

Provision of endodontics in specialized public centers for dental care in the Center-West of Brazil

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ABSTRACT

Little is known about the use of public dental services in the Center-West region of Brazil, and even less about the number of endodontic treatments. Endodontic procedures through the Brazilian Unified Health System (*Sistema Único de Saúde*; SUS) are performed mainly in specialized public centers for dental care, and these data are available from the database of the Brazilian Ministry of Health (DATASUS). This study aimed to determine the number of endodontic procedures performed in state capitals in the Center-West of Brazil. We conducted a cross-sectional study with retrospective data collection of all endodontic procedures performed through the SUS from January 2011 to December 2016. Data were obtained from the DATASUS and from the website of the Brazilian Institute of Geography and Statistics and were compared by analysis of variance, using Kolmogorov-Smirnov and Levene's tests followed by Tukey *post hoc* test at a significance level of $p < 0.05$. Campo Grande had the largest number of endodontic treatments per inhabitant (0.063), followed by Cuiabá and Goiânia, with similar rates (0.028 and 0.026 respectively), and Brasília (0.006). Teeth with three or more root canals had significantly more endodontic interventions than teeth with one or two root canals ($p < 0.05$). Higher education institutions must be attentive to the changes in the model of dental care offered by the SUS so that their graduates are trained in accordance with the epidemiological profile of the population as well as with health public policies.

Descriptors: Dentistry. Endodontics. Unified Health System.

1 INTRODUCTION

The model of public dental care in Brazil has undergone major changes in the past decades¹⁻³. Since the implementation of the Brazilian National Oral Health Policy in 2004, the quality of dental care has improved considerably^{2,3}. Given the once widespread acceptance of tooth extraction via primary care, the increased availability of alternative conservative treatment modalities, such as endodontic treatment, may represent a paradigm shift⁴⁻⁶.

The academic boards of dental schools must be attentive to the changes in the model of dental care offered by the Brazilian Unified Health System (*Sistema Único de Saúde*; SUS) so that their focus can be redirected by such changes, as this type of assistance is influential in determining the profile of human resources that will enter the health-care market⁷. Therefore, in addition to engaging students in the SUS health-care services and procedures by using different strategies, such as extramural activities, it is also important to prepare them for critical thinking that challenges the *status quo*^{7,8}.

Maintenance of the dentition can positively affect the overall health and quality of life of individuals⁹. However, endodontic treatment is a much more complex procedure than the extraction of damaged teeth, and its large-scale implementation in the public sector requires a change not only in philosophy but also in investment^{5,10}. The increasing number of specialized dental procedures performed through the Brazilian Unified Health System (*Sistema Único de Saúde*; SUS) in some Brazilian states may signal a change⁴.

Little is known about the use of public dental services in the Center-West region of Brazil, and even less about the number of endodontic treatments^{6,11,12}. Endodontic procedures through the SUS are performed

mainly in specialized public centers for dental care, and these data are publicly available from a database of the Brazilian Ministry of Health (DATASUS), which makes public health data and information easily accessible for managers, health professionals, and researchers¹³. The present study was therefore designed to determine the number of endodontic procedures performed through the SUS in state capitals in the Center-West of Brazil.

2 METHODS

We conducted a cross-sectional study with retrospective data collection of all endodontic procedures performed through the SUS in the Brazilian Federal District and in the capital cities of the three states in the Center-West region of Brazil from January 2011 to December 2016. The study was approved by the Research Ethics Committee of the University of Cuiabá (approval number 68813517.5.0000.5165).

Data were collected from the DATASUS¹⁴. The search strategy followed a standardized format designed for the database used, including searches in the health information system (TABNET) and outpatient information system (SIA/SUS). The following variables were selected: state capital where the service was provided (Brasília – Federal District, Campo Grande – state of Mato Grosso do Sul, Cuiabá – state of Mato Grosso, and Goiânia – state of Goiás); year of completion (January 2011 to December 2016); and type of procedure (permanent teeth with one root canal, permanent teeth with two root canals, and permanent teeth with three or more root canals).

The data were tabulated using the Tab Program for Windows (TABWIN; Brazilian Ministry of Health, Brasília, DF, Brazil) and presented as tables and graphs using Microsoft Excel version 15.0 (Office 2013; Microsoft Corp., Redmond, USA). Population data were

obtained from the website of the Brazilian Institute of Geography and Statistics (IBGE; www.ibge.gov.br).

Comparisons between data were performed by analysis of variance, using Kolmogorov-Smirnov and Levene's tests followed by Tukey *post hoc* test at a significance level of $p < 0.05$. All statistical analyses were performed using SPSS, version 18.0 for Windows (SPSS Inc., Chicago, IL, USA).

3 RESULTS

Table 1 shows the number of endodontic treatments performed from 2011 to 2016 in specialized public centers for dental care in the Brazilian Federal District and in state capitals in the Center-West of Brazil. The treatment-population ratio per city over 2011-2016 is shown in table 2. Campo Grande had the largest number of endodontic treatments per inhabitant, followed by Cuiabá and Goiânia, with similar rates, and Brasília (table 2). Figure 1 shows the number of endodontic procedures per dental groups in the Center-West of Brazil from 2011 to 2016.

