

Assessment of the online presence and regulatory compliance of dental practice websites in France

DIGITAL HEALTH
Volume 10: 1–12
© The Author(s) 2024
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/20552076241258143
journals.sagepub.com/home/dhj



Aude Pollet¹ and Hadrien Diakonoff^{2,3} 

Abstract

Objective: The aim of this study was to investigate the online presence of French dental practices that have a professional website. Secondly, the degree of compliance of practices' websites with the current regulatory framework was assessed.

Methods: Open data was used to identify a 5% random sample of private dental practices in France ($n = 1370$ facilities). Then, a manual search was made on Google to find the website for each practice. When found, the website was analyzed using criteria.

Results: Only 25.9% of dental practices have a functional and referenced website, allowing 28.9% of the dentists in the sample to have an online presence. Disparities exist depending on the geographical location of the facility and its type. The assessment of website content uncovered a lack of compliance with the existing regulatory framework, exhibiting variations based on the type of facility and the person who designed the website. Hiring a specialized web design provider for dentists enhances compliance with laws and guidelines, though it doesn't guarantee complete adherence.

Conclusions: The online presence of dental practices and dentists in France is limited. Where they do exist, dental practice websites generally do not comply with legal requirements and guidelines for online communication. Efforts should be made to improve the information provided to patients.

Keywords

Online communication, online presence, professional website, healthcare providers, dentistry

Submission date: 11 March 2024; Acceptance date: 13 May 2024

Introduction

Since the early 2000s, the widespread use of the Internet by the public to access health-related websites raised concerns about the quality and accuracy of information displayed online.¹ Therefore, many countries implemented legal and ethical frameworks aimed at regulating health-related websites, including those of healthcare providers. These measures were supplemented by guidelines issued by health organizations.²

In the field of dentistry, several national regulatory organizations have, for many years, restricted the content of dental practice websites to factual, noncommercial information.³ Failure to comply with these requirements may result in financial penalties or prosecution of the healthcare provider. However, recent studies highlight the lack of

compliance with these regulations by dental and orthodontics practices such as the United Kingdom,^{4,5} the Netherlands,⁶ and Australia.⁷

In France, the national regulatory organization for the dental profession, the *Ordre National des Chirurgiens-*

¹Faculty of Dentistry, Université Paris Cité, Paris, France

²Institut de Recherche Criminelle de la Gendarmerie Nationale (IRCGN), Cergy-Pontoise, France

³Institut Droit et Santé - Inserm UMR_S 1145, Université Paris Cité, Paris, France

Corresponding author:

Hadrien Diakonoff, Université Paris Cité - Institut Droit et Santé 45 rue des Saints Pères, 75006, Paris, France.

Email: hadrien.diakonoff@u-paris.fr



Dentistes (ONCD), has strictly regulated dental practice websites between 2001 and the end of 2020. At that time, any information that could be interpreted as advertising could give rise to disciplinary action against the healthcare provider, as French law prohibits all forms of advertising by this type of provider. However, this strict regulation about advertising has been deemed incompatible with European Union law and has been slightly relaxed in December 2020.⁸ Currently, the professional communication of French dentists is subject to guidelines issued by the ONCD, which can be easily updated.⁹ These guidelines apply to both the dental practice's website and social media platforms.

Despite these changes, no study has focused yet on the online presence of French dental surgeons and the compliance of their websites with the existing regulatory framework. Thus, the aims of this study were (1) to evaluate the online presence of French dental surgeons and (2) to investigate the regulatory compliance of French dental practice websites.

Methods

This study did not require ethical approval as only publicly available information from dental practices was assessed.

Table 1. The content of each website was reviewed according to three domains and corresponding criteria.

1. Practice characteristics
(1) Type of facility
(2) Population density of the city where it is located
(3) Number of dentists practicing there
(4) Existence of a Google-indexed website (whether functional or not)
2. Online-displayed information
(5) Contact information (address and phone number)
(6) Mention of the practice's dentist(s)
(7) Dentist registration number
(8) Dentist qualifications
(9) Qualification of a dentist wrongly presented as a specialty
(10) Equipment-related information
(11) Treatment-related information
(12) Social protection mention
(13) Mention of certain fees
(14) Mention of payment methods
(15) Display of patient testimonials or rating
3. Technical and legal issues
(16) Website designer
(17) GDPR compliance
(18) Legal notice compliance

GDPR: General Data Protection Regulation.

