

# Analysis of dentistry content on Instagram® and the use of social networks by Brazilian dental students

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**Aim:** The aim of our study was to analyze the content related to dentistry published on Instagram® and to investigate the students' profiles related to the use of social networks in a sample from a Dentistry School. **Methods:** This study was carried out in two stages. First, research was conducted to analyze content published on Instagram® related to dentistry. The second part investigated the profiles of students' from a dental school in relation to the use of social networks through a questionnaire. A descriptive analysis was performed and associations between the variables were tested using Fisher's exact test. **Results:** We found a diversified and large amount of content related to dentistry published on Instagram®, and publications that involved advertising were more prevalent in our study. There are also many publications that are violating the Code of Dental Ethics. In addition, in the second part of our study, we observed an enormous use of social networks by dental students (98.4%). **Conclusions:** As a result, we believe that it is important to update professionals about the ethical infractions related to social networks which could be approached during graduate courses in universities. Finally, the analyzed social network seems to be an interesting alternative for disseminating health information in order to dialogue with greater proximity to the large number of users who participate in it.

**Keywords:** Social media. Dentistry. Epidemiology. Ethics.



## Introduction

Virtual social networks are social structures consisting of a set of individuals who regularly interact online, facilitating the relations of people and/or organizations that share the same interests, goals, experiences or values<sup>1</sup>. The most popular social network today is Facebook®, which has 1.73 billion active users in the world on average per day<sup>2</sup>. There are several other networks available on the Internet such as Instagram®, which in recent years has shown a strong growth rate, currently resulting in more than 1 billion registered users<sup>3</sup>.

The use of social networks in health has increased exponentially<sup>4</sup>, challenging health professionals to achieve the best use of this new communication mode, considering all ethical standards in its use. Social networks have been widely used as a vehicle for communication by dental professionals, for example, to advertise in order to attract the labor market which is increasingly competitive<sup>5</sup>. Brazilian law prevents the use of any communication vehicle, including the internet, to advertise dental services (i.e. dental surgeons may use social networks as an advertisement vehicle) respecting the ethical restrictions that are available in the Brazilian Federal Code of Ethical Dentistry (CEO)<sup>6</sup>.

The number of articles that reviewed the use of social networks in medicine have grown over the last few years<sup>7</sup>. It is also possible to notice a lack of commitment and professionalism on the parts of professionals and students on social networks in the dental field. A study which evaluated Facebook® profiles of dental and dental hygiene students found that 5.8% of the analyzed profiles contained non-professional content such as sexism, racism, privacy violations, and lack of respect for the teacher or faculty<sup>8</sup>. In addition, there is a daily increase in the publication of content on social networks by dental professionals and students, often violating the profession's code of ethics, which, for example, does not allow disseminating before-and-after images or selfies of dental surgeons accompanied by patients or not, without their previous authorization<sup>9</sup>.

On the other hand, another study published in 2011 showed that social networks have been used to communicate experiences of dental pain, including the actions taken in an attempt to cease pain and descriptions of the impacts caused in the individual's daily routine, being an interesting instrument for behavior analysis and disseminating health information<sup>10</sup>. Social networks can also be used in a beneficial way both for professionals who can publish health content and information, and for the general population to facilitate interaction and communication between the professional and the patient. However, there is a limited number of studies in the literature which have scientifically analyzed the content related to dentistry on the Instagram® social network. Therefore, it is important to perform an analysis of the relation between dentistry and social networks so that they are best used without infringing on important ethical aspects involved in the profession.

In view of the above, the aim of this study was to analyze the contents related to dentistry published on Instagram®, to evaluate the compliance with ethical and legal

aspects, and to investigate the students' profiles related to the use of social networks in a sample from a Brazilian dentistry school.

## Material and methods

This study was carried out in two stages. Firstly, research was conducted to analyze content published on Instagram® related to dentistry. The second part investigated the profiles of students' from a dental school in relation to the use of social networks.

### Part 1: Analyzing content published on Instagram®

It is necessary to use an Instagram® profile to perform the search for the most followed profiles and identify the most used hashtags. Thus, we created a totally empty profile on the network without connection to any other users to perform the research in order to reduce confirmation bias. Research was carried out in two assessment periods. The first was performed in 2016 and the second assessment was performed in 2020.

