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Aesthetic dentistry: The contribution of the spectrophotometer Rayplicker

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RAYPLICKER™
ONE VISION • MILLIONS SHADES

Introduction

How can a patient's treatment be optimised? How can both speed and efficiency be increased, without sacrificing quality?

These questions are constantly being asked in our practices. Our patients' demands are more and more advanced in terms of aesthetic and functional results, yet they have less and less time to dedicate to treatments. We now have a lot of equipment at our disposal enabling this optimisation.

Many of these tools are digital and as such allow us to digitise our patient files in order to transfer as much information as possible to the prosthesis laboratory. This information can thus be prioritised and streamlined to be processed in the laboratory by the appropriate people in the corresponding specific field (modelling, ceramisation, etc.).

In this effort to centralise information, colour is a complex area that requires extensive resources in terms of information. It is usually assessed in the chair by means of a reading comparing the patients' teeth to one or more shade guides. This reading is influenced by many factors and results can be significantly affected by surrounding interference making it particularly subjective (brightness of the room, bright colour of a lipstick, etc.) [1], [2]

Dental photography is now considered an excellent way to convey colour information. It requires the prosthetist to use a shade guide as a reference to ensure the information is as objective as possible. Working with dental photography, however, increases working time, as the prosthetist has to perform mapping based on the information obtained from the photos. Moreover, cameras are sensitive to shade variations depending on the colour temperatures pre-determined by the camera that can skew this reading [3]. To counter this problem, spectrophotometers are currently the best tools we have to objectify a result. They work by emitting calibrated light which, depending on the reflection registered, enables a colour reading to be taken. This reading is unaffected by environmental factors that could potentially skew its results (lipstick, colourful clothing, unsuitable lights, etc.) [4], [5]

Some models allow a photo to be taken with mapping of the tooth, which enables the prosthetist to be guided more effectively in the process of creating the prosthesis. The sheet is then stored on the software and can be processed and archived in a patient file. The Rayplicker (Borea) is a device that allows the practitioner to record all the information collected and communicate it to the prosthesis laboratory. The laboratory sheet can be sent via a secure portal and reprocessed by the prosthesis laboratory. This flow also enables the form to be marked as reviewed by the laboratory, to monitor the progress of the treatment at the practice. Most shade guides on the market are referenced, making the work easier for the laboratory.

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fig. 1, Initial condition

Ms. G comes to the practice to change her restoration on tooth 23 that she finds unsightly. (fig. 1).

Clinical examination reveals the presence of a composite restoration on the vestibular surface of tooth 23 with a stained joint as well as the presence of early carious lesions on the neighbouring teeth.

fig. 2, Teeth 22 and 23 require restoration.

After discussing treatment options with the patient, it is decided that the patient will have composite restorations for the carious lesion and a veneer for tooth 23. (fig. 2)

However, there is a constraint that makes this case more difficult: Ms. G has to go abroad for three months and would like the work to be done within 10 days of accepting the treatment. Therefore, we need to get results quickly.

Shade taking

The first step in the treatment is registering the colour. performed using the Rayplicker. A reading is taken of the tooth to be restored as well as of the contralateral tooth.

This double reading will give the prosthetist information not only on the tooth to be restored but also on the overall integration of this tooth.


