As the world advances towards a digitalized way of life, dentistry cannot fail to do so. CAD/CAM technology is now a well-established practice for dental restorations, yet with so much space to grow and develop. Taking an impression for the CAD/CAM device to work on remained unpractical with all the impression trays, the putty or the alginate, until the first dental scanner was invented at the university of Zurich, then marketed by the German company, Sirona. [1]

Intraoral scanners (IOS) are devices for capturing direct optical impressions in dentistry. Similar to other three-dimensional (3D) scanners, they project a light source (laser, or more recently, structured light) onto the object to be scanned, in this case the dental arches, including prepared teeth and implant scanbodies (i.e. cylinders screwed on the implants, used for transferring the 3D implant position) [2, 3]. The images of the dentogingival tissues (as well as the implant scanbodies) captured by imaging sensors are processed by the scanning software, which generates point clouds [3, 4]. These point clouds are then triangulated by the same software, creating a 3D surface model (mesh) [3, 4]. The 3D surface models of the dentogingival tissues are the result of the optical impression and are the ‘virtual’ alternative to traditional plaster models [2, 4, 5].
WHERE ARE INTRAORAL DENTAL SCANNERS USED?
Intraoral scanners are not only used for diagnosis and better communication, since they have a wide range of utility from fabricating resin inlays/onlays [6] to single crowns in all-ceramic [7], metal ceramic [8] or lithium disilicate [9] to whole frameworks and partial/total dentures [10,11].
IOS can also be successfully used to capture the 3D position of dental implants and to fabricate implant-supported restorations. At present, implant-supported single crowns [12,13] bridges [13,14] and bars [15] can be successfully fabricated from optical impressions. Even in orthodontics the popularity of these dental scanners is increasing rapidly with digital records of the diagnosis, treatment planning, 3D models of the dental arches and monitoring treatment progression, expected to substitute hard-copy records for good. [3]

In our article we would like to compare the optical and convectional devices of impression taking. When we are thinking about comparison of the scanners, we have to think about few factors such as scanning speed, user-friendliness, image capture, size of scanner, etc.

WHAT ARE ADVANTAGES AND DISADVANTAGES?

Advantages:
1. Less patient discomfort. The conventional physical impressions can cause momentary discomfort for the patient due to the inconvenience and hardship stemming from the materials positioned on impression trays (whether generic or individualised). Some patients (e.g. patients with strong gag reflex, or children) appear to not tolerate the classic procedure. For such patients, replacing conventional impression materials with light is an advantage.
2. Time efficiency. Several studies have shown that optical impressions are time-efficient, as they enable reduction of the working times (and therefore costs) when compared to conventional impressions.
3. Simplified procedures for the clinician. In fact, when the learning curve has been completed the use of IOS may confer further clinical advantages, simplifying impression-making in complex cases, for example in the presence of multiple implants or severe undercuts that may render the detection of a conventional impression difficult and insidious. Moreover, if the clinician is not satisfied with some of the details of the recorded optical impression, they may delete them and recapture the impression without having to repeat the entire procedure; this aspect is time-saving.
4. No more plaster casts. For the clinician, optical impression allows the skipping of an otherwise unavoidable step (the conventional impression is based on the detection of physical
impression is based on the detection of physical impressions and subsequent casting of gypsum models with a time-saving effect.

5. Better communication with the dental technician. With IOS, the clinician and the dental technician can assess the quality of the impression in real-time. If the dental technician is not convinced of the quality of the received optical impression, he/she can immediately request that the clinician make another one without any loss of time and without having to call the patient for a second appointment.

6. Better communication with patients. With optical impressions, patients feel more involved in their treatment and it is possible to establish more effective communication with them; this emotional involvement may have a positive impact on the overall treatment, for example, by improving patient compliance to oral hygiene.

Disadvantages:

1. Learning curve. Older clinicians with less experience and passion for technological innovations could find using the devices and related software more complex for. It should be kept in mind that it is still unclear whether one scanning strategy is better than the other, as manufacturers provide little information about their scanning strategies.

2. It can be difficult to detect deep margin lines in prepared teeth and/or in case of bleeding. [16] In some cases, in fact, and especially in aesthetic areas where it is important for the clinician to place the prosthetic margins subgingivally, it may be more difficult for the light to correctly detect the entire finishing line.

3. Intraoral scanners lack fixed references. All subsequent images are “stitched” to the previous one by a best-fit algorithm that represents the best possible overlap of images. Each overlap has an inherent error; as a consequence, the final error should be gradually increased with every stitching process. Hence, it can be anticipated that the longer the scanning field, and the more stitching processes completed, the larger the errors would be presented. [17]

4. Purchasing and managing costs. Depending on the model, the cost of purchasing an IOS may be between 15,000 and 35,000 euros.

It seems that intraoral scanners could be a really good replacement of a conventional impression system in the future. Of course, as every single thing it has both advantages and disadvantages, so each dentist should decide by himself/herself whether he/she wants to use it in oral practice.