

# SPECTRUM denturism

January / February 2025 • V19N1



## Unveiling the Transformative Power of 3D Printing in Dentistry

By Jim Collis

Completing dentures with a two-phase silicone  
wall made of Polisil

## WAX TO WOW: CONVERTING WAX SETUP INTO PLASTIC

By Roman Wolf, Theresa Rupp

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## In this issue

January / February 2025 • V19N1

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www.palmerimediagroup.com

**SPECTRUM DENTURISM** ISSN# 1921 5932 is published six times a year and distributed to Denturists across North America. The journal is committed to presenting cutting edge education in order to optimize patient care.

Articles published express the viewpoints of the author(s) and do not necessarily reflect the views and opinions of the Editor and Advisory Board.

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### Publication Dates:

January/February, April, June/July, August, October, December

### Printed in Canada

Canadian Publications Mail Product Sale Agreement 40020046



**EDITORIAL** — The importance of collaboration..... 04

*Carlo Zanon, DD, LD, FCAD*

**VIEWPOINT** — Burnout..... 06

*Peter King, Senior Advisor Denplan*

**PRACTICE LIFE** — The importance of early diagnosis of oral cancer..... 08

*Debbie Herbst, Dentolegal adviser at the Dental Defence Union (DDU)*

Completing dentures with a two-phase silicone wall made of Polisil from Briegel Dental..... 12

**Wax to Wow: Converting wax setup into plastic**

*Roman Wolf, Theresa Rupp*

**Unveiling the Transformative Power of 3D Printing in Dentistry**..... 20

*Jim Collis, CDT*

**Continuing Education Tests** ..... 30 – 31

**PROMOWATCH** — Q&A About Denture Base 2.0 ..... 32

**Announcements & Products** ..... 34

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**Carlo Zanon,**  
DD, LD, FCAD

## *The importance of collaboration*

I have attended conferences and continuing education courses throughout my career, focusing on areas where I seek to grow and strengthen my skills. The most recent Spectrum conference was exceptionally well-organized, providing a valuable opportunity to reconnect with colleagues and establish new connections. These gatherings highlight the importance of collaboration, education, and staying informed about available products. Sharing my experiences with others makes these events not only productive but deeply fulfilling.

In the world of Denturism and dentistry, no two days and no two patients are ever the same. Each case brings its unique complexities, testing our skills and pushing the boundaries of our expertise. While our training prepares us for many scenarios, there will inevitably be moments when a procedure feels daunting, unfamiliar, or outside our comfort zone. These moments are not signs of inadequacy, but rather, they are opportunities to embrace the collaborative spirit of our profession.

Dentistry and Denturism thrives on a foundation of collective knowledge and shared experiences. When faced with a challenging procedure, turning to colleagues for guidance can make a profound difference—not just in terms of patient outcomes but also in personal and professional growth. Seeking help should not be seen as a weakness but as a commitment to delivering the highest standard of care.

The Benefits of Collaboration of collaboration are endless. Every professional brings unique experiences and insights to the table. Consulting with a colleague who has mastered a particular procedure or encountered a similar case can provide invaluable perspective. It may also open doors to learning new techniques or refining existing ones.

### **1. Enhanced Patient Care**

Patients trust us to act in their best interest. By seeking input or referring a case to a specialist when necessary, we prioritize their safety and well-being. This approach fosters trust and reinforces our reputation for ethical, patient-centered care.

### **2. Reduced Stress and Improved Confidence**

The pressure to "do it all" can be overwhelming. A collaborative approach alleviates this burden, providing reassurance and increased confidence. Knowing you have a network to lean on can transform apprehension into excitement for professional growth.

### **3. Building Professional Relationships**

Collaboration strengthens bonds within the dental community. By reaching out to colleagues, you create opportunities for mentorship, partnership, and mutual support, enhancing your professional journey.

Practical steps for effective collaboration can be taken. Gain relationships with specialists and peers in various fields of dentistry. Regularly attending conferences, study clubs, or local Denturist meetings can help expand this network. Use digital tools such as case-sharing platforms, virtual consultations, and online forums to connect.

I am committed to continually enhancing and sharing my knowledge, and I always welcome collaboration with colleagues and fellow dental professionals. Let us continue to support one another in elevating the field of Denturism, striving to uphold the highest standards of our profession. ■

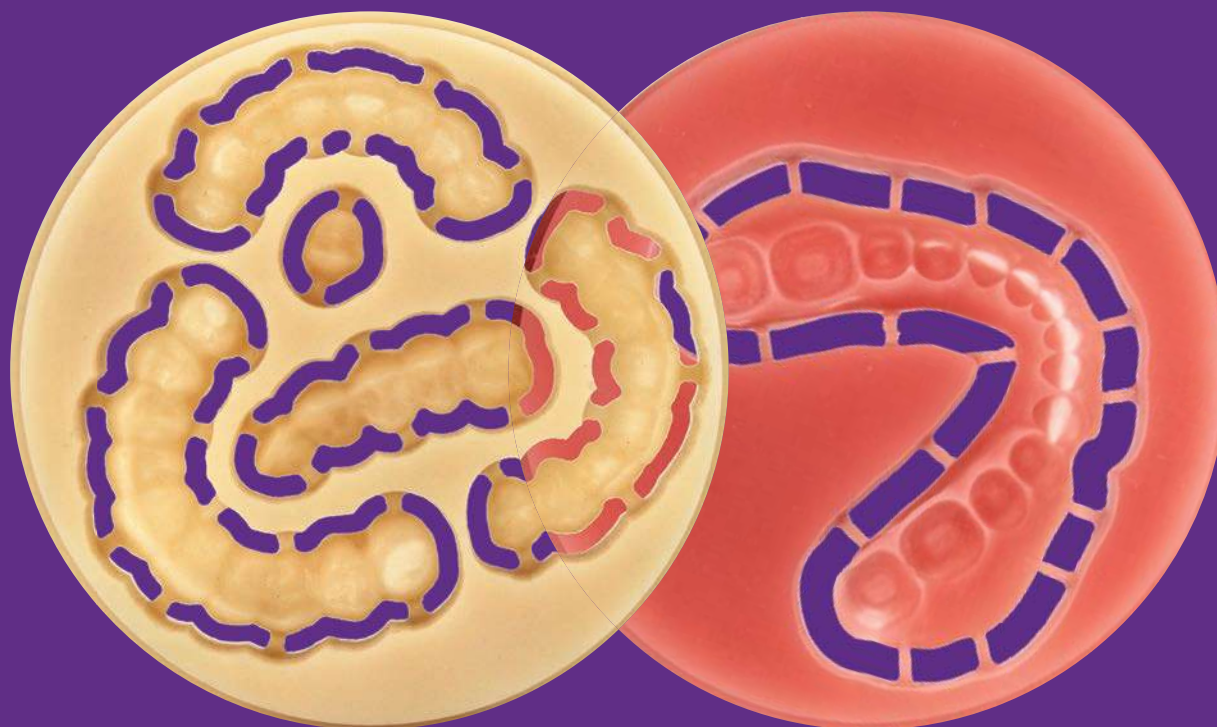




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**Peter King,**  
Senior Advisor  
Denplan

# Burnout

**Peter King** takes a look at burnout in the dental profession and how it can be prevented

**H**ave you ever had that Monday morning dread on the commute to the surgery?

Has it occurred to you to think up an excuse, turn around and go home?

Have you felt exhausted before you've even seen a patient and thought about deferring treatment?

Most of us have experienced feelings like these at some point in our careers, but they can be the early signs of burnout.

## What is burnout?

Burnout is defined by the World Health Organisation as chronic workplace stress that has not been successfully managed.

It is characterised by feelings of exhaustion, negativism or cynicism towards your job and a decrease in professional efficacy.

It refers specifically to your professional life and, though it is not depression, it can lead to mental, physical and emotional exhaustion.

The pressures that cause this stress can be emotional (such as having to deal with difficult or anxious patients), cognitive (when high concentration levels are needed to diagnose and carry out sometimes technically difficult procedures) or even physical (for example the difficult posture required to treat some patients, especially if using unreliable equipment).

