Hi everyone. First and foremost, where are materials headed for CAD/CAM?

Adam Busch, Product Manager, Sirona: Historically, conversations of CAD/CAM materials were centered around monochromatic feldspathic blocks on the chairside, and lifeless zirconium oxide frameworks for the labs. This trend held true for almost two decades. Within the past few years we have seen the evolution (or revolution) in materials. Lithium disilicate blocks, translucent zirconium and many others have joined the CAD/CAM community. Each has its own set of features and salient benefits. The future holds a whole new crop of innovative, extraordinary materials, each developed with a unique chemistry and designed for a particular outcome that will answer the requests of the dental community.

Take for instance the idea of milled metal in the form of nickel-free cobalt-chrome blocks, which can be sintered and married with full contour materials. This was seen in concept by Sirona at the 2011 IDS meeting in Cologne, Germany. Such advances open the door for the first fully digital PFM fabricated from a simple digital impression from a dentist’s office and transmitted via the Internet to a dental laboratory. The idea of digitizing the PFM process shows where we can cover the spectrum of production with CAD/CAM technology.

There is also still work to be done on the implant restorative side, which increasingly becomes a simple chairside process. We can foresee a lot of growth in this arena.

All recent developments in CAD/CAM materials move us toward high strength and easy-to-use materials.

by Krista Houstoun, Assistant Editor, Dentaltown Magazine

Once a cumbersome practice, CAD/CAM technology in dentistry has improved and refined endlessly since its genesis in the mid-1980s. Coupled with evolving computer technology and software, new developments in dental materials have made the popularity of CAD/CAM soar over the past couple of decades – despite initial hefty financial and training investments. Innovations are a fact of the future, so Dentaltown Magazine reached out to leaders in the CAD/CAM industry to get the scoop on which direction CAD/CAM materials, specifically, are likely to take.
Peter F. Golden, Professional Relations Manager, 3M ESPE: As computer-aided design and manufacturing becomes more advanced for both indirect and chairside procedures, CAD/CAM restorations will become more popular, driving ever-faster development of more aesthetic and stronger materials that are increasingly easy to use. While hardware and software advancements will continue to allow for easier integration of these technologies in both laboratories and in dental offices (for chairside applications), better CAD/CAM materials will allow the dentist clinician to provide a better service to his or her patients.

Donald E. Bell, Director of Marketing – CAD/CAM Materials and Furnaces, Ivoclar Vivadent: Developing strong, durable, highly aesthetic materials to mimic natural teeth that can be processed in a very efficient manner, ideally being able to create the restoration without requiring a secondary process, is where CAD/CAM is headed. The concept of “building” a custom restoration in layers instead of “milling” it destructively from a block of material is a vision of true customization, aesthetics and strength.

What are some major trends shaping the direction of CAD/CAM materials today?

Busch (Sirona): High strength and ease of use. The strongest materials in dentistry today are accessible to the dentist through CAD/CAM milling, and CEREC specifically. Recently 3M ESPE joined the CAD/CAM material revolution with its innovative resin-reinforced material, Lava Ultimate. Again, all manufacturers are focused on developing higher strength materials and making them easier to use and place.

New CAD/CAM users can now focus on what materials they need to provide the best patient care possible, regardless of the clinical situation. This shift in the mindset of the dental community will no doubt bring about new technologies to improve the materials and CAD/CAM experience for dentists and patients alike.
Golden (3M): Materials are now coming to the marketplace that more closely mimic the physical properties of natural teeth; these include ceramic-resin products that provide both the patient and the clinician the best of both worlds: aesthetics and toughness, which lead to increased longevity of the restoration. Also, software and hardware advances allow previously unimagined levels of productivity for both lab- and operatory-based systems, ultimately providing much improved satisfaction and profitability. As the baby-boomer generation ages, they require conservative dental restorations that can, in many cases, best be produced by CAD/CAM; these include inlays, onlays and crowns.

Bell (Ivoclar Vivadent): 1) Going fast, particularly in chairside CAD/CAM, 2) going fast and 3) going fast. I’m attempting to be funny. There is so much focus on going fast – one appointment, and as fast as possible in that one appointment – that aspects such as fit, finish, aesthetics, durability and clinical longevity could be sacrificed. The term “good enough” gets used quite a bit when referring to CAD/CAM technology. Ivoclar Vivadent develops products with passion, vision and innovation – and innovation without sacrificing performance. Corners can always be cut in the name of innovation, but I don’t believe going faster and giving up performance and aesthetics is innovative.

Do you think the need for an oven will soon be eliminated?