fig. 3

fig. 4

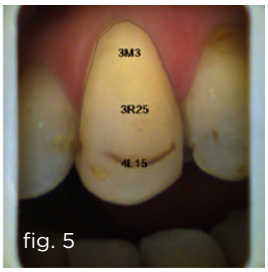


fig. 5

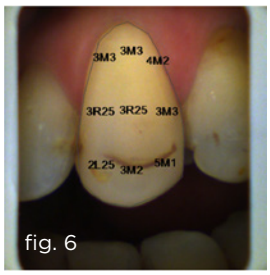


fig. 6

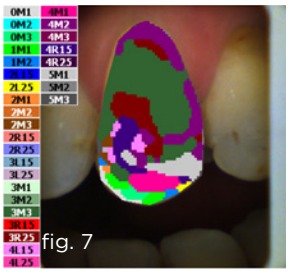


fig. 7

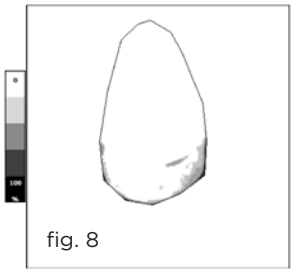


fig. 8

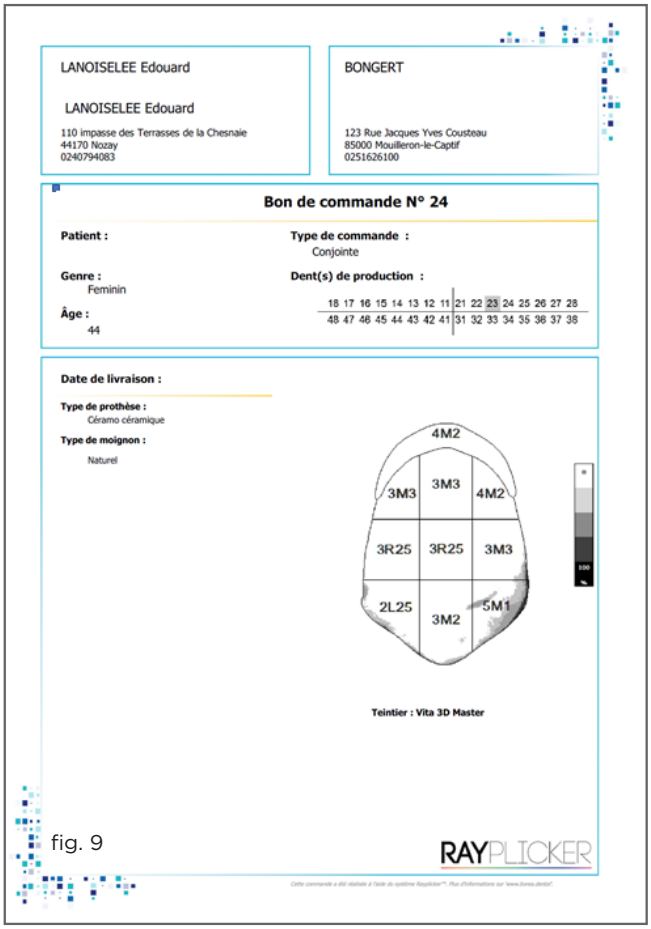


fig. 9

Reading sheet on the tooth to be treated: Polarized image (Fig. 3); Overall shade (Fig. 4); Three-part mapping (Fig.5); Nine-part mapping (Fig. 6); Detailed tooth mapping (Fig. 7); Translucency (Fig. 8); Rayplicker production file for tooth 23 (Fig. 9)