Search strategy

Open data from the French healthcare providers registry (Répertoire Partagé des Professionnels intervenant dans le système de santé, RPPS¹⁰) were downloaded at two different time points (October 2022 and October 2023). A Structured Query Language join was used across the two databases to retain only existing dental facilities in this time frame, excluding new and closed facilities. The aim of this step was to avoid new practices, which were more likely to have a website than older ones, and closed practices, which no longer had a website. Over the selected period, 27,669 private dental practices were identified, with a total of 38,562 dentists working there. A 5% random sample of practices was then generated ($n = 1370$) for analysis. This dataset was paired with the population density of the city where the practice is located, obtained from public data.¹¹ Subsequently, for each facility in the sample, a manual search for a website was conducted on the Google search engine. Indexed and functional websites were included in the analysis.

Assessment criteria

The content of each website was evaluated between December 2023 and January 2024, according to 18 criteria across three domains: practice characteristics, online-displayed information and technical and legal issues (Table 1). Criteria were defined on the basis of the ONCD's current guidelines⁹ and national regulation: Law no. 2004-575 of 21 June 2004 on confidence in the digital economy¹² and General Data Protection Regulation (GDPR).¹³

Statistical analysis

The included websites were evaluated by two authors (AP and HD). Interrater reliability was piloted across 20 websites to understand the level of agreement between researchers and standardized evaluations. Data were recorded in Google Sheets (Google, USA) and all statistical analyses were conducted using R software, Version 4.3.2.

Results

Sample

The study focuses on a sample of 1370 private dental practices in France, representing 5% of the country's dental care facilities (excluding public dental practices, such as hospitals). This sample includes 2141 practitioners, accounting for 4.9% of French dentists practicing between October 2022 and October 2023. The private dental practices referenced by the RPPS fall into three categories: individual practices, owned by a single dental surgeon (who may employ an associate); group practices, where one or more

dentists own the structure; and corporate-affiliated group practices (“centres dentaires”), involving several salaried dentists who do not own the structure. The characteristics of the sample are summarized in Table 2.

Assessment of the online presence of dental practices and dentists

Of these 1370 private dental practices, 375 (27.4%) have a Google-indexed website. The comparison between facilities highlights that group practices and corporated-affiliated group practices, and facilities with several practitioners are more likely to have a website than individual practices and facilities with only one practitioner (Table 3). Also, facilities located in densely populated cities are more likely to have a website than those located in sparsely populated cities.

While 375 dental practices of the sample had a website, it was possible to identify 15 practices with a nonfunctioning website and five with a partially functioning website due to missing pages. Therefore, only 355 practices had an indexed and functional website (25.9% of the sample). Among them, two practices had two distinct websites (one for each practitioner of the team). As a result, 357 unique and functional websites were identified, covering 508 dentists practicing in the relevant practices (28.9% of the sample of dentists in the study). These websites were included in the analysis.

Analysis of indexed and functional websites, by type of facility (n = 357 websites)

For each site, a comparative content analysis was carried out according to facility type (Table 4). This comparative analysis revealed that dental practices websites did not always list all practitioners working in the facility: while nearly 80% of individual and group practices listed all practitioners of the facility, one in two corporate-affiliated group practices listed no practitioners at all. While the ONCD guidelines recommend displaying the dentist’s registration number, only 21% of websites mention this number, with variations depending on the type of facility. The websites of corporate-affiliated group practices in the sample did not display any registration numbers, whereas a registration number was displayed in 30% of cases for individual practices and 21% of cases for group practices. Differences between structures also existed regarding the display of qualifications of practicing dentists. 59% of individual and group practice websites displayed the qualifications of all practitioners in the facility, compared to only 12% of corporate-affiliated group practices websites. In some cases, one practitioner’s qualification was incorrectly presented as a recognized specialty (4.5% of websites), which went against the guidelines. There was no significant difference between facilities on this point.

Regarding information about the practice, all analyzed websites mentioned an address and a phone number. It can be observed that individual and group practices displayed significantly more information about equipment than corporate-affiliated group practices (76% vs 12%). The same trend is observed for information about the treatments provided (82% vs 64%), although the comparative analysis is not significant. Concerning economic information, few practice websites displayed information about fees and payment methods. However, corporate-affiliated group practices websites provided more information about agreements with social protection organizations than other types of facilities. Also, nearly 10% of dental facility websites, regardless of type, displayed patient testimonials, which contradicts current guidelines from the ONCD. Regarding these elements, the comparative analysis was not significant.