Table 1. Endodontic treatments performed in specialized public centers for dental care in the Federal District and in state capitals in the Center-West of Brazil from 2011 to 2016

Procedure/Year	2011	2012	2013	2014	2015	2016	Total
Brasília, DF							
Permanent teeth with one root canal	860	1172	1090	1064	1133	977	6296
Permanent teeth with two root canals	497	772	699	756	600	814	4138
Permanent teeth with three or more root canals	1113	1572	1433	1378	1294	1294	8084
Campo Grande, MS							
Permanent teeth with one root canal	2593	2241	2657	2794	2743	2558	15586
Permanent teeth with two root canals	2187	1857	2372	2820	2781	2514	14531
Permanent teeth with three or more root canals	3815	3513	4049	4515	4644	4013	24549
Cuiabá, MT							
Permanent teeth with one root canal	599	816	1108	1027	904	906	5360
Permanent teeth with two root canals	474	717	748	789	709	656	4093
Permanent teeth with three or more root canals	596	992	1405	1322	1606	1273	7194
Goiânia, GO							
Permanent teeth with one root canal	2455	2635	2355	2121	1070	818	11455
Permanent teeth with two root canals	2286	2614	2086	2608	1123	715	11432
Permanent teeth with three or more root canals	2782	2961	2593	3459	1612	1040	14447

Source: Brazilian Ministry of Health – SUS Outpatient Information System.

Table 2. Total number of endodontic treatments performed from 2011 to 2016 in the Federal District and in state capitals in the Center-West of Brazil and the treatment-population ratio.

State capital	Population*	Number of endodontic treatments	Number of treatments/population**
Brasília	2,977,216	18,518	0.006 ^a
Campo Grande	863,982	54,666	0.063 ^c
Cuiabá	585,367	16,647	0.028 ^b
Goiânia	1,448,639	37,334	0.026 ^b

* Source: website of the Brazilian Institute of Geography and Statistics (IBGE; www.ibge.gov.br, last accessed: May 24, 2017).

** Different lowercase letters indicate statistically significant differences.

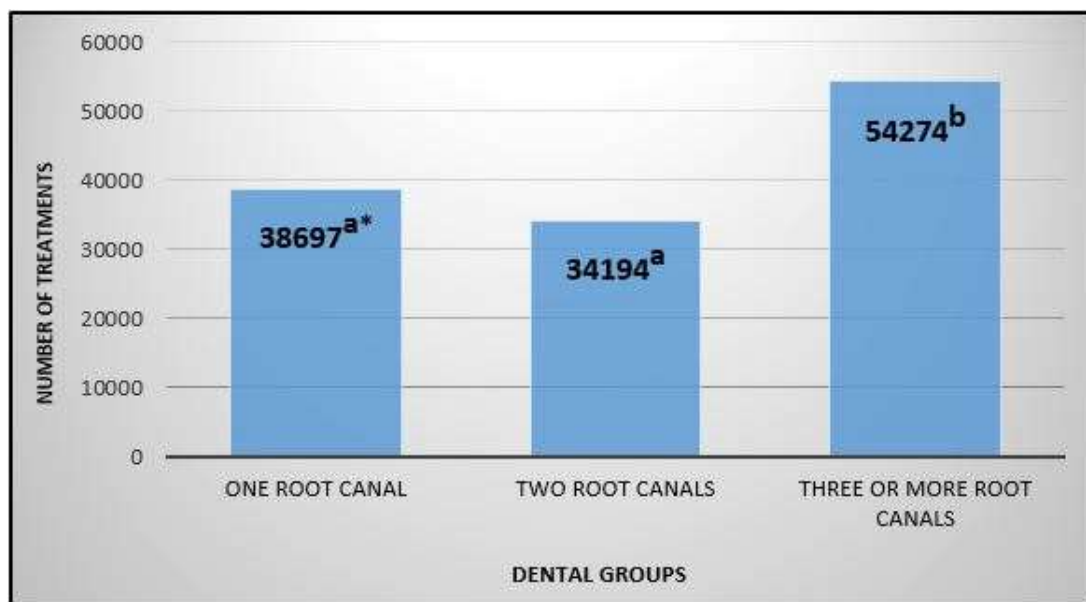


Figure 1. Endodontic treatments per dental groups in the Center-West of Brazil from 2011 to 2016.

*Different lowercase letters indicate statistically significant differences.

4 DISCUSSION

This study shows that the Brazilian public oral health care can no longer be defined on a strictly mutilating basis. The number of endodontic treatments observed in the four analyzed cities shows that there is currently a higher level of concern and public investment in dental care in the Center-West of Brazil, laying the foundation for a paradigm shift in dental practice, in particular the shift from tooth

extraction to tooth conservation. However, this result should be interpreted with caution, as dental care provided in capital cities may not be representative of these practices in smaller towns^{15,16}.

