

UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL
FACULDADE DE ODONTOLOGIA

ROGER JUNGES

ATITUDES E PRÁTICAS DE CIRURGIÕES-DENTISTAS EM RELAÇÃO À TERAPIA
IMPLANTAR E SUA APLICAÇÃO

Porto Alegre

2012

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Trabalho de Conclusão de Curso apresentado ao Curso de Graduação em Odontologia da Faculdade de Odontologia da Universidade Federal do Rio Grande do Sul, como requisito parcial para obtenção do título de Cirurgião-Dentista.

Orientador:
Prof. Dr. Cassiano Kuchenbecker Rösing

Porto Alegre

2012

CIP- Catalogação na Publicação

Junges, Roger

Atitudes e práticas de cirurgiões-dentistas em relação à terapia implantar e sua aplicação / Roger Junges. – 2012.

36 f. : il.

Trabalho de Conclusão de Curso (Graduação) – Universidade Federal do Rio Grande do Sul, Faculdade de Odontologia, Curso de Graduação em Odontologia, Porto Alegre, BR-RS, 2012.

Orientador: Cassiano Kuchenbecker Rösing

1. Implante dentário. 2. Questionário. 3. Odontologia baseada em evidências. I. Rösing, Cassiano Kuchenbecker. II. Título.

Elaborada por Ida Rossi - CRB-10/771

AGRADECIMENTOS

Aos meus pais, Arno e Rosvita, pela dedicação, carinho e exemplo ao longo de todos esses anos.

Ao meu irmão, Robert, pela amizade e pela fonte de inspiração ao longo de toda minha jornada pessoal, acadêmica e profissional.

Ao meu orientador, Professor Cassiano Kuchenbecker Rösing, pelos ensinamentos, pelo companheirismo e pela confiança no meu trabalho. Tua genialidade e dedicação atuam como motores propulsores incentivando todos ao teu redor. É um grande privilégio poder trabalhar contigo.

À minha tutora, Professora Susana Maria Werner Samuel, por todos os preciosos ensinamentos ao longo destes últimos cinco anos. Obrigado por acreditar em mim e no meu potencial desde o início de minha empreitada acadêmica.

Ao Professor Fernando Neves Hugo, homenageado da ATO 2012/2, por me ensinar que não existem barreiras físicas e ideológicas que possam conter uma mente em busca de conhecimento.

Ao Professor Roger Keller Celeste, pela dedicação e paciência ao me ajudar a desvendar os caminhos da Epidemiologia e da Bioestatística.

Aos professores Christopher Gerald Engeland e Praveen Kumar Gajendrareddy por confiarem no meu trabalho e incentivarem o meu desenvolvimento como clínico e pesquisador.

Aos atuais integrantes e egressos do Grupo Programa de Educação Tutorial (PET) da Faculdade de Odontologia da Universidade Federal do Rio Grande do Sul (UFRGS). Vocês foram parte essencial da minha formação e divido com vocês o sabor dessa conquista.

Ao grupo de Periodontia da Faculdade de Odontologia da UFRGS por enriquecer minha formação e me disponibilizar condições para o contínuo exercício da Ciência e da Odontologia Baseada em Evidências.

À Gabriela, pelo amor e carinho incondicionais.

Aos meus amigos e amigas, por serem essenciais no meu desenvolvimento como pessoa. Obrigado pela amizade.

*“Discovery consists of seeing what everybody has
seen and thinking what nobody has thought”*

Albert Szent-Györgyi

RESUMO

JUNGES, Roger. **Atitudes e práticas de cirurgiões-dentistas em relação à terapia implantar e sua aplicação**. 2012. 36f. Trabalho de Conclusão de Curso (Graduação em Odontologia) – Faculdade de Odontologia, Universidade Federal do Rio Grande do Sul, Porto Alegre, 2012.

Modalidades terapêuticas para dentes com comprometimento periodontal incluem abordagens conservadoras e cirúrgicas, confecção de próteses dentárias e a extração seguida da colocação de um implante dentário. O objetivo do presente estudo foi avaliar a tomada de decisão de cirurgiões-dentistas brasileiros acerca da indicação da terapia implantar bem como possíveis fatores modificadores. O estudo teve caráter transversal e foi conduzido entre cirurgiões-dentistas brasileiros no período de junho a novembro de 2012. O instrumento conteve 27 questões divididas em quatro diferentes seções abordando características sociodemográficas, questões sobre o exercício profissional, a tomada de decisão frente a casos clínicos e a concordância ou não com diferentes afirmações acerca das terapias endodôntica, periodontal e implantar. Um total de 155 dentistas responderam o questionário. A idade média dos participantes foi 35,5 anos. Cinquenta e um por cento da amostra foi composta por homens e 44,5% relataram ser professores. Cento e trinta e seis (87,7%) participantes afirmaram já ter realizado ou estar realizando algum curso de pós-graduação. Homens relataram realizar mais procedimentos de inserção de implantes e aumento de seio maxilar. Consequentemente, os mesmos indicavam tais tratamentos de forma mais frequente quando comparados a mulheres. Professores de forma geral e dentistas que não haviam realizado nenhum curso de pós-graduação indicaram o uso de terapias regenerativas com maior frequência. De forma contrária, periodontistas e dentistas que não estavam envolvidos com cargos de docência preferiram a indicação de terapia ressectiva para o mesmo caso. Protesistas apresentaram uma preferência por procedimentos mais invasivos. Frente às dificuldades encontradas por cirurgiões-dentistas bem como a falta de uniformidade presente em suas opções terapêuticas, faz-se necessária a criação de protocolos e diretrizes que venham a auxiliar o clínico na tomada de decisão em casos complexos.

