

Educational Article

Clinical photography: attitudes of practitioners specialized in oral mucosal diseases

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Abstract – Introduction: Clinical photography is an important tool for clinical practice, training and research frequently used across medical specialties. It may provide snapshot images of evolving clinical situations. The aim of this work was to record its contribution in the management of oral mucosal diseases and, to identify the methods of using this tool by carrying out a survey with practitioners specialized in oral pathologies. This allowed us to make recommendations for appropriate use of this tool. **Material and methods:** An online anonymous questionnaire was sent via email, to practitioners who were member of two associations of French specialists. **Results:** 51 oral medicine specialists completed the survey. Among them, 48 (94%) used photography in their daily practice. Lack of time or interest was the reasons given by the 3 practitioners who did not use photography. Pictures were mostly taken with smartphones, which provide precise and accurate images, and stored on personal or professional computers. Sharing of images was performed mostly by secured professional or personal email addresses. Consent was obtained verbally in most cases. **Conclusion:** Photography could be a valuable asset in the practice of oral medicine. However, recommendations for the safety of patient personal data are not always followed.

Introduction

Photography is an important tool for clinical practice, initial or continuing professional education and research in oral medicine. It is used frequently in multiple specialties such as dermatology [1], plastic surgery [2], maxillofacial surgery [3] and orthodontics [4].

Oral medicine is based on clinical evaluation of mouth mucosa and of its changes over time across multiple consultations. Photography of the mouth mucosa may be a true asset for clinical practice, as it could provide snapshots of evolving clinical situations, which can be visualized at a later date even in the absence of the patient [5]. Furthermore, high resolution cameras enable clinicians to see details of lesions which may have been missed during the physical examination [6,7]. For instance, it could help to visualize the epidermal collarette, therefore enabling the diagnosis of bullous impetigo.

Sometimes, the lesion may have healed or disappeared from view the day of the consultation. However, if the patient has taken pictures of his or her lesion beforehand, the practitioner may still be able to recognize the disease and make the

appropriate diagnosis and recommend treatment. Thus, photography is likely to be a critical aid for the diagnosis and management of patients with conditions of the mouth. In a recent study from France, photographs were considered an additional source of data for 65% of patients who had presented with an oral mucosal lesion [8]. It is also a tool to monitor lesions over time [9] and can enhance the dialogue and communication between colleagues and, could be particularly valuable for suspected or atypical lesions [10,11] or, when multidisciplinary care is required [12,13]. Pictures may be particularly helpful for pathologists making histological diagnoses of atypical oral mucosal lesions and communicating their findings with clinicians.

In addition, photography is an essential tool for teaching and clinical research. They are valuable illustrations with visual impact in research articles or during a clinical presentation at conferences. "Pictures speak a thousand words", they accentuate the subject matter and increase the interest of the viewer or reader [14]. A recent study showed that photographs are a tool for the teaching of oral medicine: A survey was conducted in two dental institutions in the United Kingdom and Israel, among dental students. In the study 99.4% of participants found it useful for education and 78.3% found it helpful for studying for tests and exams [15]. However,

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teaching does not only serve exam-takers; a French study showed that the use of photography in clinical practice enhanced communication between senior practitioners and interns, which in turn has a direct impact on patient care [2].

Furthermore, photos can have an impact on public health. For certain pathologies, such as Oral Squamous Cell Carcinoma (OSCC), of which there were more than 350 000 new cases worldwide in 2018, early detection is critical [16] and, photography can be used as a preventive tool to inform the population about the risks of developing cancers associated with certain behaviours. For this reason in France since 2014, the government has introduced tobacco consumption reduction measures through the printing of pictures of OSCC on cigarette packaging to dissuade people from smoking [17,18]. This has likely contributed to a decline in tobacco consumption over the last two years [17].

Photographs can also serve as legal documentation. Patients are bringing forth more lawsuits against medical practitioners. Oral images could be utilized as proof of good practice for clinicians [6,11].

