Digital Impression Taking:
The Wait-and-See is Over

In recent years, “going digital” has become a significant movement in many industries, and the dental industry is no exception. Digital photography and radiography have become quite commonplace, and record keeping and practice management are now largely done using a computer. Despite the changing tides, the numbers show that digital impression systems are still the exception instead of the rule in the majority of dental practices. A number of trends are now converging, however, to hasten the tide of adoption of this new technology. In today’s digital impression taking marketplace, many dentists who initially took a wait-and-see approach are increasingly realizing that the evidence is in. The dentists who have successfully integrated these systems into their practice commonly cite the following benefits that they see firsthand:

**Better oral care.** Dentists routinely cite tools unique to digital impressions that have improved their ability to assess their work. When your prep is magnified 20x the actual size, the technology forces doctors to take not only a second look, but a closer look at how their prep will impact the final restoration.

**Better patient experience.** The process of taking a traditional impression is quite often one of the most uncomfortable procedures in a dental office. With a digital impression, dentists have transformed that procedure into an interactive and educational experience.

**Improved productivity.** Anytime you move from a traditional process to a digital process, the goal is to eliminate inaccuracies that are inherent in that traditional process. When your final restorations are routinely coming back and dropping in with little to no adjustments, that predictability can reduce stress and improve the overall office workflow. For years dentists have heard about reducing their lab bill with a full chairside milling system, but what many don’t know is that even without a chairside milling system many labs offer a discount on restorations being sent with a digital impression system.

Even with all of these significant benefits, the vast majority of dentists have not adopted this technology.

What’s holding dentists back?

“Digital scanners are too expensive. My practice can’t afford that kind of initial investment.”

“I’m not really having problems with my traditional impression-taking technique, so why should I change something that’s working for me?”

Now let’s take a closer look at the dental industry and see what is changing and how recent innovations answer many of the objections that have been holding dentists back.
The Evolution of Digital Impression Taking

The earliest digital scanners introduced to the dental office in the late 1980s and early 1990s came bundled with in-office CAD/CAM systems and price tags in excess of $100,000—high enough that many dentists lost interest after learning the price. Today, many CAD/CAM systems still carry a similar price tag, but digital scanning technology has evolved considerably. Tools once available only as part of a costly bundle can now be purchased separately.

This freestanding scanning technology opens the door to a number of different workflows for dentists, allowing them to choose their preferred materials, workflow and lab or chairside mill connections.

Traditional Restoration Workflow
1. Capture impression
2. Place temporary crown
3. Ship case to lab
4. Modeling
5. Waxing
6. Casting
7. Porcelain
8. Receive case from lab
9. Seat crown

Model-Free Digital Restoration Workflow
1. Scan impression
2. Place temporary crown
3. Send case to lab electronically and design the restoration
4. Milling and finishing
5. Receive case from lab
6. Seat crown
These new workflow options have many similarities to past technological breakthroughs like digital radiography. While early versions of digital radiography systems came with proprietary components that were only compatible with the manufacturer’s preferred practice management system, today sensors can be integrated with the software of the dentist’s choice. Dentists have increasingly adopted digital radiography after examining the labor costs associated with processing and developing film x-rays, the cost of film itself, and the organizational challenges posed by thousands of printed x-rays. Practices with digital radiography in place have already seen that the ability to send digital data instantaneously allows them to serve patients faster and more efficiently.

Chairside CAD/CAM Workflow

1. Scan impression
2. Import and design with E4D® Design Center or IOS Technologies’ FastDesign™ CAD Station
3. Mill with PlanMill 40 or TS150™ Milling Solution and Finish
4. Seat crown
For Many Life-Changing Technologies, a Winding Path to Wide Adoption

The consumer market holds many interesting parallels to technologies that were initially prohibitively expensive or greeted with a tepid public response—only to become indispensable parts of our lives today.

“I hold a considerable measure of doubt as to whether television will for many years to come be a matter of popular appeal in American homes.” — Representative of the National Association of Broadcasters, 1928

“Not everyone has dye-sublimation color printers or 35-millimeter film recorders attached to the home computer, so to get a high-quality color print of the pictures one must carry a diskette to the local graphics service bureau.” — Technology reporter discussing an early-model digital camera, 1994

The Price of a Breakthrough

<table>
<thead>
<tr>
<th>Technology</th>
<th>Introductory Price</th>
<th>Year</th>
<th>Inflation-Adjusted to 2015 Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal computer</td>
<td>$2,000$(^5)</td>
<td>1977</td>
<td>$7,865</td>
</tr>
<tr>
<td>Personal cassette player</td>
<td>$200$(^7)</td>
<td>1980</td>
<td>$578</td>
</tr>
<tr>
<td>Digital camera</td>
<td>$799$(^6)</td>
<td>1994</td>
<td>$1,285</td>
</tr>
</tbody>
</table>

What changed for these technologies? The same things that are changing in the world of digital dentistry—innovation is driving down costs and increasing efficiency, and the technological benefits are becoming impossible to ignore.