We searched the 20 users who publish content about dentistry and who have the largest number of followers on the Instagram® network at the time of the search, totaling 40 profiles. We used the keyword "odonto" (abbreviation of odontology in portuguese) to search these profiles, and after obtaining the results of the search, we entered all the returned profiles to verify the amount of followers that each user had at the date of the search. After identifying the 40 users with the largest number of followers, the initial pages of these profiles were collected through print screens for later analysis of the published content type and classification of the profile type of those users. Likewise, we conducted the search for the most frequently used hashtags by Instagram® users related to dentistry using the keyword "odonto". From the hashtags found, the five which had the largest number of publications in both assessment periods were selected, totaling 10 hashtags. The 100 most recent posts of each hashtag were selected through print screens, and were registered for further descriptive analysis of their contents.

After the images were recorded, we collected the data of interest and organized it in a database created in Excel 2013, so the hashtag posts and the profiles of the users could be classified into categories according to their content. Disagreements were discussed until a consensus between two researchers was reached. A third author made the final decision in case of non-consensus.

First, we classified the 40 selected profiles into three categories according to the type of user to understand whether the profile belonged to a person, company or dental clinic. This identification of the user type was done through the user name, profile image and through the biography present on the profile. After evaluating the postings of these 40 profiles individually, we classified them in relation to the type of publication they generally post as follows: clinical case publication (before and after), advertising, oral health information, entertainment, and tips. We considered the images and subtitles of the posts to perform this evaluation and classification. As Instagram® does not provide the characteristics of the users, information such

as gender and age were recorded according to the appearance of the people in the photographs (when possible). These characteristics were collected for both the 40 profiles and the selected hashtag posts.

The registered publications from the hashtags were also classified into categories related to the type of publication (e.g., if they were clinical case postings, oral health information, tips, entertainment, advertising, photo with patient, selfie, patient photo or collective activity photo). Regarding user type, we collected if who did the posting was a person, company or clinic/dental clinic. This information was obtained by analyzing the images and the content of the subtitles of the publications. In addition, when explicitly stated (by image/caption), we classified the publications according to the dental specialization covered on the post.

Finally, we analyzed the presence of non-professional content on publications such as racism, sexism, privacy violations involving recognizable photographic images of patients, negative patient descriptions, and negative comments about the profession by professionals.

In practice, social networking sites report that content being published on the platforms is being made public, and that in those where there are privacy options (such as Twitter and Instagram®, for example), the only content that can be searched is that characterized as public<sup>11,12</sup>. In our study, all publications reviewed were free from privacy, meaning they were publicly available for access by any Instagram® user.

## **Part 2: Investigating the students' profiles**

All of the students from the Faculty of Dentistry from Federal University of Pelotas/Brazil were invited to participate in the study. The students should sign the consent form and then answer the questionnaire to participate, which was applied in the classroom with the prior authorization of the course lecturers. The questionnaire had 18 questions regarding the use of social networks and the students' knowledge about the Brazilian code of dental ethics. The questionnaire application took place from February to July 2018.

After the data collection, the questionnaires were double typed independently into Excel spreadsheets.

## **Data analysis**

Statistical analysis was performed using the Stata 12.0 software program (StataCorp LP, College Station, United States). A descriptive analysis was performed presenting the relative and absolute frequencies of the variables of interest. Associations between the age and publication type variables were tested using Fisher's exact test.

## **Ethical aspects**

Both phases of this study were approved by the Research Ethics Committee of the School of Dentistry of Federal University of Pelotas under protocol number #1,793,486. All study participants signed the informed consent form.

## Results

### Part 1

Data collection was carried out on August 13, 2016 and on October 17, 2020. Out of the 20 users surveyed on Instagram®, the five that had the highest number of followers up to the date of the first search were: @odontologiadic (181k), @odontoespacio (51.1k), @odonto.sopensoemidente (42.3k), @sigadontofantasy (38.2k), and @odontologiapreventiva (33.4k). In relation to the five hashtags analyzed, the one that presented the largest number of publications was #odontologia (863,932), followed by #odonto (501,600), #odontolove (166,485), #odontopediatria (150,019), and #odontoporamor (124,786).

In the second assessment, the five users that had the highest number of followers were: @odontologiadic (243k), @odontologiavfh (104k), @odontoemdic (89k), @odontofada (75.8k) and @draarielycaramori (64.9k). Furthermore, the hashtags that presented the largest number of publications in this second assessment were: #odontologia (7.6M), #odonto (3M), #odontopediatria (1.4M), #odontologiaestetica (1.3M) and #odontoporamor (1M).