Palavras-chave: Implante dentário. Questionário. Odontologia baseada em evidências.

ABSTRACT

JUNGES, Roger. **Attitudes and clinical practices of dentists towards implant treatment**. 2012. 36p. Final Paper (Graduation in Dentistry) – Faculdade de Odontologia, Universidade Federal do Rio Grande do Sul, Porto Alegre, 2012.

Periodontally involved teeth require attention and comprehensive treatment for reestablishment of good health conditions. Therapeutic modalities include conservative and surgical periodontal approaches, confection of dental prostheses and extraction followed by dental implant insertion. The aim of the present study was to evaluate Brazilian dentists' decision making regarding periodontally involved teeth and implant therapy indications as well as possible modifying factors such as gender, enrollment in teaching positions and specialization areas. This cross-sectional questionnaire-based study was conducted among Brazilian dentists between June and November 2012. The questionnaire comprised 27 questions divided into four different sections: socio-demographic characteristics, questions about their clinical practice towards implant therapy, decision making in four clinical cases and agreement with different statements regarding endodontic, periodontal and implant therapies. A total of 155 dentists answered the questionnaire. The average age of the participants was 35.5 years. Fifty one percent were male and 44.5% were involved in teaching positions. One-hundred and thirty six (87.7%) respondents had already pursued a post-graduation programme or were currently involved in one. Men performed more implant placement and sinus grafting procedures than women; consequently they also indicated it more to their patients. Dental faculty and dentists who had not followed any further training programme more often preferred the use of regenerative therapies. As opposed, dentists not involved in teaching positions and periodontists were more prone to select resective therapies. Prosthodontists had a preference for more invasive treatments. Considering the difficulties faced by professionals when handling complex cases, there is an urgent need to establish international protocols and guidelines to help the clinician towards the more appropriate treatment option.

Keywords: Dental implantation. Questionnaires. Evidence-based dentistry.

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1 ANTECEDENTES E JUSTIFICATIVA

Durante as últimas décadas, o conceito da Odontologia Baseada em Evidências (*Evidence Based Dentistry*) vem recebendo cada vez mais reconhecimento por parte da comunidade odontológica. Seu objetivo define-se pela utilização da melhor evidência disponível como base para a tomada de decisão nas atividades clínicas diárias (CLARKSON et al., 2003; RICHARDS, 2004).

Aliado à melhor evidência externa, analisam-se as necessidades e expectativas do paciente em questão, seu histórico de tratamento e a experiência clínica do profissional atuante (SACKETT et al., 1996). Considerando esses últimos aspectos, mesmo em casos onde haja evidências de estudos clínicos de alta qualidade, o tratamento realizado no paciente nem sempre será o mesmo (TÜRPEL et al., 2007). Como outro fator preponderante para a escolha final do tratamento clínico deve-se observar a área de especialização e atuação do profissional. Apesar de seu crescimento e difusão em inúmeros centros odontológicos ao redor do mundo, muitas vezes a aplicação da Odontologia Baseada em Evidências é limitada pela falta de evidências de qualidade em assuntos específicos (HEALEY; LYONS, 2002).

Na Medicina, diversos autores já publicaram estudos relatando as diferenças existentes entre opções de tratamento devido a características específicas da formação de cada profissional, tais como ano de graduação, área e modalidade de pós-graduação (HAJJAR et al., 2002; BIRKHEAD et al., 2006; HERSHMAN et al., 2009; MINER, 2009). Já na Odontologia, poucos estudos relatam as diferenças trazidas por referências externas e internas na opção e no resultado do tratamento, como, por exemplo, preferências entre especialistas e clínicos gerais (ZAHER et al., 2005), ou diferenças entre periodontistas com variações em suas escolas de formação (PERSSON et al., 2003). No primeiro dos estudos supracitados, foi encontrado que periodontistas têm uma maior tendência a tratar dentes com grave comprometimento periodontal, enquanto que a maioria dos clínicos gerais optaria pela extração desses elementos dentários (ZAHER et al., 2005). No segundo trabalho referenciado, observou-se que tanto periodontistas formados nos Estados Unidos quanto na Europa baseiam suas avaliações de risco basicamente no quão avançada a doença aparenta ser radiograficamente e pela apresentação da profundidade de sondagem em um nível ≥ 6 mm, mas raramente incluem fatores de risco como tabaco, higiene oral não favorável, diabetes e outras condições sistêmicas nessas predições (PERSSON et al., 2003).

Decisões clínicas envolvendo molares superiores com comprometimento periodontal costumam ser complexas e apresentam-se como uma ótima opção para as análises das opções de cada profissional baseadas em resultados científicos objetivos (evidências externas) e na experiência clínica própria de cada indivíduo (evidências internas). Embora existam evidências de resultados a longo prazo de tratamentos específicos, como terapia periodontal cirúrgica ou não-cirúrgica, terapia regenerativa, prótese fixa ou terapia implantar, a opção dos profissionais em manter ou não um dente com comprometimento periodontal envolve uma série de variáveis associadas à gravidade da doença nesse indivíduo.

Um estudo reportou que os critérios mais frequentemente adotados por cirurgiões-dentistas para a indicação da extração de dentes com envolvimento periodontal foram a presença de mobilidade (37,5%), severidade da perda de inserção (24,3%) e perdas ósseas maiores que 50% observadas nas radiografias (21,2%). Tais resultados demonstraram as dificuldades encontradas por profissionais no momento da escolha terapêutica para dentes com histórico de doença periodontal (MOREIRA et al., 2007).