The Tipping Point for Digital Scanning

Today, more than 20 years after digital impression-taking technology first started appearing in dental offices, its time has truly come. New, more affordable scanners are removing price barriers, and increasingly flexible workflows are allowing dentists to create the most appropriate restorations for any patient situation.

With approximately 15 percent of general practitioners in the U.S. utilizing some kind of digital scanning technology, the trend of “early adopters” is giving way to a new wave—pragmatically minded dentists who recognize the importance of this tool and don’t want to wait any longer to experience its benefits.
What are the practical benefits that are winning over these dental professionals?

Accuracy
The instant feedback provided by digital scanners makes it nearly impossible to miss an important detail. While dentists might ship a traditional impression to the lab without realizing a void or tear has occurred, the ability to watch the chairside monitor in real time as an impression is being captured lets the dentist instantly recognize and correct errors.

This increased accuracy ultimately produces better-fitting restorations, with data showing crowns produced from digital impressions have a better marginal fit and better internal adaptation than those made with VPS impression material.8,9

Increased Efficiency
While traditional impressions can require 5 to 7 minutes in setting time alone, experienced users of digital scanners report shaving valuable minutes from the procedure.10 Plus, the risk of a retake is virtually eliminated. The timesavings are dramatic at seating as well—one study has shown 33 percent greater efficiency for digitally scanned restorations.11 Clinicians have also seen dramatic reductions in remakes using digital impression systems. In fact, 3M’s digital impression system has seen a 99.7% fit rate since its launch.12 In other words, these statistics irrefutably show that digital impression taking helps both scanning and seating appointments flow predictably.

Improved Lab Communication
With a digital impression, the dentist and the lab are on the same page, and both can refer to the same digital record in the event of questions. If necessary, it is even possible for a lab technician to review the scan while the patient is still in the office, giving the lab the opportunity to provide instant feedback on a complex case.13 The back-and-forth caused by poor impressions or ill-fitting restorations is dramatically reduced, thanks to the real-time view that the scanner affords the dentist. When a digital impression is submitted to the lab, there is no longer any doubt that it is complete and accurate.

A Better Patient Experience
The scanning process is preferred over traditional impression taking by the vast majority of patients.11 In addition to increased comfort, digital scanning can also aid in the treatment process and help patients understand the scope of the work being done.14 With more comfortable, better-informed patients, dentists can enjoy increased retention and referrals.

A Stronger Dental Team
An office that has adopted digital technologies is often a more attractive place to work for other dental professionals, as dentists aren’t the only staff members who benefit from digital scanning. Where allowed, assistants have taken on the task of scanning—increasing their own productivity and further increasing efficiencies in the practice.15

Same-Day Dentistry
Chairside mill connections available through some digital scanners enable the dentist to efficiently create same-day restorations. While some scanners are marketed as a package with an accompanying CAD/CAM system, a new push toward open architecture is bringing new flexibility to the industry and letting dentists assemble the system that works best for them.
The 3M™ True Definition Scanner: Accurate, Reliable and Affordable

To gain the most from digital scanning and take advantage of the benefits they’ve been hearing about, dentists must carefully consider how to enter the market. The 3M True Definition Scanner is specifically engineered to be the best first step into digital dentistry—making digital impression taking simpler, more flexible and more affordable than ever before. Finally, dentists have a practical and affordable path forward.

More accurate and more consistently accurate than leading systems on the market

The scanner’s powerful “True Definition” video technology provides a true replica of dental anatomy, allowing dentists to capture the scan and simultaneously view it in extraordinary detail.

How important is best-in-class accuracy? If a gap in a restoration is more than 50 microns—the width of a human hair—the dentist can see it, the patient can feel it, and the restoration may fail prematurely. For a 5-millimeter crown, this means the accuracy error cannot exceed more than 1 percent. Compare the performance of the 3M True Definition Scanner to other leading systems.