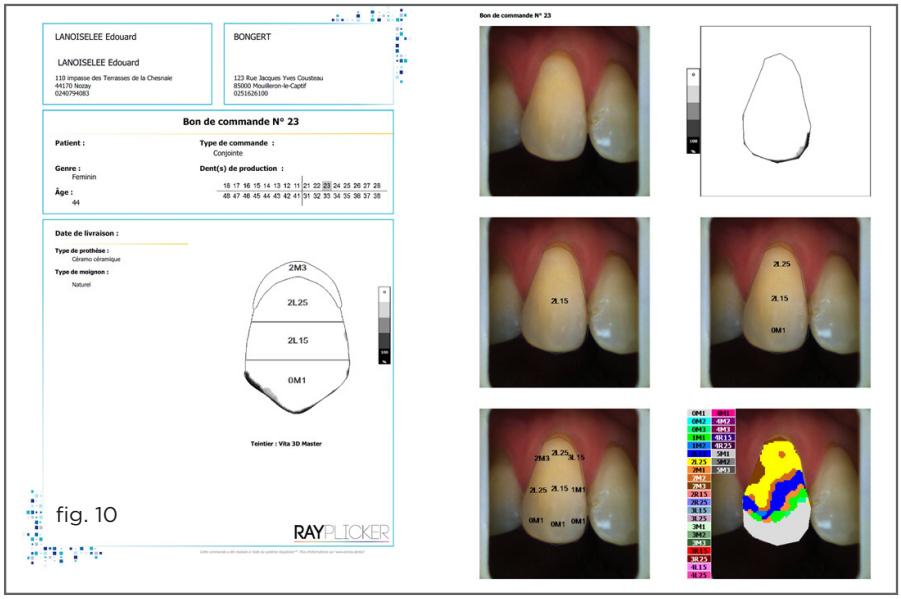


fig. 10

Reading sheet on the contra-lateral tooth. (Fig.10)

The readings are sent to the laboratory via the secure server. The important information for creating the restoration is centralised on this sheet: The shade guide values, detailed mass mapping and translucency.

3D Impression

As the treatment does not require any modification of shape, it is decided to use the initial situation as a reference for the laboratory and an optical impression is made, which will guide the laboratory in the design of the veneer.