Finally, clinical photographs can also contribute to the development of novel analytical tools. In fact, in dermatology, an algorithm for automated recognition of malignant skin lesions has been developed through artificial intelligence. The program was trained to identify suspected cases of melanoma through the use of clinician labelled photographs [19].

Nonetheless, despite the numerous uses of photography in oral medicine, few articles reviewed its use in the oral medicine specialty [10,15,20]. Here, we aim to understand the interest and usage of photography in mouth mucosa disease cases and, to present the results of a survey undertaken to assess the use of photography by oral medicine practitioners in France.

Materials and methods

An online anonymous questionnaire (made with Google Forms®) was sent by email from October 1st to December 10th, 2019, to practitioners (Fig. 1). They were either a member of the SFCO (*Société française de chirurgie orale* – French Oral Surgery Society) or of GEMuB (*Groupe d'étude de la muqueuse buccale* – Mouth Mucosa Study Group). Members of these groups are dental surgeons, oral surgeons, stomatologists, dermatologists, and maxillofacial surgeons.

The inclusion criteria for this study were to run an oral medicine practice and to have completed the survey. Only one survey response per participant was allowed. Multiple questions were asked about the type of lesions photographed, the frequency of photography use in the practice, the type of camera used, the means of storage and sharing, and the request of informed consent. They questions are listed in Figure 1. In the event of a data entry error when practitioners filled out the questionnaire, the data were excluded from the results. The questionnaire was partially based on the survey undertaken to assess the use of photography and smartphone by plastic surgeons in France [2].

Results

Summary of participants

Fifty-one oral medicine specialists completed the survey. The mean number of years practice in our sample was 18.8 years. Among them, 8 (15.7%) were dental surgeons, 2 (3.9%) dental surgeons specialized in “*médecine bucco-dentaire*” (oral and dental medicine), 23 (45.1%) dental surgeons specialized in oral surgery, 4 (7.8%) stomatologists or physician specialized in oral surgery, 6 (11.8%) maxillofacial surgeons and 8 (15.7%) dermatologists (Tab. I).

Among these 51 respondents, 48 (94%) used photography in their daily practice and 37 (72.5%) of which, used photography systematically. Only 3 (6%) practitioners declared not to use it. The reasons given were a lack of time or interest.

The following results are based on the answers of the 48 practitioners who used photography in their daily practice.

When practitioners do use photography?

Photographs were systematically taken by 22 (45.8%) respondents for each first consult and by 15 (31.2%) for all follow-up consults. In most cases, they were less frequent with 26 (54.2%) practitioners surveyed reporting taking photos occasionally, and only at the first consult and 31 (64.6%) at follow-up. 2 (4.2%) never took photographs for follow-up (Fig. 2B).

Dental surgeons specialized in oral surgery have the highest response rate for this survey. They represent 45.1% of the sample and 91% of them took photographs regularly in their practice, mostly for all types of lesions (81.8%). Maxillofacial surgeons have the lowest response rate for the use of photography with only 60% of respondents of the speciality acknowledging the use of it.

For what purpose do practitioners use photography?

Thirty-three oral specialists (68.7%) took pictures of all patients with mucosal lesions while 15 (31.3%) only took pictures when their patients had suspicious lesions (Fig. 2A).

Practitioners acknowledged that they mostly used photography to consult with other clinicians (95.8%), to monitor a patient's lesion (95.8%) and for lectures or publications in journals (93.7%).

Technical modalities of shooting and storage

In order to take photos, smartphones were used by 48.9% of the respondents, compact cameras by 11.1% and reflex cameras, in which cameras have a high fidelity of the image taken, by 40% (Fig. 3A).

The pictures were saved mainly on personal computers (60.4%), on professional computers (58.3%), or on personal external drives (45.8%) (Fig. 3B). The name of the patient and the diagnosis of the lesion were used for file classification by almost two-thirds of the respondents.