There are also many specific factors that can contribute:

- Fear of regulation and litigation
- Business or financial problems
- Unrealistic performance targets
- Appointment book pressures
- Too little time to take breaks from surgery
- Feelings of isolation in practice.

Isolation is especially common in single-handed practices but can occur even in a group practice.

Compared with the medical profession, there is far less interaction with colleagues and fewer pathways available for help and support.

## Who is affected?

Burnout typically affects dentists aged over 50, usually male (though this may be due to the demographics of the profession, which are gradually changing).

However, young, newly-qualified dentists with a lack of experience in running a business may also struggle.

Part-time dentists tend to be less stressed than those working full time and specialists are less stressed than general dental practitioners.



This may be because specialists are more confident in their skills and better able to control their workloads.

The last few years have undoubtedly increased the potential for burnout for many reasons.

With covid we had the risk of isolation, with few of the usual opportunities to get out of surgery to attend CPD courses and interact socially with colleagues.

Uncertainty about the future of your practice may be on your mind, together with difficult working conditions; increased staff absences, with many leaving the profession altogether, may have led to longer working hours and rising financial pressures; targets have been more difficult to achieve, affecting the morale of the whole dental team, and team management has often been more challenging as a result.



Some denturists suffer from imposter syndrome, where feelings of inadequacy persist despite evident success.

A denturist with a high MBI score is more likely to move jobs frequently, be absent from work, have low morale, encounter problems with relationships and suffer from substance dependency.

### How can burnout be prevented?

In my view, we need to develop a culture within practice where you can safely say no and where this is accepted and discussed rather than being instantly rejected.

Recognition of good work and appreciation of commitment are just as important as financial rewards for the whole staff.

 Dentists can exhibit obsessive-compulsive behaviour as they strive to complete complex tasks with time constraints and perfectionism 

### Consequences

To check your risk of burnout, the Maslach Burnout Inventory (MBI) is a self-assessment tool that works by allocating a score according to your response to a list of statements about your feelings, such as: 'I have negative thoughts about my job', 'I feel misunderstood or unappreciated by my co-workers' and 'I feel that there is more work to do than I practically have the ability to do'.

The resulting score indicates whether you are at low or severe risk of burnout and need to take action to prevent the situation from deteriorating further.

One of the tool's developers, Christina Maslach, indicated that burnout occurs when rewards do not meet expectations, and it is easy to see how this might apply to dentistry.

Denturists can exhibit obsessive-compulsive behaviour as they strive to complete complex tasks with time constraints and perfectionism; they often try to achieve unattainable standards and feel strongly that they should offer the best care to all.

They also have an aversion to failure – treatments can and will fail sometimes, but these instances need to be seen as an experience to learn from.

In practical terms, coping strategies could include:

- Exercising regularly – go for a run, a cycle ride, a session in the gym or just a dog walk
- Taking breaks – get away from the workplace for a while
- Mindfulness or meditation
- Further education – denturists with additional training typically suffer less from burnout
- A reduction in patient load – consider whether more time with your patients would reduce stress
- Improving your work/life balance
- Peer support – talk to your colleagues
- Counselling or mentoring.

With one in three dental professionals considering leaving the profession for reasons of personal wellbeing, we really can't afford not to address the problem of burnout. ■



**Debbie Herbst,**  
Dentolegal adviser  
at the Dental  
Defence Union  
(DDU)

# *The importance of early diagnosis of oral cancer*

With oral cancer on the rise, Debbie Herbst discusses the importance of an early diagnosis.

**O**ral cancer, comprising cancer of the lips, tongue, mouth (gums and palate), tonsils, and the oropharynx, is on the rise. Data published by Cancer Research highlights that oral cancer cases have increased by 68% in the past 20 years, and in 2020, 2,702 people died due to the disease.

The same charity's findings indicate that approximately 90% of oral cancer cases are linked to lifestyle factors, with smoking in particular associated with an estimated 65% of cases. Other factors include alcohol consumption and the human papilloma virus (HPV).

Dental professionals who are responsible for the care of a patient should ensure they are aware of relevant risk factors and record any preventative advice given

Unfortunately, Covid has affected dental professionals' ability to diagnose patients, both when it comes to a lack of in person examinations, and in causing a backlog and delay in appointments. While it has still been possible to refer patients for suspected oral cancer, it has not been possible to examine all patients who may be unaware of symptoms such as lesions. As a result, only patients concerned about such symptoms, who have subsequently visited their practice, are likely to have been referred.

At the DDU, we opened 104 files between January 2013 and August 2020 relating to oral cancer, 69 claims and 35



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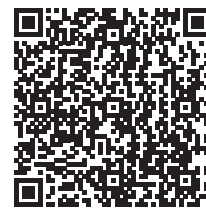
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complaints. In 65 cases, the dental professional allegedly failed to check the patient for oral cancer during their check up, did not diagnose a suspicious lesion, or there was a delay in referring the patient to a specialist.

### What to do if you suspect a patient may have oral cancer

Although a dental professional might not see a case of oral cancer during their career, it is still important to know what the signs of oral cancer are and to respond accordingly.

Firstly, dental professionals who are responsible for the care of a patient should ensure they are aware of relevant risk factors and record any preventative advice given. Advice relating to smoking, alcohol and other lifestyle factors may be appropriate, and it is important to explain why this is relevant if the patient appears unwilling to share this information. Documenting findings and keeping accurate and up-to-date records and reports is also vital.

Spotting the warning signs and making an early diagnosis often means that treatment can be dealt with in as minimally invasive a manner as possible

This might include taking photographs as they allow for the possibility of monitoring changes. Also, consider the use of mouth maps and record information such as palpations of the lymph nodes in the neck, the duration of symptoms, and the size, site, shape and texture of lesions. In doing this, it is easier to provide a justification for the actions you take.

If a patient is high risk and they have particular symptoms but no obvious problems, it would be sensible to obtain a second opinion. Arranging urgent onward referrals by the two-week suspected oral cancer pathway is appropriate. When it comes to follow-ups and referrals, it is good practice to follow up with hospitals to make sure referrals have been received and are being handled. It should be confirmed that appointments with specialists have been organized.

The GDC also recommends undertaking CPD into improving early detection of oral cancer to ensure dental professionals are regularly refreshing their skills and knowledge in the area, while NICE have also published



guidelines on how to recognize the signs of oral cancer. To conclude, rising cases of oral cancer vindicate the importance of an early diagnosis, and of making appropriate timely referrals. Spotting the warning signs and making an early diagnosis often means that treatment can be dealt with in as minimally invasive a manner as possible, and the need for complex operations and radio/chemotherapy might be avoided.

As well as making sure patients are cared for as effectively as possible, the information and advice given above can also help to ease the worry of a complaint or claim arising as a result of a late or missed diagnosis.

### Case study

DDU member Dr Jasleen Batra, discovered a malignant lump under a patient's jaw during a routine dental appointment.

Being able to spot this quickly allowed Dr Batra, who was a fifth-year student at the time, to make the appropriate referral, where the patient was diagnosed with cancer, originating from the tonsils. The patient has now been given a good prognosis, showing the importance of knowing what to look out for, and having courage in your convictions when it comes to urging further tests and referrals.