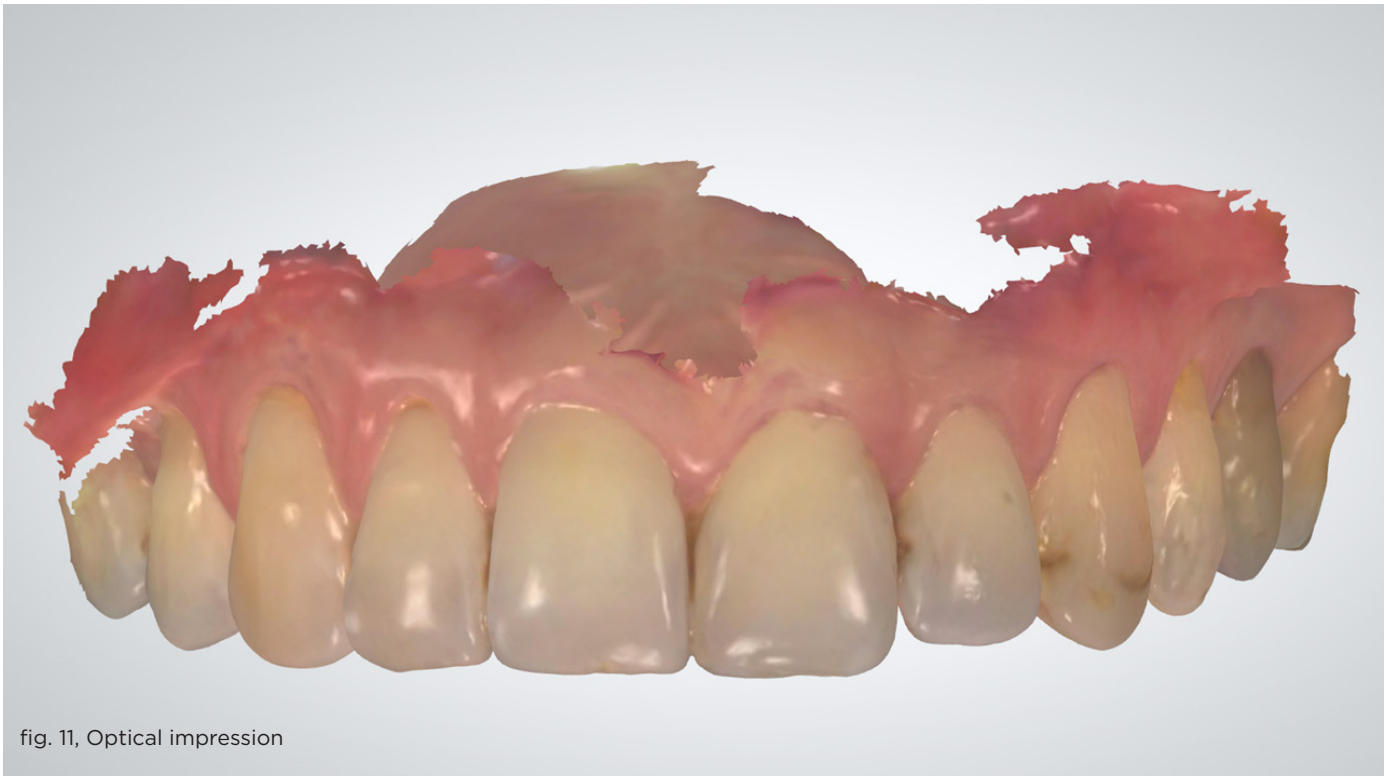


fig. 11, Optical impression

A reduction guide is then made with silicone and the tooth is prepared. The thickness will be checked at the end of preparation with this key, which enables the ceramic thicknesses, the homogeneity and the homothety of the preparation to be checked.

fig. 12, Reduction control

The optical impression of the preparation is then performed. To do this, tooth 23 is erased on the initial impression and then the area is registered. This will enable the prints to be merged easily in the laboratory to control the modelling process. All the information is then sent to the laboratory (shade sheet and optical impression). In both cases, the files are sent via a secure portal with the option of verifying receipt by the dental surgeon.

fig. 13, Optical impression of the preparation (Trios 4 3shape)

The veneer is then modelled on the 3Shape Dental System software and then printed in burnout resin on a 3D printer. It is then processed conventionally using the pressed ceramic technique, as the fineness of the veneer is not easily compatible with a machining technique.