Outros aspectos como a necessidade de tratamento de dentes adjacentes, as preferências dos pacientes e sua disponibilidade financeira também se mostram relevantes (ZITZMANN et al., 2009). Condições como quantidade de osso remanescente e proximidade com o seio maxilar são imprescindíveis para a avaliação da necessidade de procedimentos como enxerto ósseo e/ou levantamento de seio maxilar. Apesar do aumento recente nas preferências por procedimentos restauradores baseados na terapia implantar, o risco de complicações (TONETTI, HÄMMERLE, 2008), reabsorção do enxerto e doenças periimplantares (ZITZMANN, BERGLUNDH, 2008), podem redirecionar as opções de tratamento por parte dos profissionais.

Considerando as diversas opções de tratamento em uma série de situações clínicas específicas aliadas às diferenças na área, local e modalidade de formação de cada profissional bem como um recente aumento na utilização da terapia implantar, percebe-se a importância da análise das diferenças nas decisões clínicas e na aplicação de novas metodologias.

Nesse momento, é importante que se compreendam as diferentes vertentes da Odontologia Baseada em Evidências. Nesse sentido, justificam-se estudos que

estejam focados na compreensão dos fatores relacionados às atitudes e práticas profissionais: um importante segmento da prática baseada em evidências.

2 ARTIGO PARA PUBLICAÇÃO**DENTISTS' DECISION MAKING REGARDING MAINTENANCE OF
COMPROMISED TEETH AND IMPLANT THERAPY INDICATION: AN ANALYSIS
OF GENDER AND ENROLLMENT IN TEACHING POSITIONS**

JUNGES R.¹, RÖSING C.K.¹

¹ Department of Periodontology, Universidade Federal do Rio Grande do Sul, Porto Alegre, Brazil.

SHORT TITLE:

Decision making regarding implant therapy

CORRESPONDING AUTHOR:

Roger Junges

Rua Ramiro Barcelos, 2492.

90035-003 – Porto Alegre – RS

Brazil

Phone: +55 51 3308.5318 / 9207.1193

roger.junges@gmail.com

Este Trabalho de Conclusão de Curso (TCC) está escrito em forma de artigo e seguiu as normas do periódico *Clinical Oral Implants Research*

ABSTRACT

Objectives: The aim of the present study was to evaluate Brazilian dentists' decision making regarding periodontally involved teeth and implant therapy indications as well as possible modifying factors such as gender, enrollment in teaching positions and area of specialization.

Material and Methods: This cross-sectional questionnaire-based study was conducted among Brazilian dentists between June and November 2012. The questionnaire comprised 27 questions divided into four different sections: socio-demographic characteristics, questions about their clinical practice towards implant therapy, decision making in four clinical cases and agreement with different statements regarding endodontic, periodontal and implant therapy.

Results: A total of 155 dentists answered the questionnaire. The average age of the participants was 35.5 years. Fifty one percent were male and 44.5% were involved in teaching positions. One-hundred and thirty six (87.7%) respondents had already pursued a post-graduation programme or were currently involved in one. Men performed more implant placement and sinus grafting procedures than women; consequently they also indicated it more to their patients. Dental faculty and dentists who had not followed any further training programme more often preferred the use of regenerative therapies. As opposed, dentists not involved in teaching positions and periodontists were more prone to select resective therapies. Prosthodontists had a preference for more invasive treatments.

Conclusion: Results suggest that dentists' decision making did not follow the latest external evidence, which might be related to internal factors such as professional expertise and patients' preferences. Considering the difficulties faced by professionals when handling complex cases, there is an urgent need to establish international protocols and guidelines to help the clinician towards the more appropriate treatment option.

Keywords: dental implantation; questionnaires; evidence-based dentistry.

INTRODUCTION

Dental and periodontal therapies aim to reestablish oral health, function and adequate aesthetics (AAP 2011). Therapeutic options for each specific patient and case hinge on the three pillars of Evidence Based Dentistry (EBD): external evidence, internal evidence and patients' needs and preferences (Kwok, et al. 2012). External evidence can be defined as the best scientific criteria and results reported in the literature whereas internal evidence presents itself as the professional's clinical expertise. Patients' needs and preferences are also fundamentally important when deciding the most suitable treatment option (Eaton 2012). Furthermore, decision making processes may vary due to different clinicians' and patients' options as well as to current scientific uncertainties. Interestingly, in medicine, one study indicated that, in absence of clear scientific evidence leaning towards a specific treatment, physicians preferred the therapeutic modality delivered by them (Jang, et al. 2010).

Periodontally involved teeth require attention and comprehensive treatment for reestablishment of good health conditions and optimistic prognoses. Therapeutic modalities include conservative and surgical periodontal approaches, confection of dental prostheses and extraction followed by dental implant insertion (Donos, et al. 2012). Treatment decision making process regarding maintenance of compromised teeth is complex and utterly dependent on several factors, such as furcation involvement – when dealing with posterior teeth –, endodontic status, teeth mobility, amount of residual bone, and also financial aspects of each specific option as well as planned treatment time (Zitzmann, et al. 2009). Tooth maintenance and the acceptance of risks are suitable when: the tooth is not extensively diseased; the tooth has a high strategic value, particularly in patients with implant contraindications; the tooth is located in an intact arch; and the preservation of gingival structures is paramount (Zitzmann, et al. 2010). One study reported that the most often adopted criteria to indicate the extraction of periodontally affected teeth were the presence of mobility (37.5%), severity of attachment loss (24.3%) and radiographic bone loss greater than 50% (21.2%). Such outcomes illustrate the difficulties faced by dentists when indicating the extraction of teeth with severe attachment loss (Moreira, et al. 2007).