Table 1 presents the descriptive analysis of the collected variables related to the 40 most followed users selected. Considering the type of user, 8 (40%) were classified as a company, 7 (35%) as personal and 5 (25%) as a dental clinic in 2016. In contrast, we can observe an increase in personal profiles (65%) in 2020 in comparison to 2016 (35%). We

**Table 1.** Descriptive analysis of the variables collected from profiles with the largest number of followers related to the term “odonto” on the Instagram® social network (40 profiles).

Variable/Category	2016			2020			p*
	n	%	95%CI	n	%	95%CI	
User type							0.024
Personal	7	35.0	15.4-59.2	13	65.0	40.8-84.6	
Clinic	5	25.0	8.7-49.1	6	30.0	11.9-54.3	
Company	8	40.0	19.1-63.9	1	5.0	0.1-24.9	
Sex							0.500
Male	-	-	-	2	10.0	1.2-31.7	
Female	6	30.0	11.9-54.3	8	40.0	19.1-63.9	
Age							0.258
Young	-	-	-	3	15.0	3.2-37.9	
Adult	5	25.0	8.7-49.1	6	30.0	11.9-54.3	
Publication type							0.002
Advertising and marketing	11	55.0	31.5-76.9	12	60.0	36.1-80.9	
Health information	13	65.0	40.8-84.6	13	65.0	40.8-84.6	
Clinical case	12	60.0	36.1-80.9	5	25.0	8.7-49.1	
Entertainment	11	55.0	31.5-76.9	8	40.0	19.1-63.9	
Tips	11	55.0	31.5-76.9	14	70.0	45.7-88.1	
Others	2	10.0	1.2-31.7	-	-	-	

\*Fisher's exact test.

can also visualize a changing in the publication pattern and type in Table 1, where 2020 had a decrease in clinical case posts and an increase in posting tips about dentistry.

The descriptive analysis of the variables collected from publications associated with the 10 most used hashtags related to the term “odonto” on the Instagram® social network is presented in Table 2. Most of the publications regarding the user type were published in personal profiles in both assessment periods. The predominant gender in 2016 was female with 68.3% and the adult age group with 81.0%. In addition, in 2020 we could observe an increase in adults in social media (95.9%). Advertising posts (31.8%) were the most published in 2016, followed by selfie posts (18.6%). Otherwise, we observed a reduction in selfie posts (6.6%) and a significant increase of marketing publications (52.7%) in 2020.

**Table 2.** Descriptive analysis of the variables collected from publications associated with the 10 most used hashtags related to the term “odonto” on the Instagram® social network (1,000 publications).

Variable/Category	2016			2020			p*
	n	%	95%CI	n	%	95%CI	
User type							0.000
Personal	253	50.6	46.1-55.1	237	47.6	43.1-52.1	
Clinic	89	17.8	14.5-21.4	139	27.9	24.1-32.2	
Company	158	31.6	27.5-35.9	122	24.5	20.9-28.6	
Sex							0.363
Male	80	31.8	27.7-36.1	60	27.7	23.9-31.9	
Female	172	68.3	64.1-72.5	157	72.3	68.3-76.3	
Age							0.000
Young	48	19.0	15.7-22.7	9	4.1	2.6-6.3	
Adult	204	81.0	77.3-84.3	208	95.9	93.9-97.5	
Publication type							0.000
Selfie	93	18.6	15.3-22.3	32	6.6	4.6-9.1	
Advertising and marketing	159	31.8	27.7-36.1	257	52.7	48.3-57.2	
Photo with patient	37	7.4	5.3-10.1	26	5.3	3.6-7.8	
Patient's photo	40	8.0	5.8-10.7	9	1.8	0.8-3.4	
Health information	66	13.2	10.4-16.5	88	18.0	14.7-21.7	
Clinical case	25	5.0	3.3-7.3	54	11.1	8.6-14.3	
Entertainment	74	14.8	11.8-18.2	21	4.3	2.8-6.6	
Collective activity photo	6	1.2	0.4-2.6	1	0.2	0.005-1.1	

\* Fisher's exact test and chi-squared test.

Table 3 presents the distribution of the posts according to publication type and dental specializations. The specialization that presented the greatest number of publications of both photos with patients (24.2%) and photos of patients (18.1%) was pediatric dentistry. Advertising publications were more prevalent in the specialization of esthetic dentistry (47.7%), as well as publications of clinical cases (23.6%).