Our results also show that the provision of endodontics is different between the analyzed capital cities. Because the four cities have quite different population sizes, we calculated the endodontic treatment-population ratio to allow a

comparison between the cities. In doing so, we observed that Brasília, despite having the largest population, had the lowest rate of endodontic treatment per inhabitant. This may reflect either less investment in this particular dental specialty in the capital of Brazil or a lower need for endodontic treatment by the population. Neither hypothesis can be confirmed in this study, but they indicate the need for further research.

It was also observed that teeth with three or more root canals had significantly more endodontic interventions than teeth with one or two root canals. Three or more root canals are often present in molars, and their anatomy is more susceptible to caries development, which is probably the main indication for endodontic treatment in these teeth^{17,18}. Such a development needs special attention from public managers to implement actions aimed at caries prevention or early interventions, when the carious process has not yet affected the pulp.

In this study, we used DATASUS as the information source because it is easy to access and can effectively provide data and information on health^{13,19}. DATASUS is based on secondary data sets, produced for several purposes, and is therefore susceptible to errors in typing and recording, possible underreporting, and inconsistency in data collection^{13,19}. However, as DATASUS is an official federal database and, by law, all municipalities in the country are required to submit health-related information to this database, its importance cannot be underestimated²⁰. This information system may have increased reliability if these data are evaluated against epidemiological data^{3,21}, which may also help answer some of the questions raised in this study.

The results of this study suggest a concern in the provision of dental care in the public health system of the surveyed cities in a more conservative and specialized way, considering

the number of endodontic treatments performed in the different capitals. These data are in agreement with the common sense that describes public dental care in Brazil as mutilating and of poor quality¹⁻³.

The Resolution of the Brazilian National Council of Education of 2002 established the national curriculum guidelines for undergraduate courses in Dentistry aiming at the promotion, prevention, recovery and rehabilitation of oral health, with emphasis on the SUS^{22,23}. However, in addition to engaging students in the SUS health-care services and procedures by using different strategies, such as extramural activities, it is also important to prepare them for critical thinking that challenges the status quo^{7,8}. To this end, higher education institutions should be attentive to the changes in the model of dental care offered by the SUS, so that newly graduate dentists can be in line with the epidemiological profile of the population as well as with public health policies that will require their attention^{7,8,22,23}. The strategies applied to vocational training should promote a generalist and humanist understanding of society, not only contributing to but also strengthening the paradigm shift in dental care^{7,8,22,23}.

5 CONCLUSION

The analysis of the provision of endodontics in specialized public centers for dental care in the Federal District and in state capitals in the Center-West of Brazil demonstrates a paradigm shift in dental practice, in particular the shift from tooth extraction to tooth conservation. Campo Grande had the highest rate and Brasília the lowest rate of endodontic treatments, which were more commonly performed in teeth with three or more root canals. The academic boards of dental schools should therefore be attentive to the changes in the model of public dental care in

Brazil so that their focus can be redirected by such changes, as this type of assistance is influential in determining the profile of human resources that will enter the health-care market.

ABSTRACT

Produção endodôntica no atendimento público odontológico do Centro-Oeste do Brasil

Pouco se sabe sobre o atendimento público odontológico no Centro-Oeste do Brasil, ainda menos sobre sua produção endodôntica. Esta produção é realizada principalmente nos Centros de Especialidades Odontológicas (CEO), referência pública para tratamento endodôntico, acessível na base de dados DATASUS. Foi objetivo deste estudo explorar a produção endodôntica nas capitais dos estados da Região Centro-Oeste e do Distrito Federal do Brasil. Este estudo retrospectivo transversal analisou a produção endodôntica destes municípios de janeiro de 2011 a dezembro de 2016. Os dados foram obtidos consultando as bases do Ministério da Saúde (DATASUS) e do Instituto Brasileiro de Geografia e Estatística (IBGE). Os valores foram comparados por análise de variância e os testes de Kolmogorov-Smirnov e Levene seguidos pelo teste *post hoc* de Tukey. O nível de significância foi definido em $p < 0,05$. Dentre as cidades analisadas, Campo Grande teve a maior produção endodôntica por habitante, seguida de Cuiabá e Goiânia com produções similares, e Brasília. Os dentes com três ou mais canais radiculares apresentaram maior incidência de tratamento endodôntico comparados a dentes com um ou dois canais radiculares. A produção endodôntica dos CEO das capitais dos estados da Região Centro-Oeste e do Distrito Federal do Brasil foi proporcionalmente maior em Campo Grande e menor em Brasília. O tratamento endodôntico foi realizado preferencialmente nos dentes com três ou mais canais radiculares. As instituições de ensino devem estar atentas às mudanças para que seus egressos sejam formados em consonância com o perfil epidemiológico da população bem como com as

políticas públicas de saúde.

Descritores: Endodontia. Odontologia. Sistema Único de Saúde.

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