- **Specialty:** Dental surgeon, Dental surgeon specialized in oral surgery, Dental surgeon specialized in _____, Dermatologist, Stomatologist, Maxillofacial surgeon: other: _____
- **Do you use photography in your practice of oral medicine?**
 - Yes, commonly, Yes, sometimes,
 - No, why?: no interest, lack of time; material's cost; too complicated
 - For what kind of lesion: All lesions, Suspect lesions
- **What's the frequency?**
 - For the 1st consult: Never Occasionally Systematically
 - For the follow-up: Never Occasionally Systematically
- **Before taking and sharing photos, do you ask for the patient's consent:**
 - No Yes, orally Yes, with a written consent
- **Do you use photography for:**
 - Confront viewpoints with colleagues (staff) : yes ; no
 - Compare clinical situations between patients with same disease: yes; no
 - Compare clinical settings of a patient for his follow-up: yes ; no
 - Publications, lectures, teaching: yes; no
- **To take the photos, you use:**
 - Your smartphone;
 - A camera: compact; reflex
- **To store the photos, you use:**
 - No storage
 - On a computer: personal; professional
 - On an external drive: personal; professional
 - On a secure network
- **How do you file them?**
 - By name only? By diagnosis only Both: name and diagnosis Other:
 - _____
- **Sharing pictures:**
 - Do you check that no recognition of the patient is possible, before sharing:
 - For sharing to colleagues: yes; no,
 - For congress or publications yes; no,
 - What mean of sharing do you use?
 - Whatsapp® or similar ; Facebook® group; email (like Gmail®) ; Professional secure email, none
- **Number of years' practice?:** _____

Fig. 1. Questionnaire – Survey about the use of photography by practitioners in oral medicine.

Table I. Number and proportion of responses by medical specialty.

Specialities	Number of responses, n (%)
Dental surgeon	08 (15.7)
Dental surgeon specialized in oral surgery	23 (45.1)
Dental surgeon with another specialty	02 (3.9)
Stomatologist, physician specialized in oral surgery	04 (7.8)
Maxillo-facial surgeon	06 (11.8)
Other	08 (15.7)
Total	51 (100)
Other: dermatologist; another speciality; oral doctor	

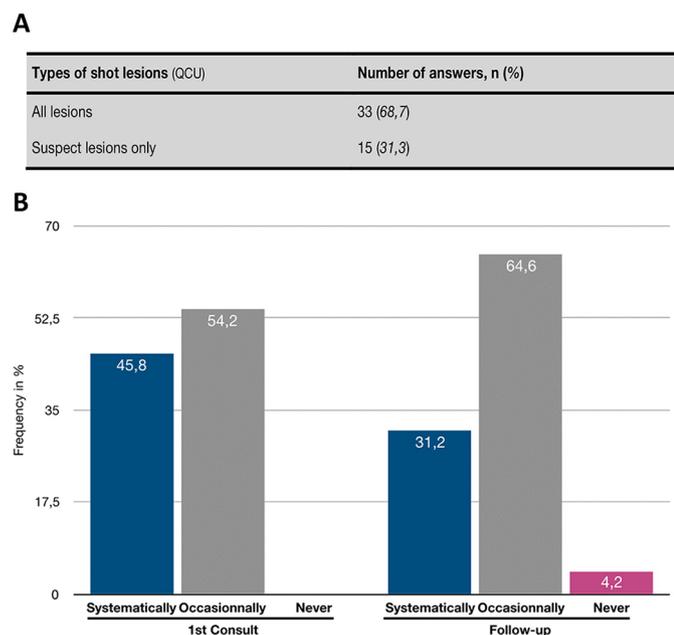


Fig. 2. Use of photography. (A) Type of shot lesions. (B) Frequency of photography's use.