Busch (Sirona): Ovens, to which I will clarify to include porcelain ovens and sintering furnaces, serve many purposes in the CAD/CAM materials world, especially in dental laboratory processes. From fully crystallizing materials to staining and glazing methods that require varying degrees of heat treatments, ovens are an integral part of today’s dentistry.

Some lower-strength materials do not require sintering in a furnace and offer a lot of flexibility for the clinician (e.g., polishing). The trade off, however, is those materials need to be adhesively cemented (bonded). Until now, all materials that can be cemented traditionally need to be sintered in a furnace. It is also important to note that we are seeing ovens and furnaces advance in their speed and efficiency at nearly the same rate as material advancements aimed at decreasing the need for lengthy sintering/baking times.

Golden (3M): Not soon, as the current offerings of popular materials include those that can only be processed that way (final firing/glazing). Processing without porcelain ovens will be the obvious goal to increase utilization of chairside systems, and will allow the clinician to service or repair restorations intraorally (this cannot be done with fired ceramic materials).

Bell (Ivoclar Vivadent): An oven isn’t needed now – it’s up to the clinician and lab based on the materials they choose to utilize. The industry has moved to placing IPS e.max CAD from labs and in chairside systems for a variety of reasons such as durability – it doesn’t break even in challenging clinical situations – and it offers excellent aesthetics processed in a short
time. As of today, it’s a great combination of features for the dental professional and patient. I do believe as the industry progresses, better and more efficient “creation” of the restoration might virtually eliminate the need for a firing furnace.

Are there any CAD/CAM materials for which you advocate conventional cementation?

Busch (Sirona): As the equipment manufacturer, we defer to our materials partners for their cementation requirements.

Golden (3M): Currently, we recommend that available materials will provide better performance when they’re used to produce adhesively bonded restorations. Each material has different physical properties and luting requirements – it is always best to observe the directions for intraoral use provided by the manufacturer of each material; the development teams of each manufacturer tests their materials and can recommend the optimum method for clinical use. For example, restorations produced using 3M ESPE’s Lava Ultimate Restorative are placed using a specific technique designed to maximize this materials (restorations) performance; this technique differs from that of other materials produced by other manufacturers.

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Bell (Ivoclar Vivadent): The evolution of lithium disilicate from framework material to a monolithic restorative material known as IPS e.max CAD offers a unique option to conventionally cement upon achieving the preparation guidelines. This is a powerful option for chairside CAD/CAM owners who can prepare a retentive preparation similar to a PFM prep, mill, crystallize and conventionally cement the final restoration. IPS e.max CAD is currently the only material offered chairside that can be conventionally cemented.

Are there any new CAD/CAM materials on the horizon from your company?

Busch (Sirona): While Sirona is predominately an equipment manufacturer, we do keep an eye on the materials market and participate from time to time. Many of our users worldwide choose to only use Sirona-branded consumables because they trust the manufacturer of the equipment to provide materials under its umbrella suitable for all indications, and in some markets not all material partners are represented. The need for Sirona consumables also presents itself when we develop proprietary process (e.g., CEREC Guide), which require the research and development of a materials solution to fulfill the needs of a software feature. With that in mind, should partnerships and innovations present themselves to the extent that we feel our users will benefit greatly from a Sirona-branded materials addition, we will consider such opportunities and participate as needed.

Golden (3M): Yes, 3M ESPE is always working to produce better-performing products in restorative and operative dentistry. New CAD/CAM materials are under development that will meet the always-increasing demands of today’s clinicians and increasingly educated patients. Our future materials will be designed to work with our newest and most advanced bonding and cementation systems, so clinicians will have confidence that the restorations they place will provide years of service.

Lava Ultimate restorative for chairside is currently available through Patterson and Henry Schein and the suggested retail price is $149.50 for one refill (includes five blocks); however, dental professionals should contact their distributors for current pricing. Lava Ultimate Restorative is also available by dental labs through Jensen Dental, InLab and Straumann Cares.

Bell (Ivoclar Vivadent): Short term we are developing more ways to use IPS e.max CAD in more clinical indications. Expanding the indications into bridges and abutments is very exciting for CAD/CAM owners. They have purchased one of the greatest tools in dentistry, and we want to offer them as many ways as possible to use it and use it as efficiently as possible.

There are new materials on the horizon, too. I think that’s all I can say without risk of losing my job! We are continuously developing materials, new or variations on existing, all with the intent of being innovative without sacrificing performance. The International Dental Show (IDS) in Cologne will debut numerous new product launches that will shortly thereafter be launched here in North America.