

CAD/CAM

international magazine of digital dentistry

2²⁰¹⁷

case report

Treatment options
for the edentulous arch

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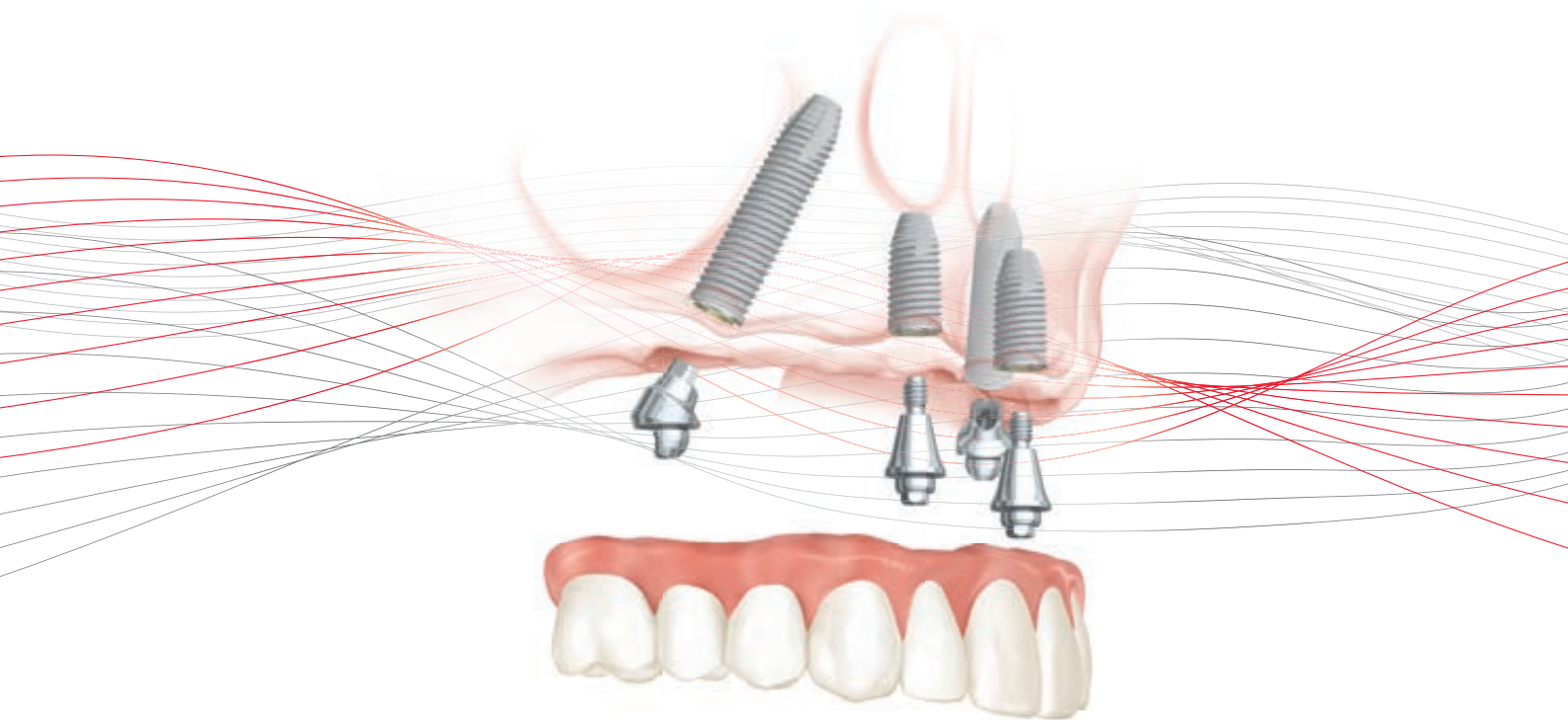
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Where are we now?



Dr Scott D. Ganz

From 21st to 25th March, the dental industry once again converged on the city of Cologne, Germany for the 37th International Dental Show, known as IDS (held every two years). The tremendous show delivered an amazing conglomeration of vendors, clinicians, dental laboratory clinicians, dental hygienists, and dental assistants in attendance from 59 countries around the globe. According to the post-show documentation, more than 155,000 visitors were able to discover "more innovation and a wider product range than ever before". If you were to visit the IDS website* you would learn that there were over 1,000 new products presented by over 2,300 companies whose exhibits spanned an incredible amount of square metres over many, many buildings.