Although initially introduced for rehabilitation of edentulous jaws (Branemark, et al. 1977), dental implants are an option for replacement of single missing teeth and

show high long-term survival rates (Roos-Jansaker, et al. 2006a, Holm-Pedersen, et al. 2007, Pjetursson, et al. 2007, Koldslund, et al. 2009, Simonis, et al. 2010, Dierens, et al. 2012). In spite of the promising results, high complications frequencies such as peri-mucositis and peri-implantitis are also reported (Roos-Jansaker, et al. 2006b, Zitzmann & Berglundh 2008, Koldslund, et al. 2010, Simonis, et al. 2010).

Sinus floor augmentation techniques are important resources when handling with posterior maxillary tooth loss. However, much controversy is still present when addressing these cases due to unpredictability of success and occurrence of adverse events such as perforation of the sinus membrane, graft infection and graft loss (Tonetti & Hammerle 2008).

A recent study conducted with European dental care providers revealed a preference among older dentists and general practitioners for regenerative treatments in periodontally involved maxillary molars even when these were not supported by strong evidence in through-and-through furcation involvements. Periodontists more often selected resective therapies whilst prosthodontists preferred more invasive treatment options with extractions and augmentations. Younger dentists also tended to prefer indication of complex augmentation procedures (Zitzmann, et al. 2011a). Single implant treatment has been reported as more likely to be indicated than removable partial dentures (RPD) in highly educated patients with few missing teeth, and also more likely to be indicated than fixed dental prosthesis (FDP) in patients with intact adjacent teeth (Cosyn, et al. 2012). Further, another study revealed that dentists perceived implants to be superior to conventional prostheses for the replacement of a single missing posterior tooth and likewise, for the replacement of a single missing anterior tooth (Lang-Hua, et al. 2012). Through these findings one can infer that patient's choice of dental care provider could influence the selection of therapeutic options. More importantly, these recommendations would depend on the degree of specialized knowledge and skills and experience offered by the care provider (Zitzmann, et al. 2011a).

The aim of the present study was to evaluate Brazilian dentists' decision making regarding periodontally involved teeth and implant therapy indications as well as possible modifying factors such as gender, enrollment in teaching positions and area of specialization.

MATERIAL AND METHODS

This cross-sectional questionnaire-based study was conducted among Brazilian dentists between June and November 2012. Fifteen universities in Brazil were contacted and a total of 114 e-mails were sent to dental faculty. Questionnaires were also sent through e-mail and social networks to clinicians from different regions of Brazil enrolled in different aspects of the profession such as public or private practice, clinic management, research and teaching positions. All participants were properly informed and consented with their participation in this study. The research was approved by the Ethics Committee of the Universidade Federal do Rio Grande do Sul.

Instrument design

The questionnaire comprised 27 questions divided into four different sections. The first section encompassed questions regarding socio-demographic characteristics, such as gender, age, year of graduation, and type of service delivered. Participants were also questioned if they had pursued any further training programme and if so in which specialty they had mastered.

The second section encompassed questions about their clinical practice towards implant therapy. Dentists were questioned whether they inserted dental implants themselves or referred those cases to a colleague, and how many of those cases they handled in a year. Participants also responded how many periodontal surgeries they performed in a year. Additionally, dentists were asked if they worked with regenerative therapies and if they treated peri-implant diseases.

Section three was composed by four clinical cases in which participants were asked to choose the treatment option they would recommend (Fig.1). Clinical and radiographic information about each clinical case were detailed in a recent study (Zitzmann, et al. 2011a). The first clinical case shows that tooth number 16 presents a through-and-through furcation involvement (degree III) from buccal, mesial and distal. Tooth is non-mobile (degree 0). Teeth numbered 15, 16 and 17 tested positive for sensitivity. Teeth 17 and 15 have no decay and circular probing pocket depths of 2–3mm, mobility degree 0. Also, tooth 17 has no furcation involvement. The second clinical case shows that tooth number 15 is missing; number 16 shows a through-and-through furcation involvement (degree III) from buccal, mesial, and distal. Teeth

17 and 14 have circular probing pocket depths of 2–3 mm, mobility degree 0, no furcation involvement, and tested positive for sensitivity. The third clinical case presents a maxillary free-end situation with missing molars. Teeth numbered 24 and 25 have circular probing pocket depths of 2–3 mm, mobility degree 0, and tested positive for sensitivity. Tooth 24 has no furcation involvement. The fourth and last clinical case is about a patient with maxillary anterior dentition maintained (canine to canine). Teeth numbered 13, 12, 11, 21, 22 and 23 have circular probing pocket depths of 2–3 mm, mobility degree 0, and tested positive for sensitivity. Participants were told that there were no financial limitations, and that it was not important whether the dentist would perform the treatment him/herself or in collaboration with a colleague and/or specialist.

The final section of the questionnaire comprised statements regarding endodontic, periodontal and implant therapy (Table 3). Participants were asked to check how much they agreed in a Likert scale (completely disagree, partially disagree, do not know, partially agree, completely agree) with each specific statement.

Statistical analyses

Descriptive analyses were carried out as cross tables with counts and percentages within groups (teaching position and gender). At times, groups of answers were merged to facilitate interpretation. Metric variables were reported as mean and standard deviations (\pm SD). Comparison of two absolute values was performed with chi-square and Fisher's exact test as applicable. Level of significance was set at $\alpha=.05$ (two-sided). Data were analyzed with SPSS 20 (SPSS Inc. Chicago, IL, USA).

RESULTS

The questionnaire was answered by one hundred and fifty five dentists. Sixty nine were enrolled in teaching positions. Considering 114 emails were sent to dental faculty, a response rate of 60.5% was achieved in this group. The other eighty six respondents were contacted by the Federal Council of Dentistry (CFO) and social media in Brazil and therefore response rates cannot be estimated.