Dr Batra says: 'Oral cancer screenings are essential and are now routine every time you see a dentist. However, checking at home is so simple. I am so glad the patient came to see me when he did and glad to hear he is doing well. I was just doing my job. I hope his story creates awareness that may save lives in the future.' ■

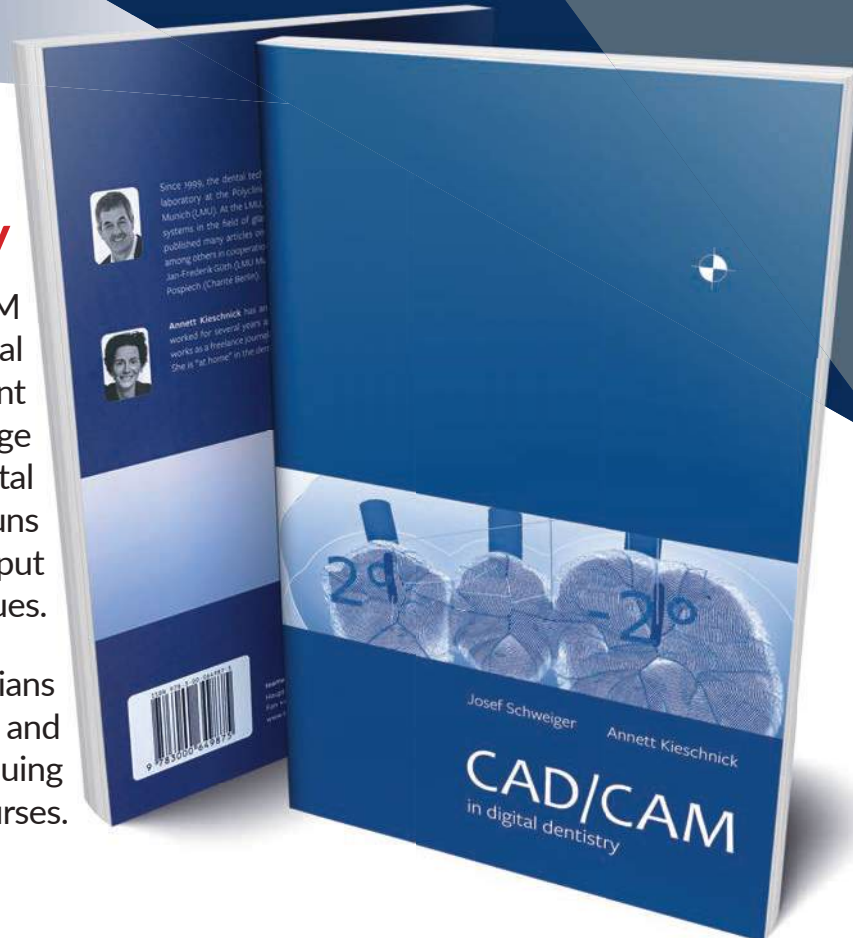


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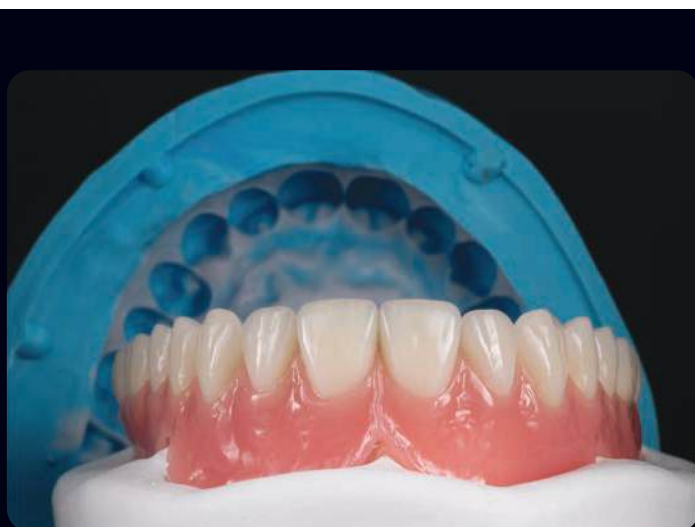


**Completing dentures with a two-phase silicone wall made of Polisil from Briegel Dental**

# Wax to Wow: Converting wax setup into plastic

By Roman Wolf, Theresa Rupp

A look behind the scenes of manual dental technology often reveals little gems. One of these is Polisil from Briegel Dental. The team of authors appreciates the genius of the idea behind this product. The "silicone from the tube" can be used to create a two-phase silicone wall that makes a lot of annoying rework superfluous - for the real "wax-to-wow" effect. No more frustration over unclean edges, excess plastic on denture teeth and laborious polishing of the same! The team of authors shows how the best results can be achieved with classic techniques, clever methods and modern materials. A good opportunity to take off your digital glasses and once again immerse yourself in the world of classic dental technology.



**FIGURE 1:** Complete denture with authentic gingival design, finished with two-phase silicone wall

**W**hile our industry seems to be dominated by technical gadgets, artificial intelligence and digital workflows, it is time again to make a plea for a classic: the full denture. The temptation to always want the latest of the latest is great – the more digital, the better, it seems. But despite all the enthusiasm for technical progress, the amount of craftsmanship and precision that goes into a full denture should not be underestimated. The manually manufactured denture has been making patients smile for decades. At the same time, there are always clever products that can be used to optimize the tried and tested process. One example is Polisil (Briegel Dental). This silicone can be used to create a two-phase silicone wall, which noticeably facilitates denture production; an impressive "wax-to-wow" effect. Good reasons, then, to take a new look at a real classic (Fig. 1).

## Wax-up as an indispensable basis for complete dentures

When producing removable dentures for toothless jaws, we as dental technicians face numerous challenges. The biggest



"hurdle" seems to be the person themselves. The many functional, anatomical and aesthetic differences pose small and large stumbling blocks. These can be avoided with a solid dental technology concept. And even though we are devoting this article to the completion of dentures, we would like to emphasize that every denture begins with the classic wax-up, the positioning of the teeth. We should be aware that our actions are aimed at a person whose quality of life depends directly on our work. The responsibility to close the "toothless space" is based on scientifically researched and clinically proven parameters and requires powers of observation, creativity and an understanding of functional relationships. With the information from a careful model analysis, the ideal tooth position can be put together like a puzzle.

### Three-dimensional gingiva design

Once the teeth have been set up, the focus is on designing the red aesthetics in wax. Functional aspects play a role here, such as a muscle-grip shape and a phonetically optimized structure. Aesthetic considerations are also important. Particular attention is paid to separating red and white aesthetics by means of clear edges. Careful modeling of the papillae and the anatomical reproduction of the natural gums - with suggested gingival margins, recesses of areas of keratinized gingiva and subtle hints of root courses - are essential (Fig. 2 to 4). The three-dimensional gingiva design is created from a sophisticated interplay between convex and concave elements in the



**FIGURE 2:** Carefully modelled in wax with clear transitions between red and white aesthetics and authentic gingival design



**FIGURE 3:** Carefully modelled in wax with clear transitions between red and white aesthetics and authentic gingival design

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**FIGURE 4:** Carefully modelled in wax with clear transitions between red and white aesthetics and authentic gingival design



**FIGURE 5:** Coating the dental arch including the gingival margin with viscous Polisil from the mixing cannula



**FIGURE 6:** Spraying the dental arch including the gingival margin with viscous Polisil from the mixing cannula

area of the alveoli, complemented by gentle stippling for an authentic, lifelike depth effect. Once this step has been carefully carried out, the prosthesis can be transferred to plastic.

### From wax to plastic

We have now invested a lot of time and love into modelling the prostheses. There are basically two options for converting the wax setup into plastic:

1. We transfer the detailed wax structure into plastic using a two-phase silicone wall, thus protecting the papilla areas as well as the fine morphology and texture of the denture teeth. This method promises to maintain the quality of our preparatory work.

2. We finish the prosthesis with a classic silicone wall, with the risk that excess plastic or residues of superglue will damage the teeth and our carefully modelled gingival structures will be lost, and then we start again with the fine work.

We choose the first option to preserve the integrity of our work. For the two-phase silicone wall, we use Polisil from Briegel Dental. The silicone is ideal for seamlessly transferring the detailed surface of teeth and the transition to the gingiva into the plastic.

### Product tip from colleagues for efficient denture production

As dental technicians, we all know the effort involved in finishing dentures. We too have been looking for a process that makes the work easier for a long time. We found Polisil from Briegel Dental. This silicone from the mixing cannula has changed our approach to the denture pressing process. When colleagues who work in the laboratory every day like us develop products or make product suggestions, that can only be a good thing. Because it means that the ideas come first-hand, shaped by real experience. One such product is Polisil, the matrix silicone specially designed for the denture pressing process. It is easy to use and resembles a two-phase impression. Polisil coats the teeth during processing, which enables the teeth to be precisely fixed in the silicone wall, among other things. The teeth literally click into the two-phase silicone wall, without the annoying superglue. In addition, the tooth and gingival structure are protected during the process. The result after devesting is a clean surface that requires little rework or polishing. For us, Polisil is not only a game changer in terms of precision, but also makes the entire finishing process much easier.