It is hard to imagine that in only two short years that so many new products could be introduced, or that any meeting could attract so many participants from all parts of the world to meet, discuss, learn, and network about our chosen industry. For our readership, it should be noted that the major focus was on digital technologies, including intraoral scanners, desktop optical scanners, CAD/CAM software and milling machines, new materials, CBCT imaging devices, advances in treatment planning software, scanning abutments, and much, much more. It was almost impossible to travel down one of the crowded rows of exhibitors without seeing new 3-D printing technologies—in my opinion, it is one of the most important developments in recent years, and a technology now available at multiple price points.

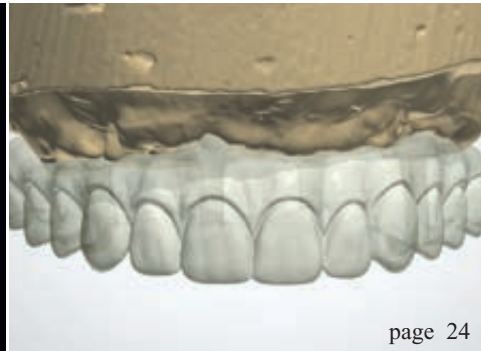
As a student of our industry, the IDS meeting has always been an educational experience. However, the plethora of new products and new technologies can be completely overwhelming, and often is. Just because companies introduce new products does not necessarily mean that clinicians understand how to fully implement these products or technologies in their practices. Each month within the pages of the various Dental Tribune International publications are well-written articles that can aid clinicians to navigate through the maze, and serve as a resource on the new digital workflow and many other topics. Therefore, to answer the question, "Where are we now?", the answer is simple. We have that much more to discover than we did two years ago.

Enjoy the new issue!

A handwritten signature in black ink, appearing to read 'Scott Ganz'.

Dr Scott D. Ganz, DMD
Editor in Chief

*<http://neuheiten.koelnmesse.net/200/2017/us/products/index>



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Demand for patient comfort and product innovations drive the US dental materials markets

Authors: Salma Mashkooor & Kamran Zamanian, USA

The US market for dental materials is experiencing remarkable changes, mainly due to demand for patient comfort and improved productivity. The need to improve patient comfort during dental procedures has demanded pricier products, encouraging market value growth. On the other hand, increasing productivity has been at the forefront of innovative delivery systems and CAD/CAM technology. Unlike the waste-saving measures provided by efficient delivery systems, CAD/CAM technology is creating a consistent downward pressure on the dental material market. As digitisation cannibalises the temporisation and impression materials segments, the growth potential of dental materials is threatened. As a result, the competitive landscape is being reordered to accommodate the growth areas of the overall dental materials market, although the leading competitors in the market tend to maintain their dominant positions.

Innovative delivery systems

Delivery systems within the dental material markets have been evolving, largely tailored towards efficiency and reducing material waste. For most materials, the traditional delivery system involved hand mixing a powder and liquid formula. Although dentists could manage with this technique, it typically led to inaccurate mixing, resulting from either too much liquid or powder. The powder and liquid approach remained somewhat relevant for dental impressions, mostly being used for alginate materials. Nonetheless, this method was originally used in cements, direct and temporary restoratives, bonding agents and core build-up materials and has since fallen in popularity. The overall movement in delivery methods has been targeted towards auto-mix systems, with the exceptions of dental anaesthetics and bonding agents. Although auto-mixing may demand a relatively premium price point, it successfully reduces waste, overcomes the prolonged clean-up time, eliminates the tedious task of hand-mixing and removes the risk of improper mixing.¹

Some markets have taken it a step further with even more innovative delivery systems. For instance, direct restoratives are progressing towards unit doses. This is largely due to the fact that the preferred materials for composite restoratives are contained within capsules.

As there are no auto-mix systems currently available for bonding agents, this market has evolved towards unit doses, which entail pre-packaged capsules and lollipops. There has also been an emergence of vial deliveries, which dispense bonding agents from the bottle into a mixing well before the material is applied with a microbrush. Collectively, these tactics allow for the material to be activated quicker and decrease waste.