Sections one and two: sociodemographic characteristics and clinical practice

The average age of the participants was 35.5 years ($SD\pm 9.2$) ranging from 23 to 65. Fifty one percent were male and 44.5% were involved in teaching positions (Table 1). Sixty nine (44.5%) dentists hold teaching positions, 110 (71%) treated their patients in private practices and 50 (32.2%) were involved in community dentistry. A total of 116 (74.8%) of the participants indicated that they usually work with other dentists – mean 5.75 ($SD\pm 7.9$). One-hundred and thirty six (87.7%) respondents had already concluded a post-graduation program or were currently involved in one. Answers regarding each participant clinical practice are presented in Table 2.

Sections three and four: decision making

Answers regarding each clinical case proposed are displayed in Figure 1. In the first clinical case, a higher number of dental faculty (40.6%; $p<.01$) chose regenerative surgery as the treatment option when compared to dentists currently not involved in teaching positions (18.6%). Conversely, the latter preferred resective surgery indication (50%; $p<.001$) as opposed to participants enrolled in teaching positions (18.8%). However, when considering different specialization areas, periodontists (62.5%; $p<.01$) and periodontists involved in teaching positions (72.6%; $p=.01$) more often preferred resective therapies compared to other specialists (data not shown). Dentists who had not followed any further training programme chose more the regenerative therapy (68.4%; $p=.05$). Extraction of tooth 16 with immediate implant placement was preferred by prosthodontists (33.3%; $p=.01$) when compared to other specialists (data not shown). With regard to the same clinical case, total responses favored resective surgery treatment (36.1%), followed by regenerative

surgery (28.4%) and extraction of tooth 16, later bone augmentation and implant placement (20%). When taking into consideration separate gender analyses, men chose more extraction, later bone augmentation and implant placement (25.3%) when compared to women (14.5%). Additionally, men also performed more implant placement (75.9%; $p=.01$) and sinus grafting procedures (40.5%, $p<.001$) than women.

With regard to the second clinical case, total answers favored significantly the choice of extraction of tooth 16, sinus grafting and implant placement in the area of 15 and 16, tooth 17 is maintained (72.3%). Extraction of tooth 16, and confection of a fixed dental prosthesis using teeth 14 and 17 as abutments was preferred by periodontists (43.8%; $p<.05$) when compared to other specialists (data not shown). Both men and women as well as participants involved in teaching positions and those not involved with such positions had similar frequencies of answers with no statistically significant differences.

The third clinical case pointed out higher preference for sinus grafting and implant placement on the area of 26 (84.5%). Only a small portion of the participants (6.5%) preferred fixed dental prosthesis, using teeth 24 and 25 as abutments and a distal cantilever. Removable partial prosthesis was only selected by 9% of the participants, but 50% ($p<.001$) of those had specialized in community dentistry (data not shown).

The last clinical case presented sinus grafting (14 to 16 and 24 to 26), with two implants placement on both sides as the most chosen treatment option (76.8%). As observed in the third clinical case, 47.4% ($p<.01$) of the participants who had specialized in community dentistry selected the removable partial prosthesis option.

The majority of the participants disagreed with the first two statements defined as 'In patients with a history of periodontal disease, I prefer implant placement.' and 'Dental implants have a better prognosis than natural teeth.' with percentages of 65.8% and 91%, respectively (Table 3). Opinions were evenly distributed with regard to the third statement 'When sinus grafting is planned, I better extract adjacent teeth, if those have a questionable prognosis.' with agreement rates of 41.9% as opposed to 49.1%. The fourth sentence defined as 'In case of complicated root canal treatment in maxillary molars, I prefer implant placement.' showed a high disagreement rate of 84.5%. No differences between groups were observed. Both fifth – 'For single tooth replacement in the maxillary posterior region, I prefer implants

over fixed dental prosthesis, even with little residual bone volume.’ - and sixth – ‘For edentulous spaces with 2 missing teeth, I prefer implants over fixed dental prosthesis, even with little residual bone volume.’ – statements presented slightly favored agreement rates of 56.1% and 62.3%, respectively.

DISCUSSION

This study assessed dentists' decision making regarding implant therapy taking into perspective the gender, enrollment in teaching positions and specialization areas. Our main results point out that dental faculty and dentists who had not followed any further training programme more often preferred the use of regenerative therapies as opposed to resective surgeries. Dentists not involved in teaching positions and periodontists were more prone to select resective therapies when choosing the treatment option for the same cases. Different areas of specialization showed differences regarding decision making.

Participants' preferences for regenerative therapies in this study can be understood as a mean to maintain the tooth in its viable conditions in the dental arch. However, one could argue that periodontal regenerative therapy is not recommended in severe furcation defects (Jepsen, et al. 2002). Further, a recent review brought to light comparisons between different techniques for such objectives and remaining challenges for the clinician (Ramseier, et al. 2012). This treatment option selected by dentists enrolled in teaching positions and dentists who had not followed any further training programme might also be perceived as they might not be updated with the latest evidence in the subject. Efforts should be conducted in order to level the knowledge of dental faculty responsible for different dentistry specialization areas. Almost ninety percent of the dentists alleged they had pursued further training programme after graduation. Such information should be considered with caution as even though they had pursued further training they might still by all means not be considered specialists. Similar perceptions have already been described in the literature (Zitzmann, et al. 2011a). Nevertheless, such high rates of dentists who did pursue further training have never been reported before. Through the historic development of dentistry in Brazil it is possible to understand that the demand for specialized professionals is increasing due to the huge amount of dentists graduating each year – 10.000 in 2008 (Saliba, et al. 2009). This has been supposedly regulated by the professional market.