Finally, corporate-affiliated group practice websites were proportionally more in compliance with legal provisions regarding GDPR and legal notices than individual dental practices and group practices.

Analysis of indexed and functional websites, by website developer (n = 357 websites)

The content of the included websites was studied considering the website designer (Table 5). Information about the website designer has been retrieved from the website’s legal notice page or copyright. The website designer could be the dentist themselves, a website design and hosting services provider (referred to as a “provider”), a specialized provider for dental websites (referred to as a “specialized provider,” defined as a person or company specializing in designing and hosting websites for dentists), or an unspecified provider (when no information about the website designer was available).

In the study sample, the majority of dental practice websites were designed by a website provider and, for 41.1% of them ($n = 147$), by a dental website specialized provider. In large facilities and corporate-affiliated group practices, the designer was most often a nonspecialized or unspecified provider. The fact that the website was designed by a specialized provider seems to favor the display of all practitioners in the facility (80% of websites), as well as the display of the registration number (36%), information about technical facilities (73%), and treatments provided (99%). Interestingly, the design of the website by a dentist did not favor the display of such information.

If we look more closely at the content related to economic information, the fact that the website was designed by a specialized dental website provider favors the display of a mention of agreements with social protection organizations (41% of websites). There is no significant difference between the different types of designers regarding information on fees and payment methods.

Table 2. Characteristics of the sample ($n = 1370$).

	Group practice, $N = 808$ (59%) ^a	Individual practice, $N = 475$ (35%) ^a	Corporated-affiliated group practice, $N = 87$ (6.4%) ^a	Total $N = 1370$ ^a	p -value ^b
Number of practitioners					<.001
1	568 (70%)	410 (86%)	13 (15%)	991 (72%)	
2-3	215 (27%)	65 (14%)	23 (26%)	303 (22%)	
4 or more	25 (3.1%)	0 (0%)	51 (59%)	76 (5.5%)	
Population density					<.001
High	355 (44%)	208 (44%)	70 (80%)	633 (46%)	
Intermediate	313 (39%)	150 (32%)	16 (18%)	479 (35%)	
Low	139 (17%)	115 (24%)	1 (1.1%)	255 (19%)	
Very low	1 (0.1%)	2 (0.4%)	0 (0%)	3 (0.2%)	

^a n (%).^bFisher's exact test.**Table 3.** Comparison of online presence of French dental practices ($n = 1370$).

	No website $(N = 995)$ (73%) ^a	Website $(N = 375)$ (27%) ^a	Total $N = 1370$ (100%) ^a	p -value ^b
Facility				<.001
Group practice	555 (56%)	253 (67%)	808 (59%)	
Individual practice	389 (39%)	86 (23%)	475 (35%)	
Corporated-affiliated group practice	51 (5.1%)	36 (9.6%)	87 (6.4%)	
Number of practitioners				<.001
1	779 (78%)	212 (57%)	991 (72%)	
2-3	175 (18%)	128 (34%)	303 (22%)	
4 or more	41 (4.1%)	35 (9.3%)	76 (5.5%)	
Population density				<.001
High	421 (42%)	212 (57%)	633 (46%)	
Intermediate	359 (36%)	120 (32%)	479 (35%)	
Low	212 (21%)	43 (11%)	255 (19%)	
Very low	3 (0.3%)	0 (0%)	3 (0.2%)	

^a n (%).^bPearson's chi-squared test; Fisher's exact test.

Table 4. Website content by type of facility ($n = 357$).