Technical modalities of sharing and publishing images

Practitioners mainly shared their photos via professional secured email (60.4%) and personal email (47.9%). However, one-third of them shared clinical pictures through social networks such as Facebook® or Whatsapp® (Fig. 3C). Patient identities were removed by 77.1% of specialists surveyed before sharing them with colleagues and by 95.8% before publication or presentations in conferences. Oral consent was required in 56.3% of cases. Written consent was obtained in 16.7% of responses. Patient's consent was not requested by 27% of the practitioners surveyed.

Discussion

This study collected data regarding the current use of photography by oral medicine specialists. This tool is used widely by the practitioners surveyed with 94% of users

affirming its use in their clinic. The results are similar to those found in the literature. In a British study, 96% of respondents used photography in their daily practice to monitor oral lesions [21]. In a more recent study, the rate of usage was 95% [20]. They show the willingness of clinicians to use photography in their practice of oral medicine. However, the study described in this article was delivered to the clinicians via email in order to facilitate data collection. It is worth noting that the specialists who do not use photography, may have abstained from completing the questionnaire and therefore the work may be biased to photography users. Furthermore, there is a bias due to the small sample of practitioners interviewed. They are not representative of the practitioner populations studied. Only a trend in the use of photography in clinical practice can be described.

Dental surgeons specialized in oral surgery have the highest response rate for this survey whereas maxillofacial surgeons have the lowest. These results could be explained by the differences of practice of these two medical specialties. However, in a study conducted in France in 2017, the authors showed that dental surgeons referred their patients with mouth mucosal diseases to stomatologists (55%) and to oral surgeons (29%) [22]. Patients are referred to maxillofacial surgeons as a second resort, when their lesions in mostly cancerous cases, need to be surgically excised or treated specifically through radiotherapy, or chemotherapy. Similarly, the formerly cited British study also reported that there was a less frequent use of photography by maxillofacial surgeons. The main reason cited by the author was that these maxillofacial surgeons do not work in teaching hospitals but instead in district hospitals, where photographic facilities may be less accessible [21].

Clinical photographs are personal health data. Thus, practitioners using it, must obey multiple rules and regulations. In Europe in particular since 2018 and the General Data Protection Regulation (GDPR) was established, and patients' information must be protected [23]. Collection and sharing of personal data must be preceded by a clear and precise report of its possible use. Fully informed patient consent is required to take and share a photograph, preferentially written consent. In the study, consent was mostly obtained orally (56.3%). Only 16.7% of the