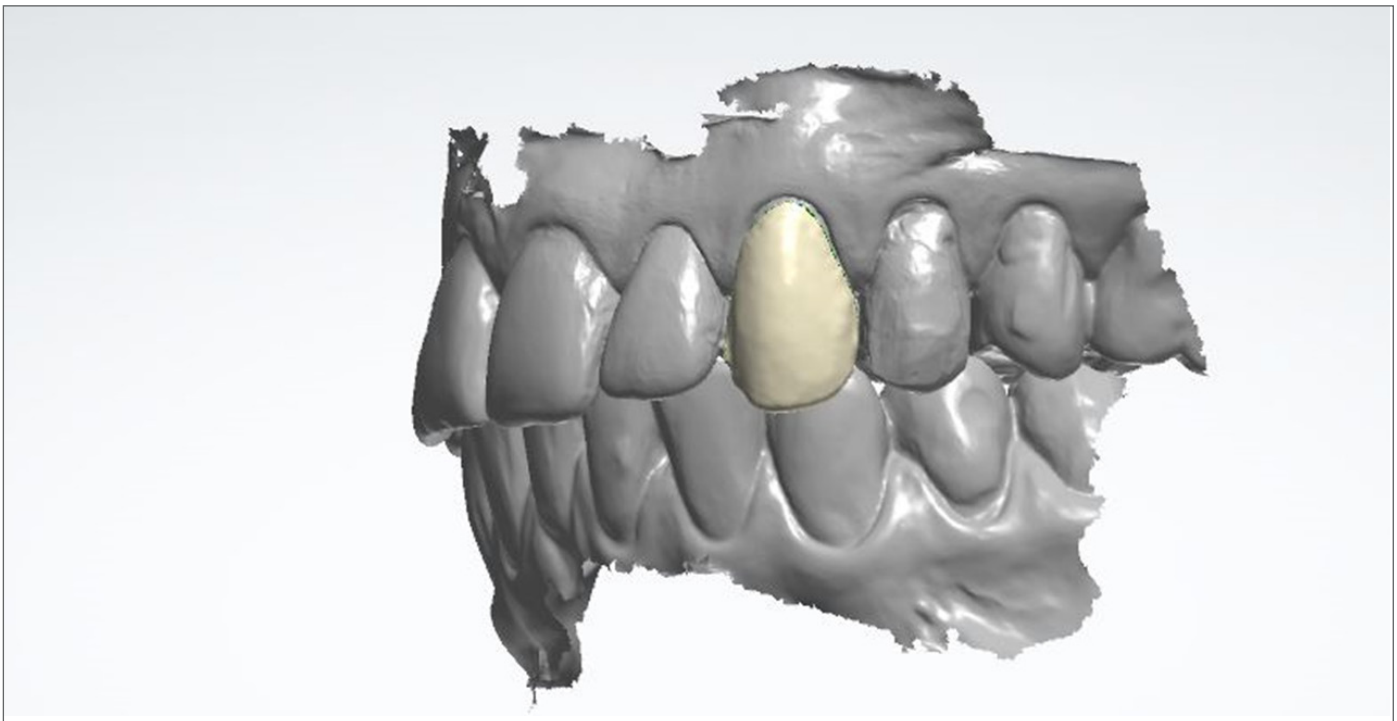


fig. 14, Optical impression of the preparation (Trios 4 3shape) Modelling of the restoration (3shape Dental System)

Veener assembly

fig. 15, The veneer

After curettage and sealing of the lesion on tooth 22, the veneer is placed with a try-in. The patient confirms the result, then the veneer is glued on to the tooth. Only light-curing glue (G-cem veneer) is used – the advantage of this type of glue is the longer working time and therefore the management of excess glue, which is easier to remove.