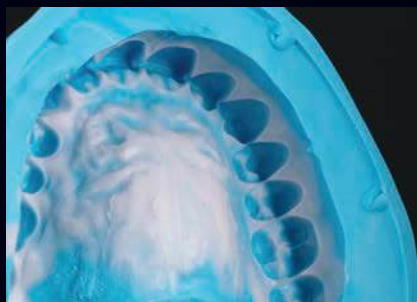
### Some advantages of Polisil that we appreciate:

- Detailed transfer of the wax model into plastic
- Protection of the morphology of prosthetic teeth (e.g. from excess plastic)
- reduces rework and polishing effort
- bonds firmly with kneading silicone for a stable two-phase silicone wall
- Replaces the use of superglue and other fastening materials, denture teeth virtually “snap” into the matrix
- supports the creation of prostheses with precise red-white transitions
- easy to use and efficient in everyday laboratory work.

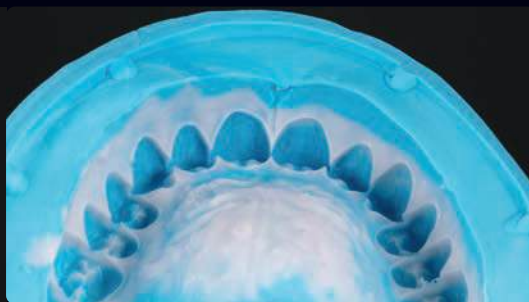
### Creating the two-phase silicone wall

After the wax prosthesis has been modelled, the embedding process begins. Polisil plays a key role in the production of





**FIGURE 7:** Silicone matrix in two phases: For the "wax-to-wow" effect, the tooth rim is completely encased in the precision silicone Polasil. Otherwise, the matrix is made of classic kneading silicone (standard procedure).



**FIGURE 8:** Silicone matrix in two phases: For the "wax-to-wow" effect, the tooth rim is completely encased in the precision silicone Polasil. Otherwise, the matrix is made of classic kneading silicone (usual procedure).



**FIGURE 9:** The prefabricated teeth are fixed precisely and securely in the matrix without any tools.



**FIGURE 10:** After conversion into plastic: exact transfer of the finest details from the wax model, clean transitions and no pink film on the denture teeth



**FIGURE 11:** After conversion into plastic: exact transfer of the finest details from the wax model, clean transitions and no pink film on the denture teeth



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the silicone wall by seamlessly covering the transition from the wax to the prosthetic tooth along the gingival margin, thus enabling a clean conversion into plastic. We inject the viscous silicone from the mixing cannula around the dental arch and gingival margin (Fig. 5 and 6). It is important that the entire dental arch - vestibular, labial and occlusal surfaces - is covered. The silicone encloses the sensitive areas like a protective coat.

After coating the dental arch with Polisil, the rest of the prosthesis is covered with a kneading silicone. While we mix the silicone, the Polisil coat hardens. This means that we can then easily cover the entire prosthesis with kneading silicone. It is practical that no additional retentions are required. Polisil and the kneading silicone bond firmly together. Once the silicone has completely hardened, the process continues as usual. We remove the denture teeth from the silicone wall (Fig. 7 and 8) and clean them with a steam cleaner. After all wax residues have been removed, we condition the teeth by sandblasting and fix them again in the matrix (Fig. 9). This is where the advantage of our "Polisil coating" becomes apparent again: the teeth virtually snap into the matrix, firmly and securely, without the need for superglue or other aids.

## Acrylx Xthetic Prime: Completion of the prosthesis

We use the prosthetic plastic Acrylx Xthetic Prime (Briegel Dental) to complete the plastic prosthesis. Our experience shows that this plastic is ideal because it has practically no shrinkage, which can be seen in Figures 10 and 11. The plastic also offers a natural, aesthetic color. Xthetic is a castable PMMA plastic that we use for both removable and fixed dentures. The minimal shrinkage and the low residual monomer content ensure a high level of fit. The surface of the material is homogeneous, which on the one hand reduces the susceptibility to plaque and on the other hand makes our work - finishing and polishing - easier.

### Some valuable benefits of Xthetic:

- very good flowability
- improved mucous membrane tolerance due to reduced monomer content (less residual monomer)
- minimal shrinkage for precise fit
- homogeneous surface for less plaque susceptibility and simplified polishing.



**FIGURE 12a:** Situation immediately after devesting: Hardly any further work is necessary. The teeth are free of any excess plastic, the red-white transitions are cleanly reproduced.



**FIGURE 12b:** Situation immediately after devesting: Hardly any further work is necessary. The teeth are free of any excess plastic, the red-white transitions are cleanly reproduced.



**FIGURE 12c:** Situation immediately after devesting: Hardly any further work is necessary. The teeth are free of any excess plastic, the red-white transitions are cleanly reproduced.



**FIGURE 12d:** Situation immediately after devesting: Hardly any further work is necessary. The teeth are free of any excess plastic, the red-white transitions are cleanly reproduced.





**FIGURE 13a:** Finished prostheses: lifelike gingiva design, natural gloss and homogeneous surface



**FIGURE 13b:** Finished prostheses: lifelike gingiva design, natural gloss and homogeneous surface



**FIGURE 13c:** Finished prostheses: lifelike gingiva design, natural gloss and homogeneous surface



**FIGURE 13d:** Finished prostheses: lifelike gingiva design, natural gloss and homogeneous surface

### Attention to detail after completion

After the denture has been removed, it is clear that the teeth are perfectly positioned in the matrix without the plastic crossing the red-white border (Fig. 10 and 11). This would otherwise be a problem, which is noticeable as a pink film on the denture teeth. Here, all the carefully modelled details are reproduced precisely (Fig. 12). Thanks to the fine surface of the precision silicone, the finishing and polishing of the denture is comparatively simple and saves time and material. Transitions and details are clearly visible and require only minimal post-processing.

### Three steps to the perfect shine: Polishing the denture

Our dream team for denture polishing also comes from Briegel Dental: Doris (polishing paste) and Philipo (synthetic leather buffing wheel). We start with a handpiece, soft polishing brush and a combination of solid plastic polishing paste and the plastic polish Doris (Briegel Dental). Then we continue with the polishing motor using pumice stone. We achieve the high-gloss finish with the handpiece and a synthetic leather buffing wheel (Philipo, Briegel Dental). The polishing agent is evenly distributed; the soft leather of the

buffing wheel means that even hard-to-reach areas can be worked on very well. With this polishing protocol, we achieve a highly polished denture in an efficient way (Fig. 13).

#### Some advantages of Doris (plastic polish) that we appreciate:

- can be used with different brush types (e.g. hard or soft goat or horsehair brushes) as well as with imitation leather brushes
- can be used with both handpiece and polishing motor
- promotes a homogeneous and smooth surface through the nano effect
- is suitable for all types of plastics and composite veneers
- efficiently enables a professional high-gloss finish

### Conclusion: old school, modern materials

Our everyday lives are often dominated by digital innovations. It is all the more wonderful to discover exciting products for classic craftsmanship. We have discovered a little gem for everyday life in the form of Polislil silicone,

which reminds us that the heart of dental technology still beats in craftsmanship.

With Polisil, we can elegantly avoid the small but often annoying hurdles in the completion of prostheses: no messy transitions between red and white aesthetics, no excess plastic or superglue residue on denture teeth, but simply a highly precise implementation of our wax model in plastic. Working with clever products, often born in everyday

laboratory life, such as those from Briegel Dental, reinforces our belief that the true art of our profession lies in the ability to combine the tried and tested with the new. So let's put the digital glasses aside from time to time and devote ourselves with respect to classic dental technology.