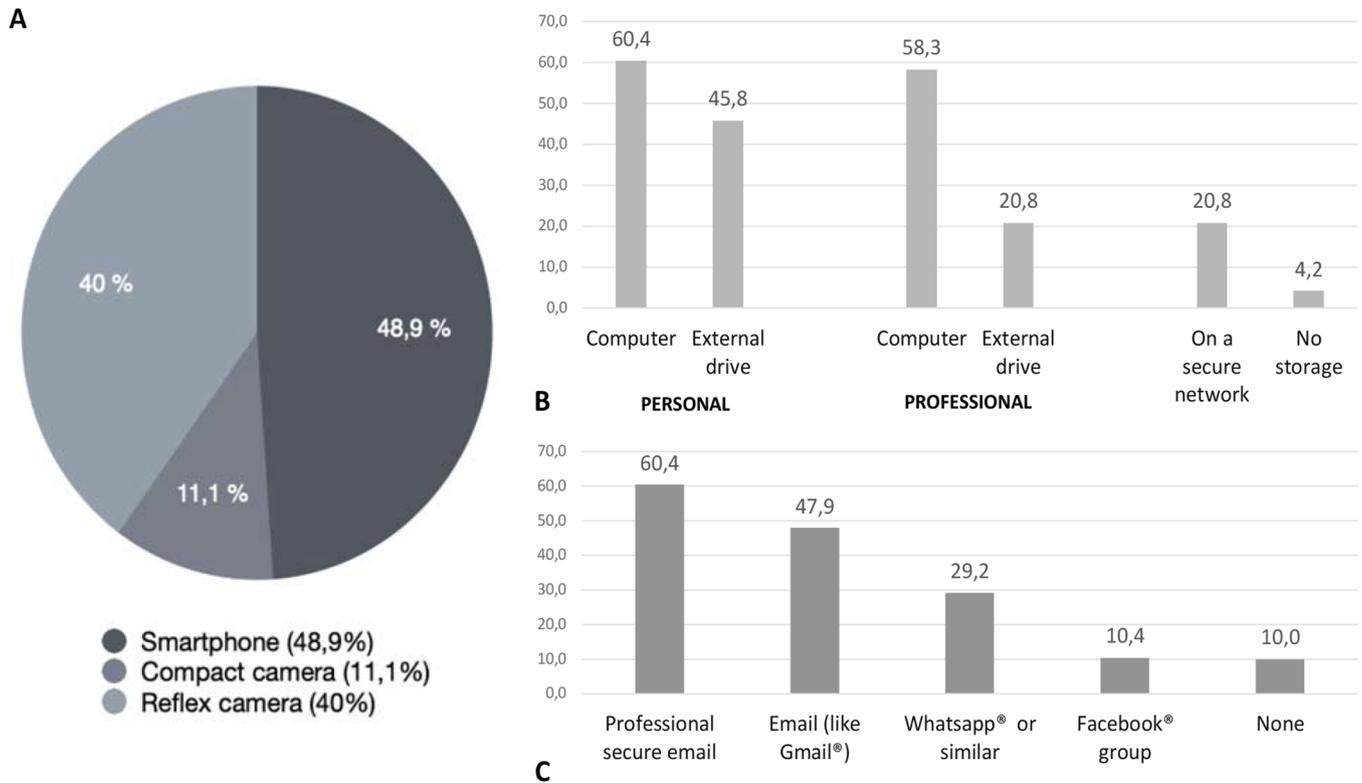


Fig. 3. Means of taking, storing and sharing photos? (A) Photo material; (B) Storage material; (C) Means of sharing.

Taking photos	Storage	Sharing
<ul style="list-style-type: none"> - Informed consent - Reflex camera rather than a smartphone - Use parameters of the camera to have the most precise and reproducible picture 	<ul style="list-style-type: none"> - Informed consent - On a safe network is recommended. - On a computer or an external drive: <ul style="list-style-type: none"> - Complex password - Uptdated firewall and anti-virus - Automatic locking of the session - Regular backups - Data encryption - Limit the plug in of non-professional devices - On a smartphone : <ul style="list-style-type: none"> - Storage is forbidden - On a cloud: <ul style="list-style-type: none"> - Allowed if it has the permission to save health data (ASIP Santé) - No declaration to CNIL is required 	<ul style="list-style-type: none"> - Informed consent. If not, deidentification of the picture is mandatory. - Using a secure email is recommended - With a standard email: <ul style="list-style-type: none"> - Log in with a complex password - Email attachment must be encrypted - On an instant messaging/ a chat: <ul style="list-style-type: none"> - Data encryption is mandatory - On a social network: <ul style="list-style-type: none"> - Deidentification of the picture - Complex privacy policy - Photos become the property of the website - In a journal or in a congress: <ul style="list-style-type: none"> - According to the privacy policy of the journal/ congress

Fig. 4. Best practice recommendations for using photography in oral medicine.

practitioners required written consent, whereas it should be mandatory, as it is part of the patients' personal data. We recommend obtaining written consent, after providing clear information on the future use of pictures [24,25]. Even if the patient cannot be recognized in the photograph, which is the case for the patients in the majority of the clinics of the respondents in the study, before sharing with colleagues (77.1%) or in a conference (95.8%), it is important to get a fully informed consent for ethical reasons [26]. However, a lack of time during consultation may explain why practitioners prefer to seek verbal consent rather than through a written form.