	Group practice, $N = 244$ (68%) ^a	Individual practice, $N = 80$ (22%) ^a	Corporated-affiliated group practice, $N = 33$ (9.2%) ^a	Overall, $N = 357$ (100%) ^a	p -value ^b
Mention of practitioners					<.001
Partial	48 (20%)	14 (18%)	6 (18%)	68 (19%)	
None	4 (1.6%)	0 (0%)	16 (48%)	20 (5.6%)	
All	192 (79%)	66 (83%)	11 (33%)	269 (75%)	
Registration number					.002
Not displayed	192 (79%)	56 (70%)	33 (100%)	281 (79%)	
Displayed	52 (21%)	24 (30%)	0 (0%)	76 (21%)	
Practitioner's qualifications					<.001
Displayed for some	37 (15%)	9 (11%)	4 (12%)	50 (14%)	
Not displayed	64 (26%)	24 (30%)	25 (76%)	113 (32%)	
Displayed for all	143 (59%)	47 (59%)	4 (12%)	194 (54%)	
Mention of speciality					.7
No mention/compliant	231 (95%)	78 (98%)	32 (97%)	341 (96%)	
Not compliant	13 (5.3%)	2 (2.5%)	1 (3.0%)	16 (4.5%)	
Information about practice equipment					<.001
No	59 (24%)	27 (34%)	29 (88%)	115 (32%)	
Yes	185 (76%)	53 (66%)	4 (12%)	242 (68%)	
Information about treatments					.038
No	43 (18%)	15 (19%)	12 (36%)	70 (20%)	
Yes	201 (82%)	65 (81%)	21 (64%)	287 (80%)	
Agreements with social protection organizations					.006
Agreement, displayed	69 (28%)	30 (38%)	19 (58%)	118 (33%)	
No agreement, displayed	1 (0.4%)	0 (0%)	0 (0%)	1 (0.3%)	
Not displayed	174 (71%)	50 (63%)	14 (42%)	238 (67%)	
Information about fees					.7
No	226 (93%)	76 (95%)	32 (97%)	334 (94%)	
Yes	18 (7.4%)	4 (5.0%)	1 (3.0%)	23 (6.4%)	

(continued)

Table 4. Continued.

	Group practice, N = 244 (68%) ^a	Individual practice, N = 80 (22%) ^a	Corporated-affiliated group practice, N = 33 (9.2%) ^a	Overall, N = 357 (100%) ^a	p-value ^b
Payment methods					.012
Not displayed	234 (96%)	69 (86%)	31 (94%)	334 (94%)	
Displayed	10 (4.1%)	11 (14%)	2 (6.1%)	23 (6.4%)	
Testimonials or ratings					.9
No	215 (88%)	70 (88%)	30 (91%)	315 (88%)	
Yes	29 (12%)	10 (13%)	3 (9.1%)	42 (12%)	
GDPR compliance					.12
No	112 (46%)	33 (41%)	9 (27%)	154 (43%)	
Yes	132 (54%)	47 (59%)	24 (73%)	203 (57%)	
Legal notice compliance					.3
No	89 (36%)	31 (39%)	8 (24%)	128 (36%)	
Yes	155 (64%)	49 (61%)	25 (76%)	229 (64%)	

GDPR: General Data Protection Regulation.

^an (%).

^bFisher's exact test; Pearson's chi-squared test.

Websites designed by dentists themselves or by nonspecialized providers displayed significantly more testimonials and ratings compared to websites designed by specialized providers (only 1.4% of websites displayed testimonials or ratings). The same trend applies to the wrongly displaying of a qualification as a specialty, although the result was not significant between the different types of designers.

Finally, websites designed by specialized providers are more compliant in terms of displaying legal notices (compliant in 91% of cases) and GDPR (compliant in 70% of cases) than websites designed by dentists (compliant in 19% and 46% of cases) or nonspecialized providers (compliant in 91% and 70% of cases).

Discussion

To the best of our knowledge, this study is the first to investigate the online presence of French dental practices and the compliance of website content with the existing regulatory framework. Out of the 1370 facilities sampled, only 355 (25.9%) have a functional and referenced website, allowing 28.9% of the dentists in the sample to have an online presence. The assessment of website content uncovered a lack

of compliance to the existing regulatory framework, exhibiting variations based on the type of facility and the person who designed the website.

Despite the widespread use of the Internet for health-related purposes by French citizens, private dental practices and dentists in France appear to have a less prominent online presence compared to those in other countries. For comparison, in an earlier study from 2011 involving 150 dental practices in the United Kingdom, Nichols and Hassal found an online presence rate of 35%, a higher rate than that found in the sample of the current study.¹⁴ More recent data about the online presence of dental practices or dentists is difficult to find because studies that have analyzed dental websites have worked from data collected through a search engine, rather than from a sample of dental practices or practitioners.^{6,7,15,16} However, recent data is available for other medical professions abroad, showing high online presence rates.¹⁷⁻¹⁹ These results suggest that French dentists are less inclined than their foreign counterparts to have an online presence through a website. This could be attributed to a lack of interest on the part of practitioners, and the financial and time costs involved in designing a site.

Table 5. Website content by designer (n = 357).