Because at the end of the day, it is our experienced hands and the knowledge refined over decades that lay the foundation for high-quality dental technology. ■



### About the authors



#### Roman Wolf

- 2019 Opening of Wolfs Art Dental Studio in Burglengenfeld
- 2018 Nominated by the Chamber of Crafts Lower Bavaria-Upper Palatinate for the Klaus Kanter Award
- 2017–2019 Master dental technician at the Dental Studio Munich
- 2017 Completion of the master dental technician examination as the best of the year
- 2014–2016 Dental technician, Nabburg
- 2010–2014 Training as a dental technician, Nabburg

#### Theresa Rupp

- 2019–2023 Training as a dental technician,
- employed at Wolfs Art Dental Studio since 2020
- February 2023 successful completion of training, journeyman's certificate
- Special area: Prosthetics

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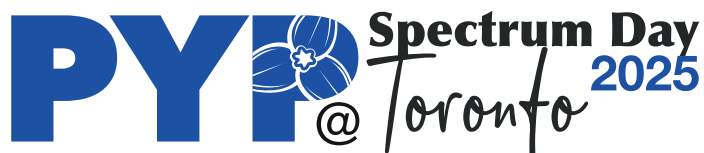


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# Unveiling the Transformative Power of 3D Printing in Dentistry

By Jim Collis, CDT

In the fast-evolving realm of dentistry, the amalgamation of digital technologies has brought about a seismic shift, reshaping traditional workflows and paving the way for unprecedented precision and efficiency. Among these digital innovations, 3D printing emerges as a beacon of transformation, offering dental labs the remarkable ability to fabricate prosthetics and devices with unparalleled accuracy and swiftness. Let's embark on a journey to unravel the profound impact of 3D printing on dental workflows, exploring its manifold benefits, versatile applications, inevitable challenges, and promising prospects.

The infusion of 3D printing into dental workflows heralds a multitude of benefits, revolutionizing the operational landscape of dental labs and enhancing service delivery. Unlike traditional methodologies, reliant on manual labor and conventional materials, 3D printing introduces a realm of unparalleled precision, consistency, and customization. This groundbreaking technology empowers dental professionals to craft an extensive array of prosthetics, ranging from crowns, bridges, and dentures to partials and surgical guides, with unprecedented accuracy and efficiency.

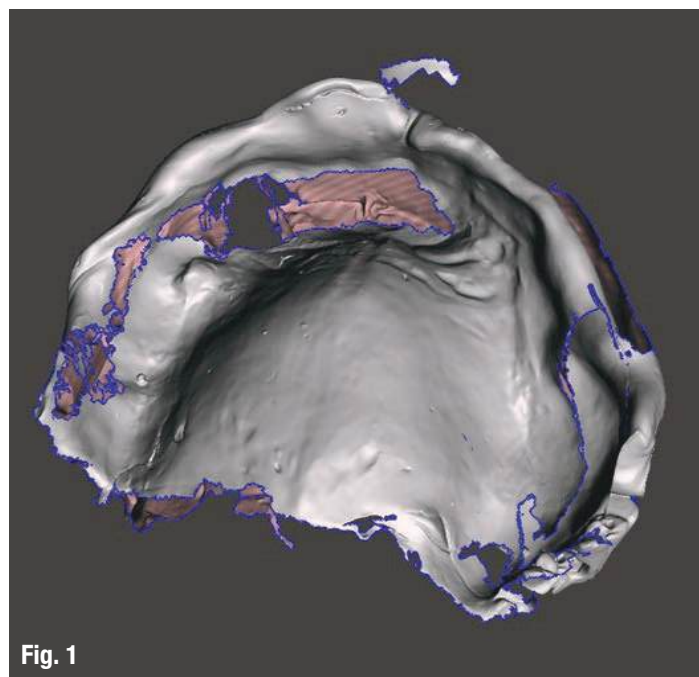
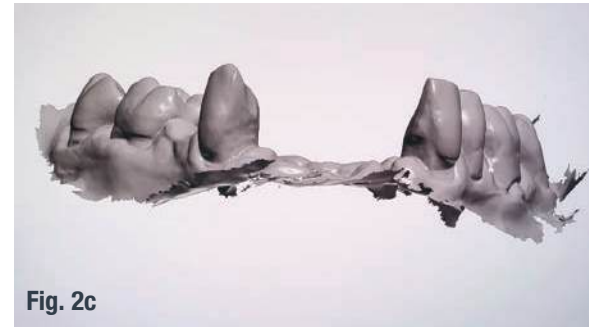
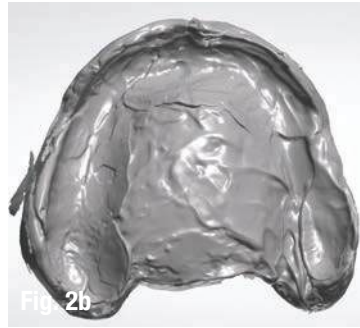
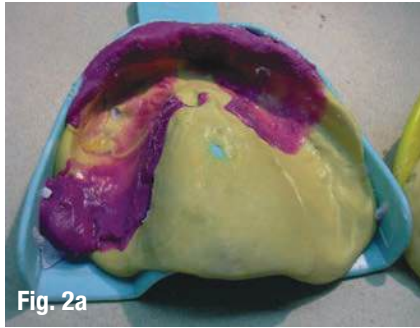


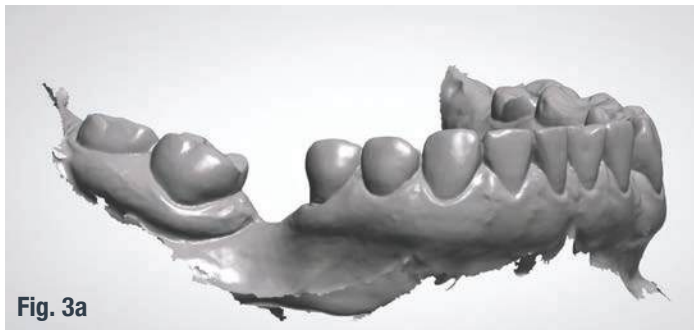
Fig. 1

**FIGURE 1:** Digital Scans need the same information as analog impressions do.





**FIGURE 2a - c:** A bad analog or bad digital impression has the same outcome. A remake! These impressions are a train wreck! The technician is unable to fabricate custom impression trays on these.



**FIGURE 3a - d:** Scans are all the lab has to work with. Good scans and bites equals success. Milled base from a TCS puck and printed tooth.

From crafting intricate single crowns to fabricating complex dental bridges, 3D printing has metamorphosed the fabrication process of various dental prosthetics. Leveraging digital impressions and cutting-edge CAD/CAM technologies, dental labs can fashion highly precise restorations tailored to seamlessly fit the unique anatomy of each patient. Furthermore, 3D printing facilitates the fabrication of surgical guides, revolutionizing implant placement procedures and elevating patient outcomes. The versatility of this transformative technology extends even further, encompassing the production of dentures and partials, offering patients solutions that are not only comfortable but also aesthetically pleasing.

To harness the full potential of 3D printing, dental labs must embark on a journey of introspection, critically evaluating their current workflows to pinpoint areas ripe for enhancement. Whether navigating the intricacies of a small-scale operation or steering through the demands of large-scale production, understanding the unique requirements of the lab is paramount. By delineating clear production output goals and aligning them with the appropriate 3D printing solutions, labs can fine-tune their workflows and elevate overall efficiency to unprecedented heights.