Optics You Can Depend On
The ability to achieve pinpoint accuracy is only an advantage if it can be done time after time. The 3M True Definition Scanner wand requires no user calibration, meaning that accurate results can be consistently achieved without worry or adjustment—and the imaging optics are protected in a compact wand that's completely sealed.

The wand’s size mimics a handpiece, and its light and balanced feel makes scanning a comfortable and familiar feeling. The 3D-in-motion technology contained within this deceptively small package has no moving parts or pieces, so dentists can rest assured their instrument will never drift out of tune.

Predictable Outcomes
With its accuracy and reliability, the 3M True Definition Scanner gives dentists the advantage of the outstanding predictability they hope for with digital imaging. Scans are completed quickly, an adept user can scan a full arch in as little as 60 seconds, and final restorations fit like a glove.

Easy Integration
Implementing digital scanning doesn’t have to mean the practice grinds to a halt while the dentist and staff familiarize themselves with a new piece of equipment. 3M provides customized in-office training that takes just a day and a half. After startup, 3M further supports customers with 30 days of scanning assistance, ensuring that every dental professional, regardless of their comfort level or experience with digital scanning, can integrate the system smoothly and efficiently.

Trusted and Open Connections
The 3M True Definition Scanner is supported by an open and secure cloud-based platform that lets dentists easily share files and connect with laboratories and other partners. The technology is designed to connect with mills and other systems—now and into the future.

This flexibility means that dentists can work with their existing labs to prescribe the materials they prefer, including PFM, full-coverage gold, all-ceramics and even custom implant abutments. Dentists and their labs have the freedom to choose the best material solution for the desired outcome. Additionally, the system’s Trusted Connections with the E4D® Design Center, PlanMill 40, and the TS150™ mill present even more options for chairside dentistry.
At Last—Affordability and Utility

The outstanding accuracy and utility of the 3M True Definition Scanner are only outshone by its unprecedented price. At a suggested retail price of just $15,995, coupled with data plans as low as $199 per month, the 3M True Definition Scanner is breaking down the high financial barrier of CAD/CAM dentistry.

Compare the workflow and connection options with other digital scanning systems and it becomes clear that the 3M True Definition Scanner provides more options for digital impression taking both in the short and long term.

### Intraoral Scanner Comparison

<table>
<thead>
<tr>
<th></th>
<th>3M® True Definition Scanner</th>
<th>Strata APOLO DI</th>
<th>CEREC Omnicam</th>
<th>CEREC Bluecam</th>
<th>Align iTero®</th>
<th>Align iTero® Element</th>
<th>Planmeca PlanScan®</th>
<th>3Shape Trios®</th>
<th>Carestream CS 3500</th>
<th>Ormco Lythos®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab Model Options</td>
<td>Trusted SLA, Lab printed, Model-free</td>
<td>infinDent SLA, Lab printed</td>
<td>infinDent SLA, Model-free</td>
<td>infinDent SLA, Model-free</td>
<td>Milled models, Lab printed</td>
<td>Milled models, Lab printed</td>
<td>Lab printed, Lab printed, Lab printed</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dental Lab Workflows</td>
<td>Open STL, 3D Margin Marking, CerecP® DentalCAD, Dental Wings Software, 3Shape Dental System®</td>
<td>Open Apollo Di, OPEN inLab, OPEN Model, OPEN 3Shape, Open STL</td>
<td>OPEN inLab, OPEN Model, OPEN 3Shape, Open STL</td>
<td>OPEN inLab, OPEN Model, OPEN 3Shape, Open STL</td>
<td>Open STL, myAlign, myAligner Plus</td>
<td>Open STL, myAlign, myAligner Plus</td>
<td>Open STL, download fee, Open STL, 3 Shape Dental System</td>
<td>Open STL, download fee</td>
<td>Open STL</td>
<td></td>
</tr>
<tr>
<td>Implant Workflows</td>
<td>BIOMET 3i® BallFit® Encode® Impression System, Straumann® CEREC® Prosthetic Solutions</td>
<td>OPEN GALILEOS Implant, OPEN GALILEOS Implant</td>
<td>OPEN GALILEOS Implant</td>
<td>OPEN GALILEOS Implant</td>
<td>BIOMET 3i®</td>
<td>BIOMET 3i®</td>
<td>BIOMET 3i®, Zimmer®</td>
<td>Unknown</td>
<td>Scan abutment in month, 2 visits</td>
<td>No, Ortho only</td>
</tr>
<tr>
<td>In-Office Mills</td>
<td>Planmeca PlanMill® 40, IOS Technologies® TPS® In-Office Milling Solution</td>
<td>inLab MC XL</td>
<td>inLab MC XL</td>
<td>inLab MC XL</td>
<td>PlanMill® 40</td>
<td>PlanMill® 40</td>
<td>PlanMill® 40</td>
<td>PlanMill® 40</td>
<td>CS 3000</td>
<td>Ortho only</td>
</tr>
<tr>
<td>Cloud Storage</td>
<td>Unlimited</td>
<td>No Storage</td>
<td>No Storage</td>
<td>No Storage</td>
<td>Ortho only</td>
<td>Ortho only</td>
<td>Romedia® Cloud</td>
<td>No Storage</td>
<td>Cloud-based digital impression storage</td>
<td></td>
</tr>
<tr>
<td>Wand Weight</td>
<td>8.2 oz.</td>
<td>3.53 oz.</td>
<td>11.04 oz.</td>
<td>9.52 oz.</td>
<td>39 oz.</td>
<td>17.6 oz.</td>
<td>19.2 oz.</td>
<td>12 oz.</td>
<td>10.4 oz.</td>
<td>9.7 oz.</td>
</tr>
<tr>
<td>Full Arch Scan Time</td>
<td>1 minute</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
<td>&lt; 10 minutes</td>
<td>&lt; 10 minutes</td>
<td>&lt; 10 minutes</td>
<td>1 minute</td>
<td>&lt; 15 minutes</td>
<td>5 minutes</td>
</tr>
</tbody>
</table>