A recent survey conducted in Switzerland and Germany evaluated dentists' decision making and perception using the original clinical cases that were used in this study. Such methodological processes are important so we can compare results and draw more representative conclusions. When compared to German and Swiss

dental care providers, Brazilian dentists chose more conservative options in the first clinical case: resective periodontal surgery tooth 16 (European dentists 20.7% vs Brazilian dentists 36.1%); regenerative periodontal surgery tooth 16 (40.6 vs 28.4); extraction tooth 16 and immediate implant placement (3.7 vs 12.9); extraction of tooth 16 and fixed dental prosthesis 15-17 (3.8 vs 2.6); extraction tooth 16, later bone augmentation and implant placement (31.2 vs 20). When considering the second clinical case, Brazilian dentists' treatment choice was more homogeneous: extraction of tooth 16, fixed dental prosthesis with 14 and 17 as abutments (33.6 vs 20); extraction of tooth 16, sinus grafting and implant placement area 15 and 16, tooth 17 maintained (61.6 vs 72.3); extraction of teeth 16 and 17, sinus grafting and implant placement area 15 and 16 (33.6 vs 20). Once again, a similar pattern for more homogeneous responses was observed for Brazilian dentists in the third - sinus grafting and implant placement area 26 (50 vs 84.5); fixed dental prosthesis, teeth 24 and 25 as abutments and a distal cantilever (17.4 vs 6.5) - and in the fourth clinical cases - splinted crowns from 13 to 23 with distal cantilevers (12.6 vs 7.1); sinus grafting (14 to 16 and 24 to 26), two implants placement on both sides (58.4 vs 76.8); removable dental prosthesis (29 vs 16.1).

We have found that men perform more implant placement and sinus grafting procedures than women; consequently men also indicate more such treatments to their patients. A recent study, in medicine, indicated that, in the absence of clear scientific evidence leaning towards a specific treatment, physicians preferred the therapeutic modality delivered by them (Jang, et al. 2010). This gender analysis corroborates previous findings in Europe (Zitzmann, et al. 2011b).

Dental faculty decision making in comparison to general practitioners has been shown to differ in several aspects such as in the recommendation of implant therapy for smoking and periodontally ill patients (Heinikainen, et al. 2002). We have found little difference when comparing decision making of dentists who hold a teaching position and those who do not. This leveling might be explained by the fact that almost ninety percent of this sample had pursued further training after graduation. Also, it should be highlighted that this is neither a representative study nor the reasons for participating or not in the survey have been explored. On the other hand, the amount of participants allows for internal validity and analytic purposes.

Good long-term success rates and greater flexibility in clinical management indicate that root canal treatment or retreatment should be performed first in most instances when compared to extraction and implant placement unless the tooth has no conditions to be maintained. When deciding if a compromised tooth of questionable prognosis should be maintained or replaced by an implant, local, site-specific and more general patient-related factors should be considered (Zitzmann, et al. 2009). Five main factors are to be considered during treatment planning: decay date/endodontic status, status of adjacent teeth, periodontal status, esthetic considerations, proximity to critical structures (Anson 2009). Interestingly, another study reported that higher willingness to pay for implant treatment was obtained from females, subjects without missing teeth or restorative need, and who had attained higher level of education (Leung & McGrath 2010). Recent evidence regarding implant placement on sinus grafted areas suggest that long-term outcomes are still controversial and all data should be considered with caution (Tonetti & Hammerle 2008, Esposito, et al. 2010). Notwithstanding, dentists' choice of treatment involved sinus grafting procedures in three of the four clinical cases presented in this study, confirming an urgent need to establish evidence-based clinical decision making. More importantly, non-biased long-term clinical trials regarding sinus grafting procedures and materials should be conducted so we can extrapolate its results and have the possibility to offer different types of treatment to our patients.

Patients with a history of periodontal disease have a higher risk of implant failure (Tonetti & Hammerle 2008, Zitzmann, et al. 2011a, Zitzmann, et al. 2011b, Cosyn, et al. 2012). Also, natural teeth have a better long-term prognosis than dental implants (Leung & McGrath 2010). As stated previously, root canal treatment should be considered first in most instances when compared to extraction and implant placement (Zitzmann, et al. 2009). Despite these clear evidences, there is still a considerable number of professionals not operating in accordance with evidence-based dentistry. Compared to European dentists (Zitzmann, et al. 2011a) results were similar for statements 1, 2 and 4. The fifth and sixth statements concerned a treatment choice between FDP and implant placement. Brazilian dentists' option favored considerably the implant placement option (56.1 and 62.3, respectively) compared to German and Swiss professionals. Such distinction might be explained by the fact that in Brazil there are post-graduation programs specifically in the field of Implantology, which might bias participants' opinion towards this treatment. In spite of

the long-term success of FDPs (Pjetursson, et al. 2007, Bouchard, et al. 2009), similar results regarding the preference for implant therapies have been described (Cosyn, et al. 2012, Lang-Hua, et al. 2012).

The final treatment decision is constituted by current external evidence, clinician's expertise and, evidently, the patient's desires and concerns. It seems clear to infer that each option will hinge on various patient's – e.g. gender, level of education, financial limitations, number of teeth, and trust in their dentist – and professional factors – e. g. area of specialization, implant training days and factors (Leung & McGrath 2010, Zitzmann, et al. 2011a, Lang-Hua, et al. 2012, Narby, et al. 2012). More importantly, considering the current scenario for implant dentistry there is an urgent need to establish international guidelines and protocols to guide the clinician towards the more appropriate treatment option.

ACKNOWLEDGEMENTS

The authors would like to acknowledge all colleagues that took part in this survey and Professor Nicola Ursula Zitzmann for consenting in using her clinical case material.

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TABLES

Table 1 – Sociodemographic and professional characteristics.