In the diverse landscape of dental laboratories, the spectrum of requirements varies greatly between large-



**FIGURE 4:** Printed on an Asiga 4 k

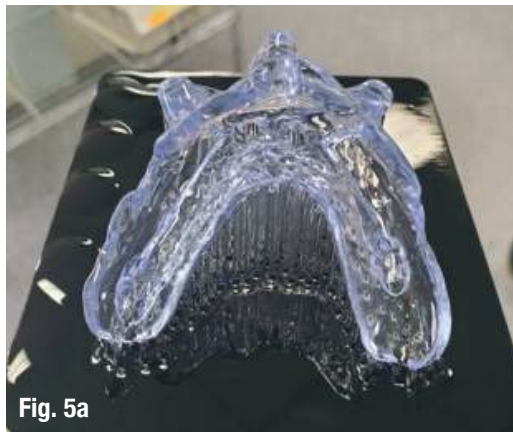
#### For Dental Labs, Denturists, and Dentists:

3D Printing can significantly enhance all aspects of dental production, from basic tasks to final product fabrication. The Ackuretta SOL and the larger Ackuretta SOL Plus are excellent choices for small labs and denturists focused on production and growth. These printers are ideal for clinicians in high-volume practices, as they enable the fabrication of custom impression trays, base plates, temporary crowns, and bridges. Additionally, night guards can serve as a significant practice builder. For those needing larger build plates, the Phrozen and Asiga printers offer an excellent solution.

scale establishments and their smaller counterparts. While expansive labs may prioritize high-throughput 3D printers capable of handling voluminous production, smaller entities may place greater emphasis on versatility and affordability. When selecting the ideal printer, factors such as print speed, accuracy, material compatibility, and post-processing capabilities should be meticulously weighed. Real-life case studies serve as pathways of guidance, shedding light on successful printer integrations and emphasizing the criticality of aligning technology with the distinctive needs of each lab.

The dental industry boasts a cornucopia of 3D printing solutions tailored to cater to specific applications and production demands. From compact desktop stereo lithography (SLA) printers to robust industrial-grade digital light processing (DLP or LCD) systems, dental labs are spoilt for choice. When embarking on the quest for the perfect printer, considerations such as throughput, resolution, material compatibility, and user-friendliness come into play. Through the lens of case studies and real-life exemplars, the efficacy of different printing technologies in meeting the bespoke demands of dental applications becomes abundantly clear.

The selection of a 3D printer serves as a pivotal juncture, dictating the trajectory of a lab's digital transformation journey. While behemoth labs may gravitate towards printers boasting high throughput and automation prowess, their smaller counterparts may favor compact, versatile

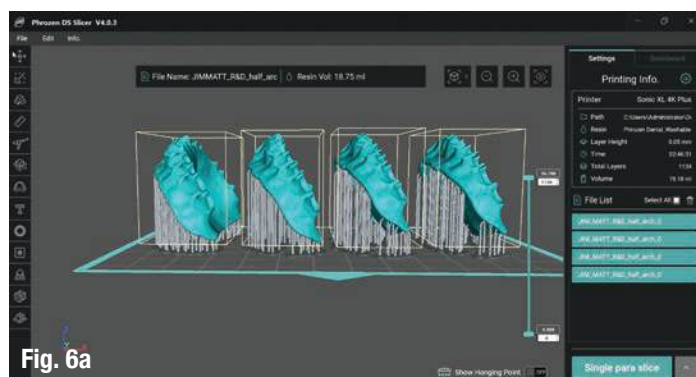


**Fig. 5a**

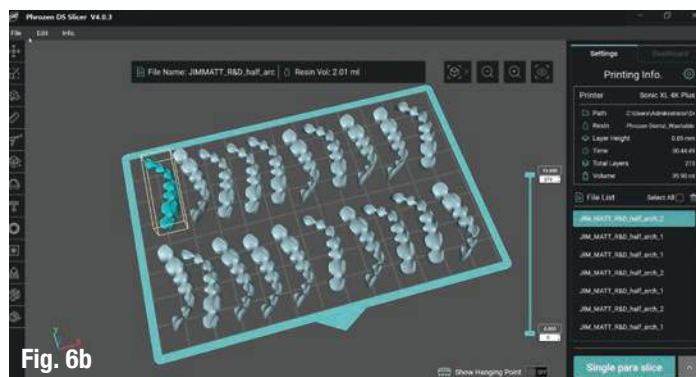


**Fig. 5b**

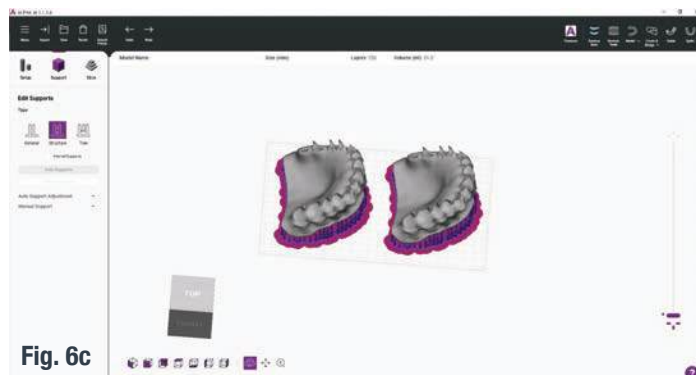
**FIGURES 5a - b:** Surgical Guide printed with Rodin Surgical Guide material. These guides are accurate, easy to adjust if needed and polish to a high shine for comfort in the patient's mouth while being used.



**Fig. 6a**



**Fig. 6b**



**Fig. 6c**

**FIGURES 6a - c:** The Phrozen and Ackuretta printers both have easy-to-use nesting and slicing software with auto support buttons. Ackuretta even has an AI feature that places the appliances at the optimal angle and placement of supports.





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**FIGURE 6:** Printed in Rodin Sculpture on the Phrozen Sonic XL 4K Plus

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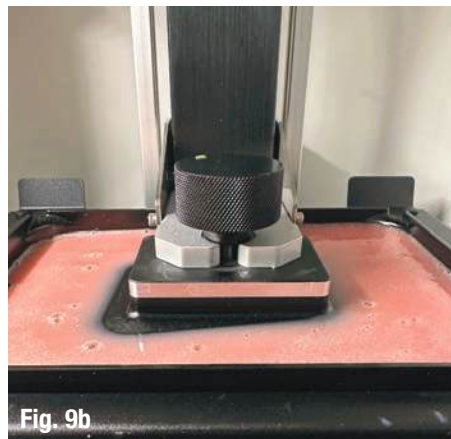
**FIGURE 7:** The Phrozen printer is fast and reliable, with a larger print platform for production, and a large material library. These 5 bases were printed with Rodin Denture Base +



**FIGURE 8:** The Ackuretta SOL is an excellent choice for a small or medium lab just starting. A clinical office such as a Denturist or Dentist can greatly benefit from the SOL. With its small footprint, this 3d printer is effortless to use. Anyone in the office can operate it. It also has a fabulous



**Fig. 9a**



**Fig. 9b**

**FIGURES 9a - b:** Ensuring proper leveling of your 3D printer is paramount for achieving high-quality prints. A misaligned printer, as depicted here, can result in subpar output. To verify alignment, a simple yet effective method involves filling the printer's clean vat halfway with water and reinserting it. Observing the water's level on both sides allows for quick assessment. Any deviation indicates the need for adjustment. This typically involves fine-tuning the printer's feet or strategically placing shims beneath it for optimal alignment. By maintaining precision in printer leveling, consistent and superior print results can be achieved. And yes, this has happened to me.

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- 240 Anterior Crowns (Manufacturing Cost: \$10 per Crown)
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#### How Many Restorations Per 1 kg Bottle?: \$399

- 50 Maxillary (Upper) Dentures (Manufacturing Cost: \$6 per Base)
- 56 Mandibular (Lower) Dentures (Manufacturing Cost: \$5.40 per Base)

systems. Additionally, factors such as material compatibility, print quality, maintenance requisites, and availability of technical support should be factored into the decision-making equation. By meticulously evaluating these facets, labs can ensure the seamless assimilation and optimal performance of their 3D printing workflows.

Despite the allure of digital workflows, labs often encounter stumbling blocks on their journey to transformation. Technical glitches, workflow disruptions, and the inertia of change pose formidable challenges that demand adept navigation. Strategies for surmounting these hurdles span the spectrum from investing in comprehensive staff training to establishing robust protocols and tapping

into technical support from equipment manufacturers. Real-world case studies serve as beacons of inspiration, illuminating pathways through which labs can navigate obstacles and emerge triumphant in their digital journey.