1 - Once the field is prepared, an adept user can scan a full diagnostic arch in as little as 60 seconds.
2 - No longer selling iTero Systems

Data on file.
One Owner’s Path: Dr. Jeffrey Cecil, in practice for 30 years, explains his recent decision to purchase the 3M True Definition Scanner.

Assessing the Options
“I had looked at several different systems over the years. The early digital scanning systems were all-in-one CAD/CAM systems, which didn’t suit my needs—I didn’t like the idea of being limited to one certain kind of crown. When other scanners came out that didn’t have a milling system attached, I looked at those too, but it seemed that they all had their own inherent weaknesses, like huge wands that I couldn’t imagine getting in someone’s mouth.”

“When I heard that 3M was coming out with a new scanner with a wand about the size of a handpiece, it excited me. I went to look at it and was just amazed. It was incredibly compact. It was a video system, versus taking the scan in little pictures. And it allowed me to scan any prep and make whatever kind of restoration I want. That was what I was waiting for.”

Choosing the Right Technology Investments
“I’m kind of a gadget guy, but over the years I’ve been seduced into buying a few new things that are now sitting on shelves. I like technology, but I don’t want to take the risk of not using it, especially if it’s expensive. I’ve looked at all the scanners out there, and the 3M True Definition Scanner just seems to incorporate all the things that I’m looking for. The number one reason is it’s a much more affordable solution. On top of that, the ease of use is incredible. The learning curve was so small; it just didn’t take any time at all to pick up. Now, it takes me a maximum of a minute and a half to scan an entire arch.”

Sharing with Colleagues
“At every meeting I’ve been to, I’ve shared my successes with this machine with other dentists. A lot of them are my age and they want to know, ‘Is this something that really works? Does it make you any faster and help you make better crowns?’ And I can very comfortably look them right in the eye and say, ‘Everything is great.’”

Wowing Patients
“Patients have a lot of concerns about impressions. The material gags them or makes them feel claustrophobic—those kinds of things. So it’s been great to tell them about the scanner and the way we take impressions now. There are so many patients out there who are just relieved; they look at you and say, ‘Wow, what a great new invention.’ When they look at their scan on the screen, they’re just amazed. Then when you go to put the crown in, the fit is incredible.”

DR. JEFFREY CECIL
“The 3M True Definition Scanner just seems to incorporate all the things that I’m looking for.”

“We’ve scanned many, many cases now and they’re just amazing. Everything is working out great.”
Are you ready for digital dentistry?

3M is ready to help you smoothly transition your practice to the new era of digital dentistry.

Take the first step and learn how your practice can benefit with help from the 3M True Definition Scanner. Request a demo at 3M.com/TrueDef

3 Television is evolving at slow but sure pace. New York Times, 4/22/1928.
12 Data on file.

3M is a trademark of 3M or 3M Deutschland GmbH. Used under license in Canada. All rights reserved. All other trademarks are the property of their respective owners. © 2015