accuracy and precision of a 3D anthropometric facial analysis with and without landmark labeling before image acquisition. *Angle Orthod*. 2011;81(2):245-252.

35. Dindaroğlu F, Kutlu P, Duran GS, Görgülü S, Aslan E. Accuracy and reliability of 3D stereophotogrammetry: A comparison to direct anthropometry and 2D photogrammetry. *Angle Orthod*. 2016;86(3):487-494.

36. Ayaz I, Shaheen E, Aly M, et al. Accuracy and reliability of 2-dimensional photography versus 3-dimensional soft tissue imaging. *Imaging Sci Dent*. 2020;50(1):15-22.

37. Camison L, Bykowski M, Lee WW, et al. Validation of the Vectra H1 portable three-dimensional photogrammetry system for facial imaging. *Int J Oral Maxillofac Surg*. 2018;47(3):403-410.

38. Mai HN, Kim J, Choi YH, Lee DH. Accuracy of Portable Face-Scanning Devices for Obtaining Three-Dimensional Face Models: A Systematic Review and Meta-Analysis. *Int J Environ Res Public Health*. 2020;18(1):94.

39. Alshammery FA. Three dimensional (3D) imaging techniques in orthodontics-An update. *J Family Med Prim Care*. 2020;9(6):2626-2630.

40. Plooij JM, Maal TJ, Haers P, Borstlap WA, Kuijpers-Jagtman AM, Bergé SJ. Digital three-dimensional image fusion processes for planning and evaluating orthodontics and orthognathic surgery. A systematic review. *Int J Oral Maxillofac Surg*. 2011;40(4):341-352.

41. Rasteau S, Sigaux N, Louvrier A, Bouletreau P. Three-dimensional acquisition technologies for facial soft tissues - Applications and prospects in orthognathic surgery. *J Stomatol Oral Maxillofac Surg*. 2020;121(6):721-728.

42. Rosati R, De Menezes M, da Silva AM, Rossetti A, Lanza Attisano GC, Sforza C. Stereophotogrammetric evaluation of tooth-induced labial protrusion. *J Prosthodont*. 2014;23(5):347-352.

43. Tang J, Wang Y, Wang Z, Guo Y, Wang C. Facial aesthetic evaluation of rehabilitation effects in edentulous patients with varying degrees of residual

ridge resorption by 3D stereophotogrammetry. *J Oral Rehabil*. 2020;47(9):1095-1102.

44. Rezende Pucciarelli MG, Toyoshima GH, Cardoso JF, de Oliveira TM, Neppelenbroek KH, Soares S. Arch Asymmetry in Patients With Cleft Lip and Palate After Rehabilitation Treatment Using Stereophotogrammetry [published online ahead of print, 2021 Jan 20]. *J Craniofac Surg*. 2021;10.1097/SCS.0000000000007460.

45. Rezende Pucciarelli MG, de Lima Toyoshima GH, Marchini Oliveira T, Marques Honório H, Sforza C, Soares S. Assessment of dental arch stability after orthodontic treatment and oral rehabilitation in complete unilateral cleft lip and palate and non-clefts patients using 3D stereophotogrammetry. *BMC Oral Health*. 2020;20(1):154.

46. Ellis JS, Thomason JM, McAndrew R. A pilot study examining the effects of enhanced aesthetics on oral health related quality of life and patient's satisfaction with complete dentures. *Eur J Prosthodont Restor Dent*. 2010;18(3):116-122.

47. Allen PF, McMillan AS, Walshaw D. A patient-based assessment of implant-stabilized and conventional complete dentures. *J Prosthet Dent*. 2001;85(2):141-147.

Attachments

Attachment A – Informed Consent Form (ICF)

Universidade de São Paulo
Faculdade de Odontologia de Bauru

Departamento de Prótese e Periodontia

TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

Convidamos o (a) Senhor (a)_____para participar da pesquisa **"Avaliação do perfil facial após reabilitação oral com próteses totais utilizando Estereofotogrametria"**

O perfil facial influencia na estética, fonética e função, e a perda dos dentes causa no perfil facial uma influência negativa, a qual as próteses totais de diversos tipos, tem o objetivo de devolver a proporção facial adequada.

Sua participação consistirá em autorizar, uma avaliação bucal e três tomadas fotográficas utilizando uma câmera adequada 3D, em sessão única de 40 minutos em média, para a realização das medidas faciais.

Os participantes serão recrutados na Clínica I da Faculdade de Odontologia de Bauru da Universidade de São Paulo (FOB/USP), nas disciplinas de Prótese I e II, e após o atendimento serão então convidados a participar da pesquisa.

As fotografias e a avaliação serão realizadas no departamento de Prótese e Periodontia, as imagens serão imediatamente passadas para o computador próprio da pesquisa a qual apenas os envolvidos na equipe de pesquisa terão acesso, as imagens serão analisadas pelo software adequado e serão levadas em consideração apenas as medidas analisadas, sendo assim, as tomadas fotográficas não serão divulgadas e as mesmas serão descartadas.

Os pesquisadores envolvidos tentarão minimizar ao máximo qualquer tipo de risco, por exemplo o cansaço do paciente. Uma vez que os participantes autorizarem as tomadas fotográficas, todos os participantes passarão por uma avaliação bucal, juntamente com orientações de higiene, caracterizando benefícios diretos para os participantes, se durante a avaliação odontológica for detectado alguma alteração bucal o mesmo será encaminhado para o setor de Triagem. Se tratando de participantes idosos, essa avalição é de extrema importância.