## Part 2

From a total of 459 eligible students, a total of 380 (82,8%) individuals participated in the study. From these, 371 (98.4%) reported using social networks and only 6 (1.6%) answered they do not use it, as we can visualize in Table 4. The most used social network by the students is Facebook® (95.5%), followed by Instagram® (88.2%).

We can also see in Table 4 that most students (89.5%) reported that they search content about dentistry on social networks. The type of content most searched by the students was clinical cases (71.8%), followed by professional tips (70.5%), information about oral health (56.3%), and publicity/entertainment (45.8%). In addition, 34.8% of individuals reported having published some content related to dentistry on the networks, with oral health information (16.1%) and photo with patient (14.5%) being the most published content. Regarding the Code of Dental Ethics, 136 students (35.9%) reported not being aware of the code aspects related to dental posts on social networks.

**Table 4.** Descriptive analysis from the collected variables related to student profiles of the Faculty of Dentistry from Federal University of Pelotas/Brazil.

Variables	N	%
Gender		
Male	125	32.9
Female	255	67.1
Use of social network		
Yes	371	98.4
No	6	1.6
Social network used		
Facebook	362	95.5
Instagram	335	88.2
Twitter	65	17.1
Snapchat	96	25.3
Others	39	10.7
Search for content about dentistry		
Yes	339	89.5
No	40	10.5
Dentistry-related content type		
Clinical cases/before and after type	273	71.8
Professional tips	268	70.5
Information about oral health	214	56.3
Publicity	53	14.0
Entertainment	121	31.8
Others	13	3.5

Continue

Continuation		
Have published some content related to dentistry on the networks		
Yes	131	34.8
No	245	65.2
Type of publication		
Clinical cases/before and after type	35	9.2
Tips	30	7.9
Information about oral health	61	16.1
Publicity	7	1.8
Entertainment	31	8.2
Photo with patient	55	14.5
Patient's photo	6	1.6
Others	13	2.7
Aware of the code aspects related to dental posts on social networks		
Yes	243	64.1
No	136	35.9

## Discussion

The present study is one of the first to analyze content related to dentistry on Instagram®. It was possible to observe that there was a great amount of content related to dentistry published on this network. As can be seen by the increase in number of followers and posts from 2016 to 2020, the use of social networks by health professionals has been considerably increasing over the years. This increasing use can be attributed to a number of factors, such as the popularization of these networks and the increase in competitiveness in the labor market. Brazil currently concentrates around 10% of dentists in the world, with an unequal distribution of professionals with concentration in the major urban centers and in the more economically developed regions<sup>5</sup>. This fact generates an increase in competition among dental professionals in the country, which makes dentist surgeons seek to give greater visibility to their work through advertising on social networks in order to attract patients<sup>5</sup>.

In fact, the publications which involved advertising were more prevalent in our study. From the total of publications, advertising posts increased from 31.8% in 2016 to 52.7% in 2020. Moreover, we could observe that the number of adults in Instagram® social media had increased. It is important to highlight that social networks have emerged as an inexpensive, accessible and rapidly-diffusing opportunity for users to carry out this marketing.

Thus, it is important emphasize that there is no legislation in Brazil that prohibits the use of social networks by dental professionals. However, in order to advertise their services, it is necessary for the dental surgeon to respect the ethical constraints of the Federal Code of Dental Ethics (CEO)<sup>6</sup>. Publications containing patient pictures and/or photos of the dentist with the patients were more present in posts related

to pediatric dentistry. According to the Brazilian CEO, it is an ethical infraction to refer to identifiable clinical cases, patient display, images or any other element that identifies the patient, using expressions of self-promotion, sensationalism, and commercialization of the profession, without the patient's or legal guardian's authorization (article 14, III)<sup>9</sup>. This becomes more critical considering the significant amount of images of children published by pediatric dentists. The Brazilian Statute of the Child and Adolescent (ECA) is clear in guaranteeing children's right to respect, which includes preserving their image and identity<sup>13</sup>. Thus, even with the presence of parents at the time of the photo, publishing images of children in a dental clinic can at least be considered inadequate.

A recent study evaluated 123 images of Instagram® postings by dental surgeons, clinics or dental academics, and found that most posts were before-and-after images for advertising purposes<sup>14</sup>. Our findings revealed that before and after clinical case reports were in greater quantity in esthetic dentistry posts, which were also characterized by a greater number of posts for the purpose of advertising. Allied to this fact, purely esthetic procedures which have been gaining popularity recently such as bichectomy and the application of botulinum toxin have been widely mentioned as hashtags alongside #odontologia (odontology in Portuguese), being even more mentioned than terms related to health.