Facility	Unknown, N = 18 (5.0%) ^a	Dentist, N = 84 (24%) ^a	Provider, N = 108 (30%) ^a	Specialized provider, N = 147 (41%) ^a	Overall, N = 357 (100%) ^a	p-value ^b
Group practice	6 (33%)	60 (71%)	76 (70%)	102 (69%)	244 (68%)	<.001
Cabinet individual	4 (22%)	21 (25%)	18 (17%)	37 (25%)	80 (22%)	
Corporated-affiliated group practice	8 (44%)	3 (3.6%)	14 (13%)	8 (5.4%)	33 (9.2%)	
Number of practitioners						.061
1	8 (44%)	35 (42%)	54 (50%)	81 (55%)	178 (50%)	
2-3	5 (28%)	43 (51%)	40 (37%)	50 (34%)	138 (39%)	
4 or more	5 (28%)	6 (7.1%)	14 (13%)	16 (11%)	41 (11%)	
Mention of practitioners						<.001
All	12 (67%)	59 (70%)	80 (74%)	118 (80%)	269 (75%)	
Partial	0 (0%)	21 (25%)	24 (22%)	23 (16%)	68 (19%)	
None	6 (33%)	4 (4.8%)	4 (3.7%)	6 (4.1%)	20 (5.6%)	
Registration number						<.001
Displayed	0 (0%)	7 (8.3%)	16 (15%)	53 (36%)	76 (21%)	
Not displayed	18 (100%)	77 (92%)	92 (85%)	94 (64%)	281 (79%)	
Practitioner's qualifications						<.001
Displayed for all	3 (17%)	38 (45%)	61 (56%)	92 (63%)	194 (54%)	
Displayed for some	1 (5.6%)	16 (19%)	11 (10%)	22 (15%)	50 (14%)	
Not displayed	14 (78%)	30 (36%)	36 (33%)	33 (22%)	113 (32%)	

(continued)

Table 5. Continued.

	Unknown, N = 18 (5.0%) ^a	Dentist, N = 84 (24%) ^a	Provider, N = 108 (30%) ^a	Specialized provider, N = 147 (41%) ^a	Overall, N = 357 (100%) ^a	p-value ^b
Mention of speciality						.5
No mention/compliant	18 (100%)	78 (93%)	103 (95%)	142 (97%)	341 (96%)	
Not compliant	0 (0%)	6 (7.1%)	5 (4.6%)	5 (3.4%)	16 (4.5%)	
Information about practice equipment						<.001
No	15 (83%)	27 (32%)	33 (31%)	40 (27%)	115 (32%)	
Yes	3 (17%)	57 (68%)	75 (69%)	107 (73%)	242 (68%)	
Information about treatments						<.001
No	14 (78%)	33 (39%)	22 (20%)	1 (0.7%)	70 (20%)	
Yes	4 (22%)	51 (61%)	86 (80%)	146 (99%)	287 (80%)	
Agreements with social protection organizations						<.001
Agreement, displayed	11 (61%)	19 (23%)	27 (25%)	61 (41%)	118 (33%)	
No agreement, displayed	0 (0%)	0 (0%)	1 (0.9%)	0 (0%)	1 (0.3%)	
Not displayed	7 (39%)	65 (77%)	80 (74%)	86 (59%)	238 (67%)	
Information about fees						.6
No	18 (100%)	77 (92%)	100 (93%)	139 (95%)	334 (94%)	
Yes	0 (0%)	7 (8.3%)	8 (7.4%)	8 (5.4%)	23 (6.4%)	
Payment methods						.7
Not displayed	17 (94%)	78 (93%)	99 (92%)	140 (95%)	334 (94%)	
Displayed	1 (5.6%)	6 (7.1%)	9 (8.3%)	7 (4.8%)	23 (6.4%)	

(continued)

Table 5. Continued.

	Unknown, N = 18 (5.0%) ^a	Dentist, N = 84 (24%) ^a	Provider, N = 108 (30%) ^a	Specialized provider, N = 147 (41%) ^a	Overall, N = 357 (100%) ^a	p-value ^b
Testimonials or ratings						
No	18 (100%)	55 (65%)	97 (90%)	145 (99%)	315 (88%)	<.001
Yes	0 (0%)	29 (35%)	11 (10%)	2 (1.4%)	42 (12%)	
GDPR compliance						
No	6 (33%)	45 (54%)	59 (55%)	44 (30%)	154 (43%)	<.001
Yes	12 (67%)	39 (46%)	49 (45%)	103 (70%)	203 (57%)	
Legal notice compliance						
No	5 (28%)	68 (81%)	42 (39%)	13 (8.8%)	128 (36%)	<.001
Yes	13 (72%)	16 (19%)	66 (61%)	134 (91%)	229 (64%)	

GDPR: General Data Protection Regulation.