Apenas a equipe de pesquisa estará no local reservado: "laboratório de prótese", não podendo ter mais pessoas no local próprio para coletas as imagens. Se o participante se queixar de cansaço, em vista de minimizar esse risco, haverá uma cadeira no local para descanso, visando o conforto dos participantes e para que os mesmos fiquem a vontade de desistir de participar, porém fica assegurado aos indivíduos participantes o direito a indenização caso algum dano dela decorra. Os gastos que forem gerados por este trabalho ficarão a cargo do responsável pelo projeto.

O benefício indireto resultante desse trabalho será a possibilidade de avaliar o perfil facial dos usuários de prótese totais, observando se a mesma está sendo satisfatória e se aproxima ao perfil facial de indivíduos que possuem toda a dentição, visto que devolver proporção facial está diretamente ligada a estética, fonética e função.

O participante da pesquisa receberá uma via deste documento, assinado e rubricado por ele próprio e pelo pesquisador responsável. Para o desenvolvimento dessa pesquisa, sua participação é fundamental, mas não obrigatória. e todas as informações serão **CONFIDENCIAIS**, podendo ser publicadas apenas para fins científicos, portanto sem a identificação dos participantes. A qualquer momento poderá ser pedido mais informações ou até mesmo negar-se a continuar participando da pesquisa sem qualquer penalidade.

Rubrica do Pesquisador Responsável:

Rubrica do Participante da Pesquisa :

Al. Dr. Octávio Pinheiro Brisolla, 9-75 – Bauru-SP – CEP 17012-901 – C.P. 73
e-mail: **dep-prot@fob.usp.br**– Fone/FAX (0xx14) **3235-8277**
http://www.fob.usp.br

Universidade de São Paulo
Faculdade de Odontologia de Bauru

Departamento de Prótese e Periodontia

Desde já agradecemos a colaboração e nos colocamos à disposição para mais esclarecimentos que se fizerem necessários. Se restarem dúvidas, o participante poderá entrar em contato com o responsável pelo estudo (Maria Giulia Rezende Pucciarelli), pelo telefone (14) 3235-8277, pelo e-mail mgpucciarelli@usp.br ou pelo endereço: Departamento de Prótese, da Faculdade de Odontologia de Bauru/USP, Alameda Dr. Octávio Pinheiro Brisolla, 9-75.

Para denúncias e/ou reclamações, entrar em contato com Comitê de Ética em Pesquisa-FOB/USP, à Alameda Dr. Octávio Pinheiro Brisolla, 9-75, Vila Universitária, ou pelo telefone (14)3235-8356, e-mail: cep@fob.usp.br.

Pelo presente instrumento que atende às exigências legais, o Sr. (a) _____ _____, portador da cédula de identidade _____, após leitura minuciosa das informações constantes neste TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO, devidamente explicada pelos profissionais em seus mínimos detalhes, ciente dos serviços e procedimentos aos quais será submetido, tais como a avaliação bucal e as fotografias, não restando quaisquer dúvidas a respeito do lido e explicado, DECLARA E FIRMA seu CONSENTIMENTO LIVRE E ESCLARECIDO concordando em participar da pesquisa proposta. Fica claro que o participante da pesquisa ou seu representante legal, pode a qualquer momento retirar seu CONSENTIMENTO LIVRE E ESCLARECIDO e deixar de participar desta pesquisa e ciente de que todas as informações prestadas tornar-se-ão confidenciais e guardadas por força de sigilo profissional (Art. 9º do Código de Ética Odontológica (Res. CFO-118/2012)).

Por fim, como pesquisador(a) responsável pela pesquisa, DECLARO o cumprimento do disposto na Resolução CNS nº 466 de 2012, contidos nos itens IV.3 e IV.4, este último se pertinente, item IV.5.a e na íntegra com a resolução CNS nº 466 de dezembro de 2012.

Por estarmos de acordo com o presente termo o firmamos em **DUAS VIAS** igualmente válidas (uma via para o participante da pesquisa e outra para o pesquisador) que serão **rubricadas em todas as suas páginas** e assinadas ao seu término, conforme o disposto pela Resolução CNS nº 466 de 2012, itens IV.3.f e IV.5.d.

Bauru, SP, _____ de _____ de _____.

_____	_____
Assinatura do Participante da pesquisa	Maria Giulia Rezende Puccairelli (Pesquisador responsável)

Al. Dr. Octávio Pinheiro Brisolla, 9-75 – Bauru-SP – CEP 17012-901 – C.P. 73
e-mail: **dep-prot@fob.usp.br**– Fone/FAX (0xx14) **3235-8277**
http://www.fob.usp.br

Universidade de São Paulo
Faculdade de Odontologia de Bauru

Departamento de Prótese e Periodontia

O **Comitê de Ética em Pesquisa – CEP**, organizado e criado pela **FOB-USP**, em 29/06/98 **(Portaria GD/0698/FOB)**, previsto no item VII da Resolução nº 466/12 do Conselho Nacional de Saúde do Ministério da Saúde (publicada no DOU de 13/06/2013), é um Colegiado interdisciplinar e independente, de relevância pública, de caráter consultivo, deliberativo e educativo, criado para defender os interesses dos participantes da pesquisa em sua integridade e dignidade e para contribuir no desenvolvimento da pesquisa dentro de padrões éticos.
Qualquer denúncia e/ou reclamação sobre sua participação na pesquisa poderá ser reportada a este CEP:

Horário e local de funcionamento:
Comitê de Ética em Pesquisa
Faculdade de Odontologia de Bauru-USP - Prédio da Pós-Graduação (bloco E - pavimento superior), de segunda à sexta-feira, no horário das 13h30 às 17 horas, em dias úteis.
Alameda Dr. Octávio Pinheiro Brisolla, 9-75
Vila Universitária – Bauru – SP – CEP 17012-901
Telefone/FAX(14)3235-8356
e-mail: cep@fob.usp.br

Rubrica do Pesquisador Responsável:

Rubrica do Participante da Pesquisa :