Core build-up materials have also experienced a slight upturn towards pre-mixed materials, such as pre-packaged pens. However, this strategy is still relatively new.²

Emergence of CAD/CAM dentistry

CAD/CAM dentistry swept across the dental material market, capping the growth potential of both temporary restoratives and dental impressions. The need for dental impressions is dwindling as digital scanners are becoming more affordable and popular. Nonetheless, alginate impressions are relatively resistant against the downward pressure caused by digitisation. As an inexpensive preliminary impression, alginates will serve as a hand-held model for dentists in addition to a scanner model.³

On the other hand, the temporary filling market has already been contracting. With the emergence of intraoral scanners, the preparation phase of restorations will be eliminated as they may be assembled and applied in a single dental visit. This translates into temporary restorations no longer being essential in the preparation stage of the final product.⁴ However, temporary materials will not go into

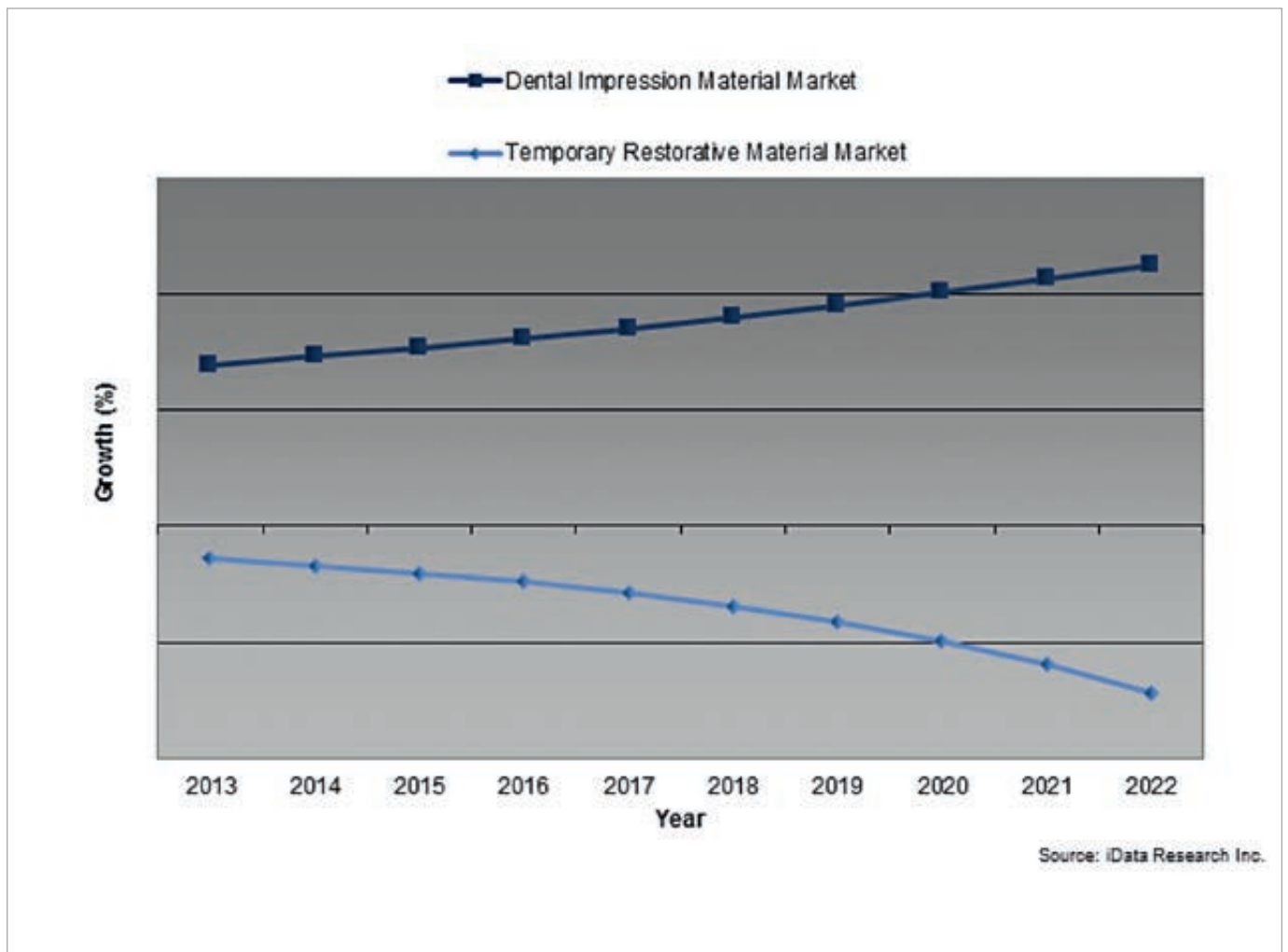
extinction as cost-sensitive patients will continue to rely on them.