The main oral health public problems are caries and periodontal disease, which have an unequal distribution, affecting the lower socioeconomic level of the population<sup>15</sup>. This population group is the one who generally less use and access dental services, and when they do, they mostly use public services<sup>16</sup>. Considering that ads on social networks are carried out by companies and dentists working in the private service which focus on patients with higher incomes and therefore have a lower burden of oral diseases, it is not surprising that only aesthetic procedures gain prominence in the posts and that the content related to dentistry on the networks is increasingly focused on the market and not on health promotion. It is also worth noting that Brazil is one of the countries which performs the greatest number of aesthetic medical procedures in the world, which also confirms the high value given to esthetics by the Brazilian population<sup>17</sup>.

In addition, in the second part of our study we observed a huge use of social networks by dental students (98.4%). From the total of students, 34.8% reported having published some content related to dentistry on the networks. Furthermore, more than one third of students reported not being aware of the ethical code aspects related to dental posts on social networks. In this sense, educational institutions should guide students from the beginning of their graduate course on how to correctly use social networks, avoiding future problems in their professional lives, such as those detected in the analyzes of the present work.

A study conducted in 2014 on Twitter® demonstrated that online social networks can become a powerful complement to traditional sources of health information; in addition, the study showed that the users of the research use the Twitter® social network for the purpose of expressing feelings, being able to be positive and/or negative<sup>18</sup>. In agreement, another study published in 2020 regarding Instagram® demonstrated that social networks are used to communicate experiences of dental pain, including

actions taken to stop pain and descriptions of the impacts on their daily routines, and can be an interesting tool for behavioral analysis and disseminating health information<sup>19</sup>. Given these findings, we can see that social networks can be very beneficial and useful for both professionals and patients. For example, in the case of professionals they can be used to disseminate health information for patients, and thus guide their followers how to face some kind of difficulty regarding dental pain or any other dental problem. From the users' perspective, the use of social media for health purposes can provide access to information on healthcare, as well as for them to express their daily states. Finally, social networks could even be used by government and health professionals with a focus on health surveillance.

Health surveillance actions, which have the principle to observe and analyze the health situation of the population, articulate themselves in a set of actions aimed at controlling determinants, risks and damage to health<sup>20</sup>, and could also be put into practice on the social networks, where one could partially analyze the health situation and behaviors of the population, and in turn promote virtual actions aiming to disseminate health information as well as control determinants. Furthermore, disseminating health information could be performed by researchers to communicate relevant findings of studies and by professors in order to assess students in another way of communication in a more modern and direct language, as people nowadays are connected to their smartphones and have wide access to the internet. In this sense, once any content can be published on the networks, the publication of health information by professors would also help to ensure that higher quality content was made available to users in order to increase knowledge of the population about oral health based on the best evidence<sup>21</sup>.

It is also important to highlight some limitations of the present study. First, we did not investigate all content linked with dentistry published on Instagram®. We have investigated a sample of this content and most of the analyzed posts were from Brazil; therefore, the results must be interpreted carefully. In addition, the second part of the study was carried out in a public dental school in southern Brazil, so the findings can only be compared with dental schools with a similar profile. On the other hand, this study shed light on a contemporary topic, such as the use of social media in dentistry. The presence of dentistry in social networks is a reality, with an increasing trend over the next years, following society's pattern. Studies about the use and content related to oral health on these networks are of great interest to understand how dental professionals are behaving and what we can expect in the future.

In conclusion, there is a very diversified and large amount of content related to dentistry on the Instagram® social network, and there are also many publications which are violating the Code of Dental Ethics (CEO). Thus, a concern arises with respect to professionals who are violating the CEO, since a part of the analyzed publications were not professionals in the exercise of teaching, but posts aiming at self-promotion, sensationalism, and commercialization of the profession. In addition, we believe that it is important to update professionals about the ethical infractions present in the CEO related to social networks/the internet, which could be approached during the graduate course in universities so that future dentists do not commit the same infractions. Finally, the analyzed social network seems to be an interesting alternative

for disseminating health services and information in order to dialogue with greater proximity to the large number of users who participate in it.

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## Disclosure statement

The authors declare no conflict of interest.

## Author Contribution

Study design: M.B. Correa, L.J.C Oliveira, and C.B.F. Cumerlato;

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Statistical analysis and interpretation of data: M.B. Correa, L.A. Chisini and C.B.F. Cumerlato;

All authors revised and approved the final version of the manuscript.

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