Achieving the zenith of print quality and speed hinges upon meticulous calibration of printer settings, tailored to suit the unique exigencies of different dental applications. Parameters such as layer height, exposure time, curing settings, and support structures wield a profound impact on print quality and accuracy. By discerning the specific requirements of each application, labs can fine-tune printer settings to orchestrate symphonies of perfection. Tips and tricks abound for enhancing print quality and expediting





**FIGURE 10:** The Ackuretta SOL has a Clean Vat Function that works extremely well



**FIGURE 11:** All materials should be siphoned through a funnel with a screen mesh to separate cured resin and debris. These are sold on Amazon for about 12 Dollars US.



**FIGURE 12:** Clean the resin Vat with an Alcohol wipe after whipping out excess resin with a lint-free absorbent disposable towel.

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**FIGURE 13:** Blow dry the resin Vat with a rechargeable Blower-Vacuum. Also purchased from Amazon for about 24 dollars US.



**FIGURE 14: Print Quality**

If the print quality is poor, check the tank for pieces of material or tears in the film which can be very costly if you don't change them yourself. Downtime in a lab or clinical setting is very costly as well. Adjusting the print speed and temperature can also improve the output.



Fig. 15a



Fig. 15b



Fig. 15c

**FIGURES 15a-c: Carbon printers** deliver high-quality, high-volume output, making them ideal for production-intensive laboratory environments. While they might be more than what a typical dental office needs, these advanced machines demand dedicated technician oversight. It's crucial to have multiple technicians trained in their operation. Additionally, these printers are usually leased rather than owned, with a maintenance agreement in place to ensure optimal performance.



**FIGURE 16:** The Carbon printer is an exceptional choice for large laboratories, offering the ability to stack models for increased efficiency. This feature, also available on other printers, makes it a versatile option for scaling production.

print times, ranging from strategic support placement to the astute utilization of resin-specific settings furnished by manufacturers.

In the tapestry of 3D printing, software serves as the unsung hero, orchestrating the harmonious convergence of hardware and digital design. CAD/CAM software empowers labs to sculpt and customize dental prosthetics with surgical precision and unfettered efficiency. Moreover, slicing software facilitates the generation of optimized tool paths, curtailing print times and material wastage. By harnessing the full gamut of advanced software capabilities, labs can orchestrate seamless symphonies of 3D printing prowess, from the inception of design to the finish of post-processing.

The synergy fostered through collaboration between dental labs heralds a realm of boundless possibilities, unlocking avenues for expanded services and mutual



**FIGURE 17:** Night guards offer significant profitability, by efficiently producing a large volume of high-quality prints in a single run on the Carbon 3d printer



**FIGURE 18:** Surgical guides are essential for precise implant placement, whether it's a single crown or an all-on-X procedure. The Carbon printer streamlines the process by handling multiple prints at once, allowing technicians to focus on other critical tasks and save valuable hands-on time.

growth. By pooling resources, sharing expertise, and embarking on collaborative ventures, labs can furnish comprehensive solutions to both dentists and patients alike. Additionally, labs can explore symbiotic partnerships with dentists equipped with 3D printing capabilities, extending design services and expertise to augment their practices. Collaboration, as an agent of innovation and knowledge exchange, enables labs to transcend boundaries and remain at the forefront of digital dentistry.

Dentists endowed with 3D printing capabilities stand to reap bountiful rewards through strategic partnerships

with dental labs. By outsourcing design services to seasoned labs, dentists can tap into specialized expertise, ensuring the production of premium-quality prosthetics. Labs, in turn, can extend a helping hand, offering design consultations, digital impression analysis, and personalized treatment planning to fortify dentists in delivering superlative patient care. This symbiotic liaison empowers dentists to leverage advanced digital technologies, broadening the horizons of services available to their patients.

The landscape of digital dentistry continues to change, heralding a deluge of emerging technologies. ■



## About the author

### Jim Collis, CDT



Jim Collis has been a CDT and actively practicing laboratory technician for over forty years. He possesses a degree in Dental Technology from Triton College. He Retired from his laboratory, Collis Prosthodontic Laboratory in 2016, He specialized in high quality, removable prosthodontic appliances. The lab served a select clientele of dental offices in the north and west suburbs of Chicago.

Jim has also previously served as an instructor in the Junior/Senior laboratory of Northwestern University Dental School for ten years. In that capacity, he presented numerous courses to the dental school students on prosthetics including advanced esthetics pertaining to removable prosthodontics, fixed work, and advanced attachment and implant techniques. He now works for Solvay Dental 360.

Jim has been very active on the lecture circuit over the past sixteen years. He has presented lectures and hands-on clinics, accredited for Continuing Education hours, at various venues throughout the United States, Canada, Germany the UK and Ukraine. Jim is also a visiting instructor at the Harvard Dental School of Medicine. He is a consultant and lecturer for several companies in the industry. Since 2013, he has served as Master of Ceremonies, featured lecturer and moderator of panel discussion for the Spectrum Day Removable Symposium in Chicago. He is an Advisory Board Member for Spectrum Dialogue and has written numerous articles on a wide variety of topics that have been published in Spectrum, as well as articles that have appeared in other industry publications. Jim also won the Educator of the Year award in our industry in 2017.



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### Questions for:

Completing dentures with a two-phase silicone wall made of Polisil from Briegel Dental

#### Wax to Wow: Converting wax setup into plastic

Roman Wolf, Theresa Rupp

1. **What is the primary purpose of using Polisil in denture production?**
  - a. To replace the wax model with a digital design
  - b. To maintain the detailed surface of teeth and gingiva during conversion to plastic
  - c. To create a one-phase silicone wall for aesthetics
  - d. To eliminate the need for kneading silicone
2. **Which material is recommended for completing the prosthesis after using Polisil?**
  - a. Composite resin
  - b. Acrylx Xthetic Prime
  - c. Gold alloy
  - d. Polycarbonate
3. **What is a significant advantage of using Polisil in the denture pressing process?**
  - a. Eliminates the need for wax-ups
  - b. Enhances plaque retention for better bonding
  - c. Reduces rework and polishing effort
  - d. Increases the shrinkage of the prosthetic material
4. **Polisil is designed to bond firmly with kneading silicone, creating a stable two-phase silicone wall.**
  - a. True
  - b. False
5. **The use of Polisil eliminates the need for model analysis and careful wax-ups.**
  - a. True
  - b. False
6. **What feature of Acrylx Xthetic Prime makes it ideal for dentures?**
  - a. High shrinkage for better fit
  - b. Improved mucous membrane tolerance due to reduced monomer content
  - c. Soft texture for easy handling
  - d. Excessive plastic film for enhanced aesthetics
7. **What is the primary benefit of the "wax-to-wow" effect created with Polisil?**
  - a. Eliminates the need for traditional wax-ups
  - b. Ensures precise transfer of wax model details to plastic
  - c. Provides a glossy finish without polishing
  - d. Creates an instant digital rendering of the denture
8. **During the creation of the two-phase silicone wall, why is the dental arch coated with Polisil?**
  - a. To prevent wax from hardening too quickly
  - b. To protect the morphology of teeth and gingiva during processing
  - c. To enhance the digital scanning process
  - d. To bond the teeth with superglue
9. **Acrylx Xthetic Prime has minimal shrinkage, which enhances the precision of the fit in denture production.**
  - a. True
  - b. False
10. **The polishing protocol described in the article relies exclusively on digital tools.**
  - a. True
  - b. False

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### Questions for:

