Integrating an Efficient Digital Workflow Based on Digital Intraoral Impressions
Introduction

The foundation for many dental treatments—including indirect, laboratory fabricated restorations and implant restoration components—has traditionally been alginate and/or polyvinyl siloxane impressions. These delicate, physical impressions record the anatomical details of a patient’s intraoral condition for use by local Dental Services Group (DSG) laboratories when fabricating a multitude of fixed and removable restorations. The records these impressions provide are also essential components for planning orthodontic treatments and guided implant surgeries. Accurate impressions are the cornerstone for providing successful treatments. Taking traditional impressions can be challenging, requiring dentists to ensure that they are free of voids, tears, and bubbles; have faithfully captured all anatomical details; and have not distorted during handling.

While it’s true that advancements in impression materials have made them easier to use, more resistant to distortion, and capable of capturing fine details, the impression taking process is still wrought with inconveniences. Impression taking is time-consuming, tedious, and uncomfortable—if not annoying—for patients, especially if additional appointments are needed to retake impressions. Impression trays are big and bulky, and impression materials taste unpleasant, often causing patients to gag or experience anxiety.
Fortunately, technologies like digital intraoral scanners (IOS) are changing dentistry in dynamic and transformational ways. Intraoral scanners acquire information—or essentially take an impression—by capturing images through a scanning acquisition device that records details of what’s being scanned, such as the occlusal, buccal and lingual teeth surfaces, as well as mesially and distally interproximal contacts and gingival tissue. As the camera in the scanner wand collects information that will ultimately be digitized to create a 3D image, the scanner tip emits either laser light, structured light, or light emitting diode, depending on the specific IOS model.

Several digital IOS models are available, either as stand-alone intraoral scanners or components of a computer-assisted design/computer-aided manufacturing (CAD/CAM) system for in-office milling of restorations. The available options that dentists working with Dental Services Group (DSG) laboratories use include the following: 3Shape TRIOS, Align Technologies iTero® Element Scanner, 3M™ ESPE True Definition Scanner, E4D Technologies Planmeca Emerald™ Scanner, Carestream Dental CS3600 Intraoral Scanner, and Sirona CEREC Omnicam.
Once the impression images are digitized, they can be transferred electronically among treatment team members, such as between the dentist and their DSG laboratory, creating a very efficient restorative workflow. They can also be manipulated to create virtual models, digital wax-ups, and restorative designs.

Further, depending upon the capabilities of the specific scanner, the digital impressions may also be capable of digital shade matching, live bite registration, and hard palate scanning. With digital impression shade taking, the scanner automatically identifies the shades of adjacent natural teeth as it records images of the affected teeth and/or preparations. The identified shades can then be included in the digital impressions that are sent to the dentist’s DSG laboratory.

**KEY TAKEAWAYS**

- Traditionally impressions have historically been made with alginate and/or polyvinyl siloxane
- Taking traditional impressions can be challenging, they are required to be free of voids, tears, and bubbles; capture all anatomical details; and have not distorted during handling
- Traditional impression taking is still wrought with inconveniences including:
  - Being time-consuming and tedious
  - Uncomfortable and potentially annoying or anxiety inducing to patients
  - The need to retake impressions if the initial impression had errors
- Intraoral scanners acquire information (take a digital impression) by capturing images through a scanning acquisition device that will ultimately create a full 3D image
- There are many digital IOS models available as stand-alone intraoral scanners or in combination with a CAD/CAM system for in-office milling
- Once an impression is digitized it can be easily transferred electronically between dentist and lab
- With these digital impressions the lab can create digital models, wax-ups and restorative designs
Digital impressions are enabling dentists and laboratories such as DSG to eliminate the challenging materials and techniques historically associated with making physical impressions and models. In the process, intraoral scanners are also making impression-taking, restoration, and treatment processes more accurate, efficient, and cost-effective.