48.9% practitioners surveyed took photos with their smartphones rather than a reflex camera (40%) or a compact camera (11.1%). Even if the resolution of smartphones on average is higher each passing year, they do not allow for the easy correction of parameters to have the appropriate light exposure of the lesion. There is no comparison with the quality of pictures shot with reflex cameras which can reveal the finest details and complexity of the mouth mucosa diseases [11]. The trend to primarily use smartphones is similar in other medical specialties such as plastic surgery or dermatology [2,27].

In a recent study, 93% of the plastic surgeons surveyed took photos in their clinical practice with smartphones because of the ease of their use and their portability [2]. Advances in technology lead to more and more powerful smartphone cameras with resolution approaching that of a reflex camera. Their usage in clinical photography will probably continue to grow. However, practitioners should remain attentive to the safety of the personal data of their patients with the associated risk of a hacking attack on their smartphones. Some security norms should be followed, such as locking the phone with a safe password or regularly transferring and deleting patient pictures from smartphones [23]. Despite these recommendations, a majority of clinicians kept photos of patients on their smartphone [2,27]. In our survey respondents were not able to answer whether they stored clinical pictures on their mobile. Clinicians mostly declared that they stored images on their personal computer (60.4%), on their professional computer (58.3%) or on a personal external hard drive (45.8%). 2 clinicians did not store any take or store any photos. From our survey questions we cannot excluded that a portion of the people surveyed kept patients' pictures on their smartphone despite safety recommendations. Nonetheless, images stored on a computer or external drive could also be hacked. Safe passwords, automatic computer lockouts after a certain time of inactivity and having up to date firewalls and antivirus software are elements necessary to securely keep personal data of patients. Utilizing computers on a secured work network could aid practitioners in following these recommendations. However, only 20.8% of clinicians surveyed used these types of services, which may be due to lack of knowledge about these computer networks or an underappreciation of risks of hacking on personal devices.

With the multiplication of technologies, in the telecommunication field, the different ways to share pictures are

always more numerous. The majority of specialists surveyed used a professional secure email (60.4%) rather than a personal email (47.9%) or instant messaging application such as Whatsapp® (29.2%). This result is encouraging in terms of safety, as secure emails are more likely to enable encrypted messaging, further protecting the personal data of patients [23,28,29]. The speed and efficiency of modern means of communication facilitate exchanges about patients between clinicians. Photography is used for this purpose by 95.8% of the practitioners surveyed. This is also the purpose of both intra- or inter-disciplinary meetings in which ideas and viewpoints are debated to reach a diagnosis and a treatment strategy, especially for atypical or rare cases. Photography is also used to compare clinical settings to monitor patient lesions. Digital photographs allow for instant visualization of lesions and enable practitioners to analyse minute details without needing the patient to be present [6,11]. The comparison of clinical situations between two patients with the same disease, aided by photographs, was less frequent for the clinicians surveyed, with only 60.4% answering that they had done so. This could be explained by the clinicians' long experience in the field, with an average of 18.8 years practicing, which may not be aided by consultation with other clinicians or photography. Finally, 93.7% of the clinicians acknowledged using photographs to illustrate publications or lectures. This is likely the result of how practitioners commonly have teaching practices, which are enhanced by taking photos frequently, whereas this may not be the case with practitioners that have private practices.

Conclusion

This study assessed the current attitude toward photography by oral medicine practitioners. Photography is a frequently used tool in daily practice of the clinicians surveyed. However, basic security standards for the safety of patient personal data are not always followed. It could be interesting to do postgraduate training on this subject, explaining the administrative modalities of photo library management, as well as the technical requirements to be respected. This could also participate in the creation of digital databases helping to recognize pathologies of the oral mucosa.

Authors contribution

J. Rochefort: Conceptualization, Methodology, H. Olugbeje: Writing original draft. J. Bosco: Visualization, Investigation. J. Rochefort: Writing- Reviewing and Editing; J. Bosco, G. Lescaille, V. Baaroun: reviewing.

Conflict of interest

The authors declare that they have no conflicts of interest in relation to this article.

Informed consent

The authors declare that informed consent not required.

Ethical committee approval

The authors declare that Ethical approval not required.

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