^an (%).^bFisher's exact test; Pearson's chi-squared test.

The present study also highlights differences in online presence between types of facilities: facilities located in densely populated areas and those with several dentists were more likely to have a website than facilities located in sparsely populated areas or individual practices. This observation can be explained by the fact that facilities located in densely populated areas may be more subject to competition between practitioners, an online presence is a useful approach to gaining a competitive edge. On the other hand, facilities located in sparsely populated areas, or individual practices, would see no value in investing financially in a practice website. However, regional disparities between dental practices with a website and those without one could contribute to healthcare inequality across regions. Patients in areas with limited online presence may face disadvantages due to a lack of information about their local dental practice.²⁰

Moreover, having a website for the practice was no guarantee of online visibility, since 24.6% of the websites analyzed did not mention all or any of the practitioners working there. Dental practices where the dentist is not the owner also have a reduced online presence, which is unfortunate because patients don't have access to information about their practitioner. Furthermore, by lacking online visibility, the dentist may not be able to control their online reputation, and third-party marketing websites may appear in search engine results when patients search for the practitioner. A similar issue is found for other healthcare professionals.^{19, 20}

In light of these findings, it seemed important to analyze the content of the information displayed on the website related to dentists. For 79% of websites, there was no mention of the practitioner's registration number, which contradicts the guidelines of ONCD. Similar results were reported on U.K.¹⁴ and Dutch dental practice websites.²² Interestingly, orthodontic practices seem to be more compliant on this issue than dental practices, with a higher mention rate.⁶ The qualifications of the dentists mentioned were also evaluated: 54% of the websites mentioned the qualifications of all the practitioners listed on the site. On the other hand, 32% of sites did not mention the qualifications of any practitioner. A lack of information about a dental surgeon's qualifications can make it difficult for patients to choose a practitioner, particularly in facilities with several practitioners or when the patient has a specific treatment request.

In addition, 4.5% of dental practice websites incorrectly described the practitioner as a specialist, in contradiction with the ONCD guidelines which stipulate that only dentists who are on the specialist register may use the term "specialists" in their activities.⁹ Such an attitude could mislead the public and lead the dentist to be charged with unprofessional conduct by the ONCD. In some cases, a nonspecialist practitioner was described as a specialist, most often in orthodontics, which is one of the three

specialties recognized in France along with oral surgery and oral medicine. In other cases, the specialty listed on the website was not recognized by the ONCD: specialist in periodontics, endodontics, aesthetics or implantology. Similar results can be found in other countries, such as the United Kingdom: in 2014, Raimundo showed that 16% of U.K. implant practice websites claimed that the practitioner was an implant specialist, a speciality that isn't recognized by General Dental Council.²³ It is also possible to ask whether certain clinical practices are more likely to lead dental facilities to display information that does not comply with the guidelines, as shown by Raimundo and other studies carried out on orthodontics¹⁵ and aesthetic care.^{4, 14} The present study seems to confirm this idea, but further research is needed to draw definitive conclusions on this issue.

This study also analyzed information related to the technical facilities and treatments: information about technical facilities is often present (68% on average), as well as information about the treatments offered (80%). However, it is noteworthy that websites designed by specialized providers almost systematically display information about treatments. This is explained by the standardized content that is reproduced across all websites created by these providers. This standardized information, created by an editorial committee of dentists, ensures the delivery of scientifically recognized information. However, it was possible to observe that some content is outdated, and to identify the presence of content that had no medical relevance, such as "humor at the dentist" or "Does wearing a mask cause bad breath?." Finally, it was observed that some content created by the dentist himself or a provider could violate professional guidelines. It is therefore necessary to find a balance between standardized content that is scientifically accurate and personalized content that is inappropriate from an ethical or regulatory point of view.

Few of the analyzed websites displayed patient testimonials or ratings (12% of websites), which seems to show compliance with ONCD guidelines. These guidelines prohibit dentists from posting patient testimonials or reviews in their professional communications, despite the benefits they may have for website indexing and practice reputation.²⁴ This ban also exists in Australia, Canada, some states in the United States, Hong Kong, and Singapore, but not in the United Kingdom, where the use of testimonials and reviews by dentists is unregulated.^{25, 26} However, it can be seen that websites conceived by dentists are more likely to display testimonials (35% of websites) than websites designed by specialist website providers (1.4% of websites). This can be explained by the fact that many dentist-created websites use the Google Sites tool, which enables patient comments to be included from the Google platform. Such a result highlights the need to make dentists who develop their own websites aware of the regulation of patient testimonials.