The accuracy of digital impressions acquired through IOS is assured, in part, because digital images are immune to factors that affect the integrity of physical impressions and models. Such factors include improper handling, material distortion, and error-prone model pouring techniques. Digital impressions essentially provide dentists with more control over the outcome of impression-taking, improve prescription accuracy and communication with their local DSG laboratory, and contribute to faster case design feedback. Restorations and other treatment components fabricated based on digital impressions also demonstrate greater accuracy in terms of fit, shape, and anatomical form.
Without the need to spend the time typically associated with the preparation and handling of traditional impressions, turnaround time is competitive, and the process typically involves fewer adjustments, reducing the dentist’s chairtime and improving the patient experience.

As with traditional impressions, optimal tissue management and preparation design are necessary when taking digital impressions. The dentist should always assess the quality of the digital impression scans prior to electronically forwarding these records to their DSG laboratory to increase the likelihood of accuracy. However, because digital impressions eliminate the time intensive issues involved with impression taking and partnering with your DSG laboratory, if something is incorrect, your DSG laboratory can identify potential problems much faster when digital impressions are used.

But perhaps the most significant benefit is a more comfortable patient experience, as well as enhanced patient communication and understanding of their treatment plan. Virtual models and digital diagnostic wax-ups that are created based on digital impressions enable dentists and their DSG laboratory to incorporate more meaningful communication tools when explaining a diagnosis during patient consultations.

**KEY TAKEAWAYS**

- Intraoral scanners are making impression-taking, restoration, and treatment processes more accurate, efficient, and cost-effective
- Digital impressions are immune to error causing factors such as improper handling, material distortion and error-prone model pouring techniques
- Restorations and other treatment components fabricated based on digital impressions demonstrate greater accuracy in fit, shape and anatomical form.
- Digital impressions do not require impression materials or trays, reducing practice overhead
- Time is additionally saved with no need to prepare or handle traditional impressions
- More competitive turnaround times with digital impressions immediately being sent to the lab
- The dentist will still need to manually assess a digital impression before sending off to a lab to ensure accuracy of the impression
- Digital impression taking improves the patient experience, enhances communication and understanding of their treatment plan
A Whole New Workflow

Not surprisingly, many dentists have realized a return on their investment in all areas of their practice by incorporating digital IOS for impression taking. These rewards include increased productivity as a result of streamlined processes, simplified procedures, and new collaborative workflows with their DSG laboratory. To date, DSG laboratories have fabricated an average of more than 300 digital impression cases per day, and almost any type of restoration can be designed and fabricated based on a digital impression.

In a streamlined, digital workflow based on digital impressions, the dentist captures information about the patient’s preoperative condition and tooth preparations (meaning, an impression) using the digital intraoral scanner. Then, after reviewing the digital impression chairside on a computer screen to verify image/impression quality, the dentist electronically forwards the file to their local DSG laboratory, rather than prepare the Rx and impression and ship to the laboratory. As a result, a faster turn-around on digital impression cases is experienced, along with enhanced communication, efficiency, and accuracy for both the dentist and the laboratory.

KEY TAKEAWAYS

- Rewards of using digital IOS include increased productivity as a result of streamlined processes, simplified procedures, and new collaborative workflows
- Almost any type of restoration can be designed/fabricated with a digital impression
- Digital impressions result in faster turn-around time, enhanced communication, efficiency, and accuracy for both the dentist and the laboratory
Digital impression scanners are ideal tools for capturing intraoral patient information, and they are increasingly becoming invaluable during treatment planning and restorative processes. Not only are digital workflows transforming how efficiently, productively, and accurately different treatment components can be fabricated at your DSG laboratory, but the use of digital impression scanners also enables patients to experience greater comfort, convenience, and understanding of their condition and treatment objectives.

At DSG, we believe that all dentists can realize benefits from incorporating digital impression scanning into their practice. By partnering with the digital experts at DSG, you have our years of training and technical expertise available to you and your clinical team. We encourage you to think of us as a resource and be confident in our ability to assist you in incorporating your IOS investment into your practice.