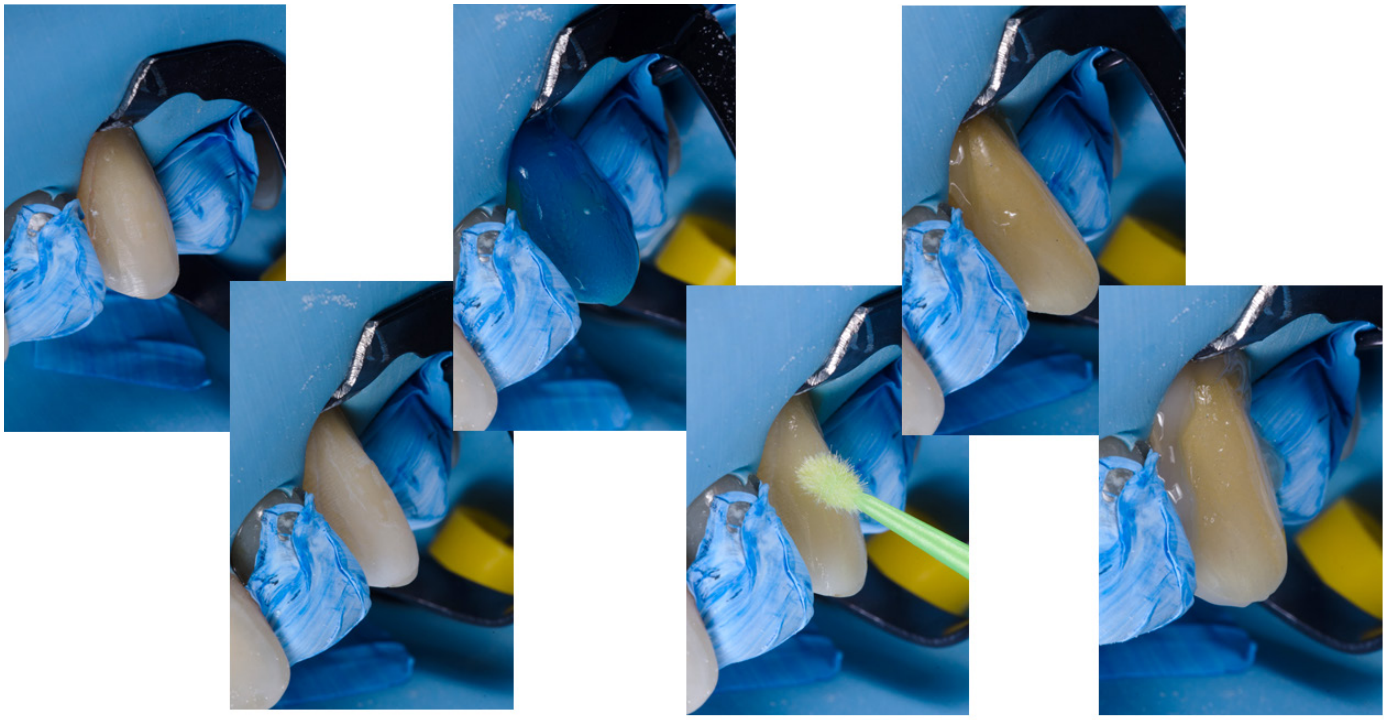


fig. 16, Assembly with dental dam

After thorough polishing, the dental dam is removed and a final polish is performed.

fig. 17, Situation after removal of the dental dam

The patient is seen again at 4 months, when she returns from abroad for a check-up. The teeth are rehydrated and the periodontal tissues that were pushed in when the dam was put in place have returned to their original position. As such, it can be seen that the restoration has integrated well.

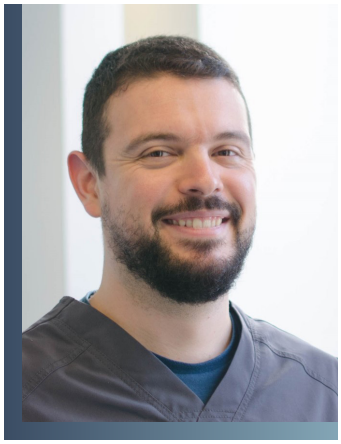
fig. 18, Check-up at four months

Conclusion

The use of digital techniques means that it is now possible to create simple and reproducible protocols. If the practitioner or prosthetist encounters difficulties, these can be analysed and resolved quickly. While shape can now easily be checked by the practitioner, colour is one of the crucial points to master during procedures. Spectrophotometers such as the Rayplicker now offer a simple, fast and effective solution. The secure platform facilitates interaction between the practice and the prosthesis laboratory, as well as confirming receipt of documents and centralising information with the option of enhancing the content with photos clarifying the surface qualities and characterisations required for the integration of the prosthesis.

All these elements combined deliver qualitative and rapid results in line with patients' expectations.

About the author:



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Dr Edouard Lanoiselee graduated from the Faculty of Dentistry of the University of Nantes in France and later obtained a master's degree in medical sciences.

He worked as a university hospital assistant at the teaching and research centre of the Nantes university hospital in the prosthetic department.

He is the coordinator of the aesthetic dental restoration university degree at the University of Nantes and a consultant to the implantology department of Nantes university hospital. Dr Lanoiselée is a CAD/CAM specialist and a partner at a general dental practice in Nozay in France.

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Bibliography:

[1]. Bauer R. Using dental photography for predictable results from your dental lab. Today's FDA. 2010;22(2):48-51.

[2]. Miyasaki M. Photography ensures better lab communications, better restorations. Dent Today. 2001;20(11):96-9.

[3]. McLaren EA. Shade analysis and communication. Inside Dent. 2010:6(5)58-66.

[4]. Mohammad Hassan Kalantari,1 Seyed Ahmad Ghoraishian,1 and Mina Mohaghegh. Evaluation of accuracy of shade selection using two spectrophotometer systems: Vita Easyshade and Degudent Shadepilot. Eur J Dent. 2017 Apr-Jun; 11(2): 196–200. doi: 10.4103/ejd.ejd_195_16

[5]. Tsiliagkou A, Diamantopoulou S, Papazoglou E, Kakaboura A. Evaluation of reliability and validity of three dental color-matching devices. Int J Esthet Dent. 2016 Spring;11(1):110-24.