In France, dental treatments are fully or partially reimbursed by the social security system, and dentists are therefore required by law to display reimbursement information for patients. However, analyzed websites made little mention of information on social security (33.3% of websites), fees (6.4% of websites), and methods of payment (6.4% of websites), information which is nevertheless required by law and guidelines.⁹ Such a result could be explained by the fact that dentists are not only unaware of the law or guidelines, but are also reluctant to disclose the costs of their fees not covered by social security organizations. Dentists and website providers therefore need to pay closer attention to the economic information displayed on their websites.

Finally, it was chosen to verify the compliance of websites with two legislations: national legislation requiring the display of legal notices¹² and European legislation on data protection (GDPR).¹³ Sixty-four percent of the websites displayed legal notices, and 57% had a data protection policy. Websites created by dentists were less compliant with the legislation than those designed by specialized providers. It is also noteworthy that websites designed by providers, whether specialized or not, are not fully compliant with the legislation. However, these two laws state that the person in charge of the website, namely the dentist, is responsible for the content displayed, not the provider. The dentist who delegates the design of the website must therefore be vigilant about the content created by the provider. It can be suggested that a lack of compliance with current regulations may result from the fact that many analyzed websites are old, with some being over eight years old. However, the GDPR came into effect on 25 May 2018. Additionally, some websites have been recently created by dentists using website creation tools like Google Site or Wix. These tools do not default to the writing of legal notices, a process that is mandatory only for professionals in France.¹²

All the results of this study emphasize the need for increased awareness among French dentists to ensure that the information they provide complies with the existing regulatory framework, whether they design their own websites or use the services of a website provider. A proactive approach to awareness and training should be conducted by the ONCD and professional associations. Dental students could also receive more training on professional communication at the end of their curriculum. Finally, to reinforce website compliance with the law and guidelines, it may be appropriate to set up a certification process for dental practice websites and/or dental website providers by one or more certification bodies appointed by dental regulatory authorities.

This study has some limitations: similar to other investigations of this nature, it was conducted at a single time point and provides only a snapshot of websites at that particular stage; the quality of website content was not assessed, as

the analysis focused on the presence or absence of specific information without delving into qualitative aspects, which can be evaluated using tools like LIDA or DISCERN, two tools used to provide users with a systematic assessment of the accessibility, usability, reliability, and overall quality of information.^{27,28} Finally, the online presence of dentists is not limited to websites alone but also includes social networks. Further research is therefore needed to gain a better understanding of the online presence and the compliance with regulations regarding the content of dentists' online communication in France.

Despite those limitations, our study has some strengths. In contrast to other studies in this field, the selection of websites was based on a sample of structures obtained from the public register, rather than through a direct search on a search engine; The analysis sample is significant as it represents 5% of private dental care facilities in France; finally, for each structure, manual website search helped prevent inclusion errors.

Conclusions

Despite the widespread use of the Internet in France, particularly for accessing medical information, the online visibility of French dental practices and dentists remains limited. In cases where websites exist, they often fall short of complying with guidelines and regulatory requirements. While engaging a specialized web design provider for dentists can enhance compliance with laws and guidelines, it does not guarantee total adherence. Consequently, there is a need for French dentists to enhance their compliance with guidelines and the legal framework governing their online communication.

Contributorship: Aude Pollet: conceptualization, methodology, data curation, data Analysis, writing—original draft and Hadrien Diakonoff: data analysis, writing—review and editing.

Declaration of conflicting interests: The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Ethical approval: This study did not require approval by the institutional review board because it involved the use of public access data only.

Funding: The authors received no financial support for the research, authorship, and/or publication of this article.

Guarantor: Hadrien Diakonoff.