Question	Frequency (%)
Gender	
male	79 (51)
female	76 (49)
Dental faculty	
Yes	69 (44.5)
No	86 (55.5)
Work with other dentists?	
Yes	116 (74.8)
No	39 (25.2)
Post-graduation programme	
Yes	136 (87.7)
No	19 (12.3)
Which area?	
Periodontics	40 (29.4)
Prosthodontics	27 (19.8)
Oral surgery	22 (16.1)
Community Dentistry	20 (14.7)
Implantology	19 (13.9)
Endodontics	12 (8.8)
Did not answer	2 (1.4)
Other (e.g. orthodontics, paediatrics)	33 (24.2)

Table 2 – Participants' information regarding clinical practice.

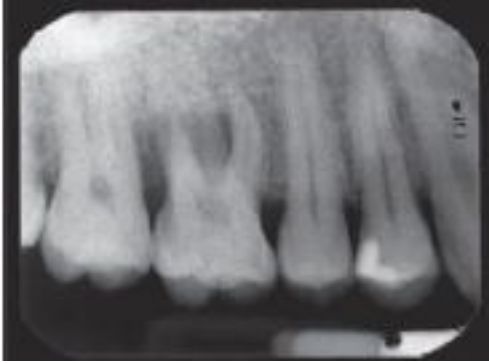
Question		Frequency (%)
Do you perform periodontal surgeries?	Yes	78 (50.3)
	No	77 (49.7)
How many per year?	1-10	17 (21.8)
	11-20	23 (29.6)
	21-30	15 (19.2)
	31-40	4 (5.1)
	41-50	4 (5.1)
	51+	15 (19.2)
Do you use regenerative materials in those situations?	Yes	36 (46.2)
	No	42 (53.8)
How many per year?	1-10	28 (77.8)
	11-20	3 (8.3)
	21-30	1 (2.8)
	31-40	0 (0)
	41-50	1 (2.8)
	51+	3 (8.3)
Do you perform sinus augmentation procedures?	Yes	40 (34.8)
	No	115 (74.2)
Do you insert dental implants?	Yes	52 (33.5)
	No	103 (66.5)
Do you perform implant maintenance?	Yes	65 (41.9)
	No	90 (58.1)
Do you treat peri-implant diseases?	Yes	46 (29.7)
	No	109 (70.3)
Do you refer patients for implant therapies?	Yes	123 (79.3)
	No	32 (20.7)
How many hours per week do you spend working with implants?	1-10	81 (83.5)
	11-20	14 (14.5)
	21-30	1 (1)
	31-40	1 (1)

Table 3 – Results on the statements proposed regarding implant therapy indication.

Statement	Total (%)	Dental faculty		Gender	
		Yes (%)	No (%)	Male (%)	Female (%)
1. In patients with a history of periodontal disease, I prefer implant placement.					
Agree	42 (26.3)	20 (29)	22 (25.6)	23 (29.1)	19 (25)
Do not know	11 (7.1)	4 (5.8)	7 (8.1)	6 (7.6)	5 (6.6)
Disagree	102 (65.8)	45 (65.2)	57 (66.3)	50 (63.3)	52 (68.4)
2. Dental implants have a better prognosis than natural teeth.					
Agree	10 (6.5)	5 (7.2)	5 (5.8)	2 (2.5)	8 (10.5)
Do not know	4 (2.6)	1 (1.4)	3 (3.5)	1 (1.3)	3 (3.9)
Disagree	141 (91)	63 (91.3)	78 (90.7)	76 (96.2)	65 (85.5)
3. When sinus grafting is planned, I better extract adjacent teeth, if those have a questionable prognosis.					
Agree	65 (41.9)	29 (42)	36 (41.9)	34 (43)	31 (40.8)
Do not know	14 (9)	4 (5.8)	10 (11.6)	4 (5.1)	10 (13.2)
Disagree	76 (49.1)	36 (52.1)	40 (46.5)	41 (51.9)	35 (46.1)
4. In case of complicated root canal treatment in maxillary molars, I prefer implant placement.					
Agree	23 (14.8)	12 (17.3)	11 (12.8)	12 (15.2)	11 (14.5)
Do not know	1 (.6)	1 (1.4)	0 (0)	0 (0)	1 (1.3)
Disagree	131 (84.5)	56 (81.1)	75 (87.3)	67 (84.8)	64 (84.2)
5. For single tooth replacement in the maxillary posterior region, I prefer implants over fixed dental prosthesis, even with little residual bone volume.					
Agree	87 (56.1)	39 (56.5)	48 (55.9)	50 (63.3)	37 (48.6)
Do not know	4 (2.6)	1 (1.4)	3 (3.5)	0 (0)	4 (5.3)
Disagree	64 (41.3)	29 (42)	35 (40.7)	29 (36.7)	35 (46)
6. For edentulous spaces with 2 missing teeth, I prefer implants over fixed dental prosthesis, even with little residual bone volume.					
Agree	97 (62.3)	45 (65.2)	52 (60.5)	57 (72.2)	40 (52.6)
Do not know	4 (2.6)	1 (1.4)	3 (3.5)	1 (1.3)	3 (3.9)
Disagree	54 (34.8)	23 (33.3)	21 (36)	21 (26.6)	33 (43.4)

FIGURES

(a)