Although CAD/CAM dentistry has gradually made strides on the dental material market, it will take years to realise its full potential. The acceptance of digitisation will occur in parallel to the generational displacement of older dentists with younger counterparts that have received training in innovative technologies. As with most modern products in the dental industry, the switchover is further bound by the price premium of these tech-savvy systems and tweaks in its accuracy.⁵

there is an increasing demand for more effective and less daunting anaesthetics. Recent product innovations have led to needleless syringe and spray delivery systems. Once again, these improved systems demand a price premium.

Dental impressions have similarly undergone a lengthy history of advances. The traditional, rubber-based alginates were inaccurate and produced a foul smell.⁶ Alginate impression products were succeeded by the earliest generation of polyether materials. When compared to alginates, polyether impression materials are much more accurate and

Fig. 1: Effects of CAD/CAM dentistry on the growth rates of temporary restoratives and dental impression materials.



Demand for patient comfort

Evolution of the dental material market is mainly directed towards improving patient comfort. However, a pleasurable dental visit does not come without an inflated price tag. This trend is flagrantly apparent in the dental anaesthetic field. Topical anaesthetics are typically used to numb the injection area before the local injectable needle is administered. However, hypersensitive patients must rely solely on topical products for numbness. As such,

provide better dimensional stability. Nonetheless, the difficult removal and unpleasant taste offered by polyether impressions has encouraged a movement towards alternative materials, such as costly composite impressions.⁷

Patient comfort extends beyond the realm of taste and smell, additionally pertaining to hygiene concerns. Regulatory bodies such as the Centers for Disease Control and Prevention (CDC) and the Food and Drug Administration (FDA) continue to tighten

the existing regulations regarding non-disposable products. This is particularly relevant to the "two-paste/syringe" delivery method, which represents a modern rendition of hand-mixing powder and liquid. Although the technique still requires hand mixing, it delivers a more consistent and precise mixture via the assistance of a syringe. According to the CDC, any device that comes in contact with the mucous membranes is classified as "semi-critical" and will require intense sterilisation with a chemical disinfecting solution. The FDA does not support this notion and suggests that any device that is remotely contaminated should be discharged altogether.⁸ Therefore, the innovative trail of the dental industry is pushed towards disposable products like capsules.

Shifts of the competitive landscape

The competitive landscape of dental materials is highly fragmented and unstable due to economic fluctuations and ongoing product innovation. Nonetheless, the top players of the market have maintained their position, and will continue to do so in the foreseeable future, largely due to their outstanding reputations. Particularly, 3M ESPE dominates the market, having their presence in every market segment aside from dental anaesthetic materials. As 3M ESPE has been involved with dental materials for quite some time, their products have been subject to many academic studies and proved to be highly effective.

The presence of smaller competitors in the market is accentuated in the highly fragmented arena of composite materials, particularly in direct restorations. They gain the majority of their appeal by offering niche products that specialise in a specific area of restoratives, such as low shrinkage. Needless to say, 3M ESPE leads this space with the Filtek product line, which offers an assortment of products ranging from nanohybrid to flowable composites.

The competitive portfolio of dental anaesthetics will be prone to reorganisation in the upcoming years. A multitude of competitors are entering the space with innovative ideas tailored towards improving patient comfort and numbing effectiveness. Even foreign players are experiencing notable growth in the US market. Pierrel Pharma, for instance, has been importing their articaine product Orabloc from Italy and despite the shuffling of the current anaesthetic competitive landscape, private label companies will maintain a large share of the market. Distributors such as Benco, Darby Dental Supply, Dental Health Products, Henry Schein, IQ Dental Supply, Patterson Dental and Safco Dental Supply sell their own brand-named

anaesthetics. Since these products contained the exact same drugs, and were slightly cheaper than competitors, they continue to be an intriguing option for dentists.

Editorial note: This article has been published courtesy of iData Research. iData Research is an international market research and consulting firm dedicated to providing the best in business intelligence for the medical device, dental and pharmaceutical industries.