ORCID iD: Hadrien Diakonoff  <https://orcid.org/0000-0003-1089-3386>

References

1. Wilson P. How to find the good and avoid the bad or ugly: a short guide to tools for rating quality of health information on the internet. *Br Med J* 2002; 324: 598–602.
2. Winker MA, Flanagan A, Chi-Lum B, et al. Guidelines for medical and health information sites on the internet: principles governing AMA web sites. *JAMA* 2000; 283: 1600.
3. Kravitz AS, et al. *Manual of dental practice 2015*. Edition 5.1. Council of European Dentists, 2015.
4. Donnell CC, Woolley JJ and Worthington SW. Advertising and facial aesthetics in primary care: how compliant are practice websites and social media with published guidance? *Br Dent J* 2021; 1–9.
5. Alsaqabi F, Madadian MA, Pandis N, et al. The quality and content of websites in the UK advertising aligner therapy: are standards being met? *Br Dent J* 2023; 1–5.
6. Oey CG and Livas C. The informative value and design of orthodontic practice websites in the Netherlands. *Prog Orthod* 2020; 21: 1–7.
7. Meade MJ, Ju X, Hunter D, et al. Compliance of orthodontic practice websites with ethical, legal and regulatory advertising obligations. *Int Orthod* 2023; 21: 100727.
8. Decree No. 2020-1658 of December 22, 2020, amending the code of ethics for dental surgeons and relating to their professional communication. *Journal Officiel de la République Française*. 2020; 322:24990–24995.
9. Ordre national des chirurgiens-dentistes. Communication professionnelle des chirurgiens-dentistes : recommandations et explicitations du Conseil national de l'Ordre des chirurgiens-dentistes, 2023.
10. Ministère de la santé et de la prévention. Répertoire Partagé des Professionnels intervenant dans le système de santé., <https://esante.gouv.fr/produits-services/repertoire-rpps> (accessed 29 April 2024).
11. Institut national de la statistique et des études économiques. Grille communale de densité. <https://www.insee.fr/fr/information/2114627> (accessed 29 April 2024).
12. Law No. 2004-575 of June 21, 2004, on confidence in the digital economy. *Journal Officiel de la République Française*. 2004; 143:10031-10044.
13. Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation). *Official Journal of the European Union*. 2016; L119:1-88.
14. Nichols LC and Hassall D. Quality and content of dental practice websites. *Br Dent J* 2011; 210: E11–E11.
15. Patel A and Cobourne MT. The design and content of orthodontic practice websites in the UK is suboptimal and does not correlate with search ranking. *Eur J Orthod* 2015; 37: 447–452.
16. McMorrow SM and Millett DT. Adult orthodontics: a quality assessment of internet information. *J Orthod* 2016; 43: 186–192.
17. Montemurro P, Cheema M, Tamburino S, et al. Online and social media footprint of all Swedish aesthetic plastic surgeons. *Aesth Plast Surg* 2019; 43: 1400–1405.
18. Davies N, Murphy DG, Van Rij S, et al. Online and social media presence of Australian and New Zealand urologists. *BJU Int* 2015; 116: 984–989.
19. Kim C, Gupta R, Shah A, et al. Digital footprint of neurological surgeons. *World Neurosurg* 2018; 113: e172–e178.
20. Abu-Serriah M, Bharmal RV, Gallagher J, et al. Patients' expectations and online presence of oral and maxillofacial surgery in the United Kingdom. *Br J Oral Maxillofac Surg* 2014; 52: 158–162.
21. Bilello J, Patel S, Potluri V, et al. Characterizing the online presence of interventional radiologists: a potential marketing opportunity. *Cureus* 2020;12: 1–7.
22. Poorterman JHG, Tjiook SP, Moeijes SFS, et al. Websites of dental practices evaluated. *Ned Tijdschr Tandheelkd* 2014; 121: 263–267.
23. Raimundo H and Robinson P. An audit of implant practice websites: content and regulatory compliance. *Br Dent J* 2014; 217: 673–677.
24. McLeod NS. Enhancing the online presence of a dental practice. *J Prosthet Dent* 2012; 107: 271–275.
25. Donnell CC, Iafrate LF and Worthington SW. The 'five star' fallacy: an analysis of online reviews and testimonials of dental practices in Northern England. *Br Dent J* Epub ahead of print 22 September 2022.
26. Jensen E, Sethi S, Poirier B, et al. Advertising and general dental practice: how compliant are practice websites in Australia with legal requirements? *Aust Dent J* 2023; 68: 92–97.
27. Charnock D, Shepperd S, Needham G, et al. DISCERN: an instrument for judging the quality of written consumer health information on treatment choices. *J Epidemiol Community Health* 1999; 53: 105–111.
28. Minervation. The LIDA Instrument: Minervation validation instrument for health care websites, Version 1.2. 2011. <http://www.minervation.com/wp-content/uploads/2011/04/Minervation-LIDA-instrument-v1-2.pdf> (accessed 29 April 2024).