Decision	Dental faculty		Gender		
	Total	Yes (%)	No (%)	Male (%)	Female (%)
1. Resective periodontal surgery tooth 16	56 (36.1)	13 (18.8) ^{***}	43 (50) ^{***}	25 (31.6)	31 (40.8)
2. Regenerative periodontal surgery tooth 16	44 (28.4)	28 (40.6) ^{**}	16 (18.6) ^{**}	23 (29.1)	21 (27.6)
3. Extraction tooth 16 and immediate implant placement	20 (12.9)	12 (17.4)	8 (9.3)	8 (10.1)	12 (15.8)
4. Extraction of tooth 16 and fixed dental prosthesis 15-17	4 (2.6)	2 (2.9)	2 (2.3)	3 (3.8)	1 (1.3)
5. Extraction tooth 16, later bone augmentation and implant placement	31 (20)	14 (20.3)	17 (19.8)	20 (25.3)	11 (14.5)

(b)



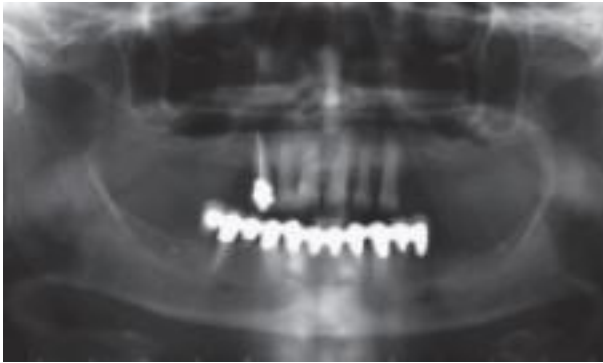
Decision	Dental faculty			Gender	
	Total (%)	Yes (%)	No (%)	Male (%)	Female (%)
1. Extraction of tooth 16, fixed dental prosthesis with 14 and 17 as abutments	31 (20)	16 (17.4)	15 (23.2)	12 (15.2)	19 (25)
2. Extraction of tooth 16, sinus grafting and implant placement area 15 and 16, tooth 17 maintained	112 (72.3)	48 (69.6)	64 (74.4)	60 (75.9)	52 (68.4)
3. Extraction of teeth 16 and 17, sinus grafting and implant placement area 15 and 16	10 (6.5)	4 (5.8)	6 (7)	6 (7.6)	4 (5.3)
4. Other	2 (1.2)	1 (1.4)	1 (1.2)	1 (1.3)	1 (1.3)

(c)



Decision	Dental faculty			Gender	
	Total (%)	Yes (%)	No (%)	Male (%)	Female (%)
1. Sinus grafting and implant placement area 26	131 (84.5)	59 (85.5)	72 (83.7)	66 (83.5)	65 (85.5)
2. Fixed dental prosthesis, teeth 24 and 25 as abutments and a distal cantilever	10 (6.5)	6 (8.7)	4 (4.7)	6 (7.6)	4 (5.3)
3. Removable dental prosthesis	14 (9.0)	4 (5.8)	10 (11.6)	7 (8.9)	7 (9.2)

(d)



Decision	Dental faculty			Gender	
	Total (%)	Yes (%)	No (%)	Male (%)	Female (%)
1. Splinted crowns from 13 to 23 with distal cantilevers	11 (7.1)	8 (11.6)	3 (3.5)	4 (5.1)	7 (9.2)
2. Sinus grafting (14 to 16 and 24 to 26), two implants placement on both sides	119 (76.8)	53 (76.8)	66 (76.7)	63 (79.7)	56 (73.7)
3. Removable dental prosthesis	25 (16.1)	8 (11.6)	17 (19.8)	12 (15.2)	13 (17.1)

Figure 1 – Four different clinical situations were presented (Zitzmann, et al. 2011a) and participants were asked to indicate the treatment option they recommend to their patient. (a) Tooth number 16 shows a through-and-through furcation involvement (degree III) from buccal, mesial and distal. Tooth is non-mobile (degree 0). Teeth numbered 15, 16, and 17 tested positive for sensitivity. Teeth 17 and 15 have no decay and circular probing pocket depths of 2–3mm, mobility degree 0. Tooth 17 has no furcation involvement (** $p < .01$; *** $p < .001$). (b) Tooth number 15 is missing; tooth 16 shows a through-and-through furcation involvement (degree III) from buccal, mesial, and distal. Teeth 17 and 14 have circular probing pocket depths of 2–3 mm, mobility degree 0, no furcation involvement, and tested positive for sensitivity. (c) Maxillary free-end situation with missing molars. Teeth numbered 24 and 25 have circular probing pocket depths of 2–3 mm, mobility degree 0, and tested positive for sensitivity. Tooth no. 24 has no furcation involvement. (d) Maxillary anterior dentition maintained (canine to canine). Teeth numbered 13–23 have circular probing pocket depths of 2–3 mm, mobility degree 0, and tested positive for sensitivity.

3 CONSIDERAÇÕES FINAIS

Com base nos resultados apresentados, observa-se um notável descompasso entre as atuais evidências científicas presentes em relação à Odontologia – mais especificamente em relação à terapia implantar – e a decisão de tratamento dos cirurgiões-dentistas que exercem a profissão.

Frente a isso, faz-se necessária a contínua perpetuação de evidências através de cursos e programas de educação continuada para que o profissional formado em Odontologia seja conscientizado em relação à constante necessidade de atualização acerca das diferentes vertentes de seu ramo. Além disso, o desenvolvimento de protocolos e diretrizes que venham a ajudar o clínico na tomada de decisão de casos complexos mostra-se como uma opção viável e extremamente interessante quando da presença de desafios e circunstâncias adversas no cenário prático.

Futuramente, a disseminação de investigações com o mesmo cunho desta pesquisa contribuirá para o delineamento de um panorama mundial a respeito da conduta exercida por cirurgiões-dentistas. Além disso, estudos intervencionais acerca da formação dos protocolos sugeridos anteriormente constituem-se como metodologias necessárias para a evolução e perpetuação da Odontologia Baseada em Evidências.

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