#### Unveiling the Transformative Power of 3D Printing in Dentistry

Jim Collis, CDT

1. **What is one key advantage of 3D printing in dentistry?**
  - a. Increased reliance on manual labor
  - b. Enhanced precision and customization
  - c. Reduced use of CAD/CAM technology
  - d. Limited material compatibility
2. **Which of the following dental devices can be fabricated using 3D printing?**
  - a. Crowns and bridges
  - b. Surgical guides
  - c. Dentures and partials
  - d. All of the above
3. **What is a major consideration when selecting a 3D printer for a dental lab?**
  - a. Number of available colors
  - b. Print speed and material compatibility
  - c. Size of the printer
  - d. Ability to print non-dental items
4. **3D printing eliminates the need for CAD/CAM technology in dental workflows.**
  - a. True
  - b. False
5. **Smaller dental labs should prioritize high throughput printers over affordability.**
  - a. True
  - b. False
6. **How do smaller dental labs typically approach 3D printing compared to larger labs?**
  - a. By prioritizing high throughput over affordability
  - b. By focusing on versatile and cost-effective systems
  - c. By avoiding digital workflows altogether
  - d. By only producing surgical guides
7. **What role does slicing software play in the 3D printing process?**
  - a. Reduces the need for CAD/CAM technology
  - b. Optimizes tool paths and minimizes material waste
  - c. Directly prints prosthetics without additional hardware
  - d. Automates post-processing tasks
8. **How can labs overcome challenges associated with 3D printing workflows?**
  - a. By avoiding staff training
  - b. By investing in comprehensive training and robust protocols
  - c. By limiting the use of technical support
  - d. By reducing printer maintenance
9. **The accuracy of 3D-printed prosthetics depends on proper calibration of printer settings.**
  - a. True
  - b. False
10. **Collaboration between dental labs and dentists can expand services and improve patient care.**
  - a. True
  - b. False

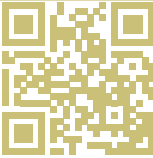
Once you have completed the questionnaire, fill out the information below. You can photocopy this form. Then simply complete the form and submit to Spectrum Denturism by mail to 35-145 Royal Crest Court, Markham, ON L3R 9Z4 or by fax to 905-489-1971. It's that easy!

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# Q&A About Denture Base 2.0

**A**s a general question, how long does a unpolished and unprotected printed pink resin for denture base remain impervious to water absorption and discolouration in the mouth? Would you know how polishing the surface by hand (with pumice & polishing compounds) extends the integrity of the denture?

Are your denture printing resins nano filled? How do the Pac-dent Rodin denture resins compare performance wise with say Rodin Titan or Rodin Sculpture? So many questions, but the more you learn about the products, the better placed you are to provide better results!

## 1. How long does an unpolished and unprotected printed pink resin for denture base remain impervious to water absorption and discolouration in the mouth?

a. It is difficult to predict clinically how color stable a denture material will be due to all the different conditions it is exposed to. However, we have conducted lab-based tests subjecting materials to water, dye, and denture cleansers. This roughly estimated use for 1 year. There was no clinically significant color change (change in color less than Delta E of 3) after treatment.

b. Rodin denture materials meet ISO standards for water absorption.

## 2. Does polishing the surface by hand (with pumice & polishing compounds) extends the integrity of the denture?

a. a. We are strong advocates of polishing all restorative materials and prosthetic devices. Polishing creates a smooth surface that helps prevent plaque accumulation, discoloration, improves wear resistance, and strength. With respect to polymer-based materials, polishing helps remove any layers that might not be completely cured due to oxygen inhibition.



## 3. Are Rodin denture printing resins nano filled? How do the Pacdent Rodin denture resins compare performance wise with say Rodin Titan or Rodin Sculpture?

a. Our lab has tested a number of printed, machined, and conventional denture resins. With respect to overall mechanical properties Rodin materials are higher than other printed and machined materials including Lucitone Digital Print. We do not compare these materials to those for printed permanent restorations as they require different design features. Denture materials are designed more for impact resistance with increased flexibility while permanent materials need to be stiffer particularly if being bonded to natural tooth structure. ■

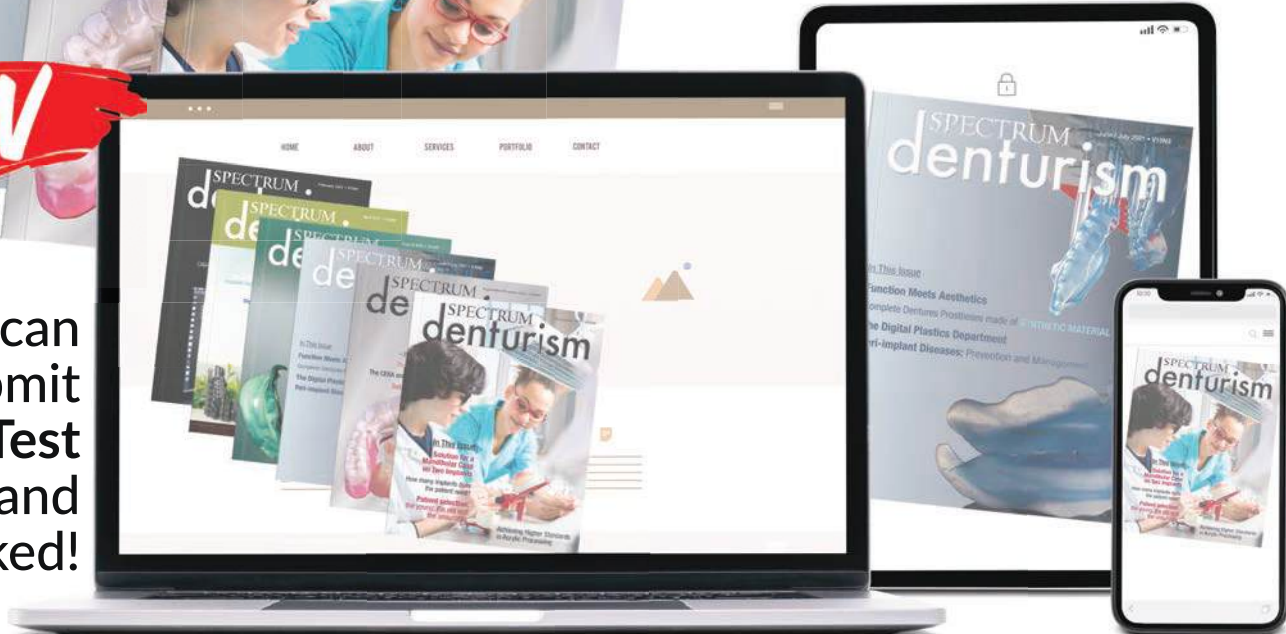




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# Announcements & Products

## Spectrum Day Across Canada

Palmeri Media Group is pleased to announce the dates for the 2025 Spectrum Day schedule across Canada;

**Calgary: June 14th | Vancouver: October 4th**

**Montreal: October 25th | Toronto: November 7th**

All events will now be techno-clinical in nature, inviting Dentists, Dental Technicians, Denturists, and Hygienists to participate.

## Unique Dental Supply Inc. Introduce the Shining 3D Intraoral Scanners and the AccuFab-CEL - Dental 3D Printer



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- High Accuracy
- Powerful AI Process
- Intuitive Communication

### Aoralscan 3 Wireless

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- Wireless
- Fast and Stable
- Long-lasting Battery
- Next-level Software Functions

### Aoralscan Elite

- Photogrammetry
- Two-in-one system
- High precision
- High efficiency
- Smooth eventual scanning

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- Multi-Size Ceramic Platform - Ceramic Plates 1 Large, 1 Small
- Build-In Design Software
- Professional Slicing Software
- One-Click Lock
- Light Board Uniformity with High Accuracy
- Real-Time Cabin Environment Detection and Heating
- Enhanced Z Axis Movement System
- Six Core CPU Mainboard With 5G Hz Connection
- Advanced Printer Software

For more information on those products please contact Unique Dental Supply Inc. at Ontario Tel: 1.888.532.0554; Quebec Office: 1.514.999.8497, visit us on the web: [www.udscanada.com](http://www.udscanada.com) or email us at [orders@udscanada.com](mailto:orders@udscanada.com)

## Swiss NF KeySplint Soft

Asiga's number one Canadian distributor is proud to announce the addition of KeyPrint products to its vastly growing line of 3D resins for digital dentistry. With Canada's largest selection of open source resins and best price guarantee, you can feel confident ordering all your materials under one roof.

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