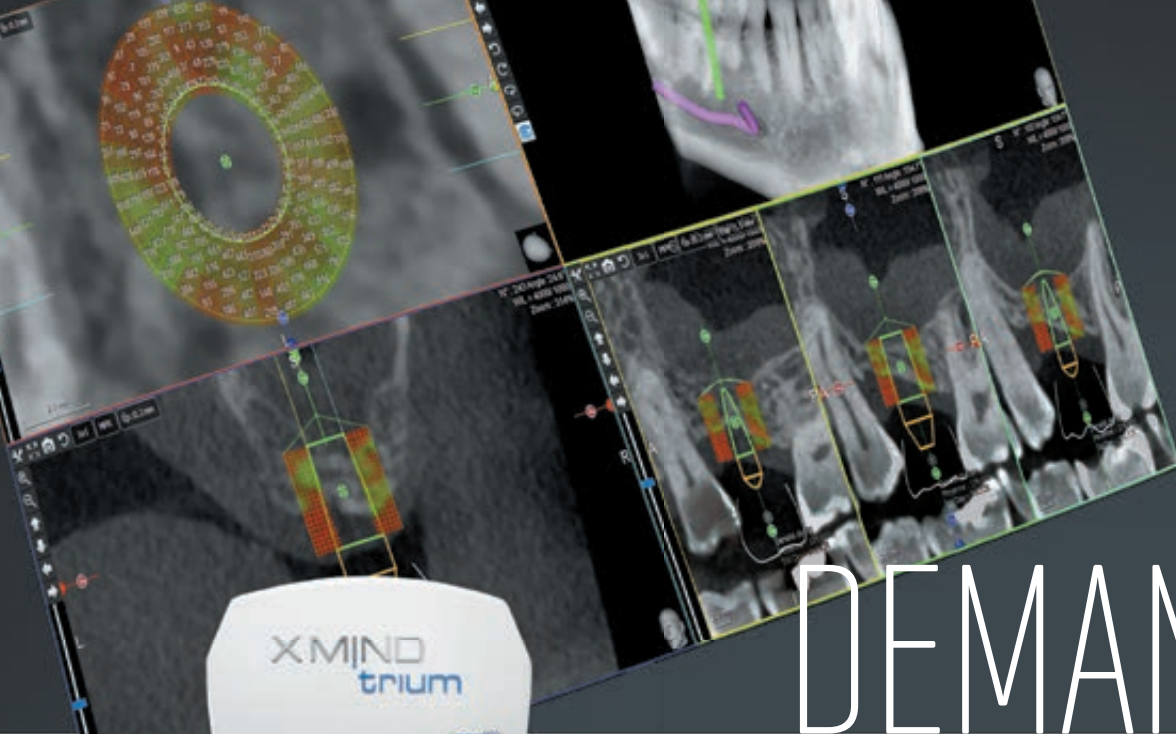
References

- [1] Konings, M., & Krueger, D. (2005, September 1). Deliverance: Trends in permanent luting cement. Dentistry IQ. <http://www.dentistryiq.com/articles/dem/print/volume-10/issue-4/materials/deliverance-trends-in-permanent-luting-cement.html>
- [2] RAPIDCORE. (2016). <https://www.centrixdental.com/rapidcore.html>
- [3] Dental Material Market – 2017. iData Research.
- [4] Carestream Health. (2016). Intraoral Scanners: What They Could Mean for Your Oral and Maxillofacial Surgery Practice. http://www.carestreamdental.com/ImagesFileShare/sitecore/media_library/Files/Intraoral_Scanner.Oral-Surgery-Scanning-Guide.pdf
- [5] Mitchem, C., Dr. Why Digital Impressions? Dental Economics, 102(1). <http://www.dentaleconomics.com/articles/print/volume-102/issue1/features/why-digital-impressions.html>
- [6] Freedman, G. (2014, May 1). Dental Trends: Knowing These Can Optimize Your Practice! Dentistry Today. <http://www.dentistrytoday.com/interview/9973-dental-trends-knowing-these-can-optimize-your-practice>
- [7] Hatrick, C. D. & Eakle, S. (2016). Dental Materials Clinical Applications for Dental Assistants and Dental Hygienists (3rd ed.).
- [8] Multiple-Use Dental Dispenser Devices. (2016, May 16). <http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/DentalProducts/ucm404472.htm>

about

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