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# Professional smartphone photography - a contradiction in itself?

by Prof Louis Hardan, Lebanon.

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Taking high-quality intraoral pictures has a wide range of benefits, but doing so can be unfeasible for practitioners due to the amount of time, training and expense needed to use DSLR cameras and other equipment properly. An alternative is using a smartphone camera, provided it is operated in the right environment. Taking photos with a smartphone produces good results that are suitable for professional documentation in dentistry, and comparable to pictures taken with a DSLR. The light conditions in the anterior and posterior region can also be controlled using an MDP (Mobile Dental Photography) device, which helps ensure image quality.



The participants of the Multi Media Masterclass 2018 learned how to take professional photos with their DSLR ...

With DSLR (digital single lens reflex) cameras, it is possible to take high-quality intraoral pictures. However, too few dental practitioners make use of these cameras on a regular basis. Surveys reveal that even in a country like the United Kingdom, only about 50 percent of dentists properly document their patient cases, and not even half of them use a DSLR camera for this purpose.

This is a pity, since professional documentation is very useful for many purposes such as:

- treatment planning
- communication with the laboratory
- communication with existing patients
- acquisition of new patients
- self-evaluation and self-improvement
- lecturing and publishing
- communication with insurance companies and for medico legal reasons, etc.



... and with a smartphone.

## Smartphone as an alternative

Still, many practitioners decide against making use of this tool. Probably, the main reasons are the enormous amount of time needed and the training required to be able to manage the equipment. Last but not least, expenses are high even for those with a camera body already at hand: They need a specific macro lens, one or two flash systems, a number of diffusers and filters. Thanks to advances in technology development, however, the use of a professional DSLR camera is no longer a strict requirement for high-quality dental photography. Instead, a smartphone may be utilised – provided that it is operated with the right lighting equipment. This is what I demonstrate during my own mobile dental photography courses, and every time, the participants are astonished by the results and enthusiastic about implementing smartphone photography in their own dental office. This was also the case during the Multi Media Masterclass organised by 3M in March 2018, where Prof Paulo Monteiro and I performed a battle of the cameras.



The mini photo studio developed specifically for mobile dental photography.

In the end, we were able to show that very good results can be obtained with a DSLR camera and with many of the modern smartphones, if light is used properly. This can be easier with a smartphone than with a DSLR. The latter requires the use of a ring flash for photography of posterior teeth and a twin flash for photography of anterior teeth. For smartphones, a single device is available that provides the required light for the anterior and the posterior region: It is called SMILE LITE MDP (Mobile Dental Photography) by Prof Louis Hardan. I started to develop this device four years ago as a mini photo studio that may be used with any smartphone. It has an integrated ring flash (central LEDs) and a twin flash (lateral LEDs) that can be used separately or simultaneously at different light intensity levels. The system also comprises a diffuser and a polarising filter.

## How to get started

For taking intraoral photos, the distance between the camera and the front teeth should be about 15 to 20 cm, however, it may vary slightly depending on the smartphone in use. In order to produce high-quality images, it is also essential that no retractors, lips and gloves are visible on them. Instead of cropping the photos afterwards, the user should use the zoom function of the camera until he can see only the teeth and gums and then take the picture.



Portrait taken with a mobile phone for a smile design project.

## Images of anterior teeth

In DSLR photography, it is recommended to use a twin flash for pictures of anterior teeth. Correspondingly, the lateral LEDs of the MDP device are turned on at full power and the central LEDs are turned off. This shows more details of the teeth than a central light source, since the light is coming from the mesial and distal sides; the differences in translucency and colour of the teeth will be revealed. For a natural light-and-shadow effect and a better representation of the surface structures, the diffusers should always be used when pictures of anterior teeth are taken. In addition, the use of a lip retractor and – if only the upper teeth are shown – a contrastor placed on the lingual side of the teeth is highly recommended. The best position for the operator is behind the patient.



For evaluation of internal translucencies and colours and for choosing the recipes of shades while doing a direct composite restoration, polarised imaging may be useful. With the MDP, the best effect is obtained with the polarised filter and the central LEDs at full power, while the lateral LEDs are turned off. For those who would like to combine diffusers and the polarising filter, it is recommended to turn on all LEDs.

## Images of posterior teeth

In the posterior region, proper illumination of the area to be captured poses the greatest challenge. In DSLR photography, it is recommended to use a ring flash. With the MDP device, the central and lateral light sources may be combined, so that the illumination effect is maximised. For this purpose, all LEDs need to be set to full power. Diffusers are not required, but proper retraction of the cheeks and lips is particularly important here to ensure an unobstructed view. An occlusal mirror supports the user in that it facilitates the exposition of the teeth to be captured. The operator should stand next to the patient.

## Portraits, videos and more

Apart from intraoral photography, the smartphone can also be successfully used for everyday procedures, e.g. for the digitisation of old X-rays, for teaching purposes to show the smallest details, for video documentation of clinical procedures and even for Skype lecturing. While capturing video data of a treatment procedure, it is possible to use the screen of the phone for any visual control, and to leverage the zoom function to have a more detailed view e.g. of the margin during tooth preparation. Finally, portrait photography is feasible with smartphones and Smile Lite MDP or with additional light sources (soft boxes).



Figure 2: Image taken with the lateral LEDs at full power, with diffusers. The central LEDs turned off and a black background is used. This image is used for shade matching and communication with the lab technician.



Figure 3: Image taken with the central LEDs at full power, with a polarising filter.



Figure 4: Polarised picture with composite buttons to confirm the recipe of composite shades chosen to restore the tooth, A1 Dentine and A2 Enamel.



Figure 1: Image taken with the lateral LEDs at full power with diffusers, the central LEDs turned off.

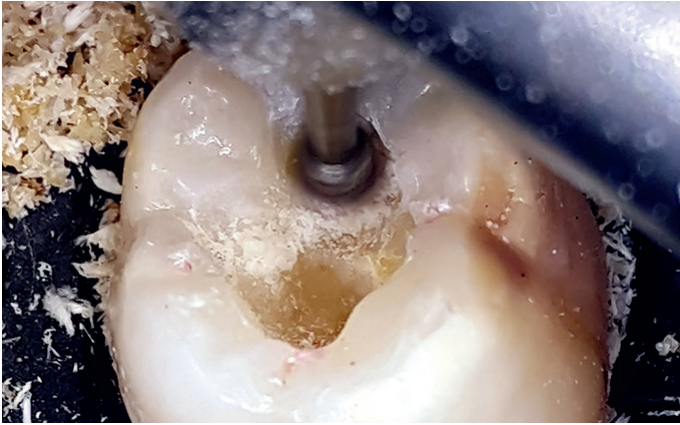


Figure 5: Image of posterior teeth taken with all LEDs at full power.

## Conclusion

Today, it is possible to use a smartphone for professional documentation in dentistry. The quality of the images is strongly dependent on the camera sensor and on the light conditions, the latter being easily controlled with the MDP device. I am convinced that, due to the availability of this tool, dental photography will become accessible to a great number of dentists who do not use a DSLR camera for different reasons including time, economic considerations and complexity of the procedure.



## Prof Louis Hardan

Prof Hardan graduated in Dentistry in 1989 and continued his post-doctoral education at Saint Joseph University in Beirut; he obtained a certificate for basic science in 1993, and completed his specialisation in restorative and aesthetic dentistry in 1995. Finally, he completed his PhD in oral biology and materials in 2009. At the present, he is an associate professor at Saint Joseph University and owns a private practice in his home town Byblos.

He is an honorary and active international StyleItaliano™ member and the inventor of Smile Lite MDP (Smile Line, Switzerland).

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