One for All - Efficient Modeling Made Easy

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Technology moves forward quick, especially in the area of implant prosthetics and CAD/CAM produced understructures of any kind. However, even though the CAD/CAM goal is mainly to create a case from beginning to end by computer and automated milling machine, still the manual modeling techniques, where a built-up frame is scanned and then milled, are still the majority. This work flow – modeling, scanning, milling – is in general a newer approach, but the available materials such as all the different modeling waxes or powder liquid resins commonly used did not keep up with this new technology. It requires skill and experience to produce perfectly fitting frames with these materials, frames that are precise enough to fulfil the requirements for implant cases and avoid expensive remakes in the CAM process. To overcome these limitations and make efficient modeling easy for all sorts of cases and for high skilled as well as lesser experienced technicians, a new, universal modeling composite was developed – primopattern.

Primopattern is a light cured, ready to use one-component-material that is available either as modeling gel or modeling paste (Fig. 1). As a universal composite modeling resin, primopattern is designed for a large variety of uses in dental technology. It works excellent in the different areas of implantology, all ceramics (copy milling, CAD/CAM), bite transfer and bite checking, fixed and removable restorations as well as all sorts of fixings and blockings. As modeling gel, primopattern is applied directly from the syringe, as modeling paste the material offers clay like consistency and can easily be formed, applied or adjusted. Primopattern cures in most conventional light curing units and burns out cleanly and completely even if thick layers had been built up.

In detail, primopattern LC is used in the following areas of dental technology:

1- **in implantology for build-ups for casting or scanning of:**
- implant abutments
- implant bars
- implant superstructures
- tertiary constructions over Galvano mesiostructures

2- **as well as the production of:**
- transfer-or insertion guides
- implant jigs, verification indexes, etc.

3- **plus any connecting or fixing of single implant parts or segments.**

Since it is developed as a universal material it can as well be used for any kind of fixed or combined restorations, bite transfer and bite checking guides. It also works great for retaining single parts or parts that need to be separated for welding or soldering, for fixing of attachments or in general for retaining or fixing of single parts or segments.

Case descriptions

The first case to be described, shows the work flow for an implant-borne bridge restoration in the lower right quadrant and a custom implant abutment on the lower left side (Fig. 2). Once the temporary acrylic abutments are screwed to the implant model analogs the modeling process for the single implant abutment starts with primopattern LC gel (Fig. 3) directly from the syringe. When the syringe is used with a lightly vibrating motion, the material becomes more flowable, when the vibrating motion is stopped, the Gel will stay in place. Due to this so called thixotropic behaviour, it is very easy and convenient to apply primopattern gel to the spot (Fig. 4).Once the custom implant abutment is built up and light cured it can be trimmed with carbide burs or rubber polishers (Fig. 5). Since primopattern is a universal modeling composite, from here on it could still be decided whether the abutment is sprued and cast, as the material burns out cleanly and completely, and can be copy milled (ZirkonZahn, AmannGirrbach, etc.) or scanned. In this case it was scanned with the Nobel Forte scanner and sent to Nobel Biocare (Procera) for milling a zirconium abutment (Fig. 6). The abutments for the implant-borne

Fig. 1: Primopattern – perfectly aligned viscosity of Gel and Paste for quick and precise application

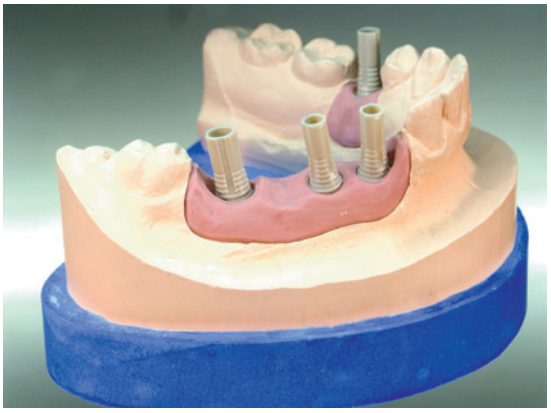

Fig. 2: A rather normal implant case – since the acrylic implant cylinders provide sufficient mechanical retention, a special bonder is not needed

Fig. 3: Primopattern Gel comes as a ready to use, one component material directly from the syringe

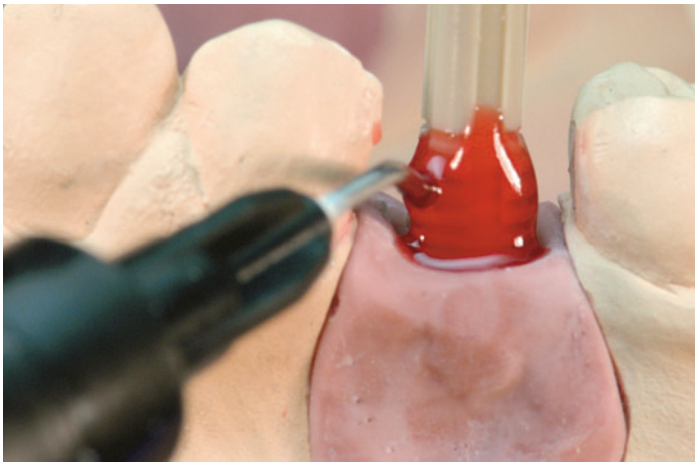

Fig. 4: Other than with a wax knife or PMMA brush acrylic techniques, primopattern Gel can be applied easily in one shot

bridge in the lower right quadrant are produced basically in the same way as the single abutment on the other side. Since the gel stays where it is placed (thixotropic), primopattern is also a very economical material (Fig. 7).

Even though it is desired to work most efficiently, there is no unnecessary rush as both Gel and Paste have a long enough working time (>20 minutes). For the pontic primopattern LC paste is used. The Paste is the material of choice when larger amounts of material need to be applied efficiently (i.e. bars, pontics, etc.). It has a soft putty like consistency, does not stick and can be easily shaped manually (Fig. 8).

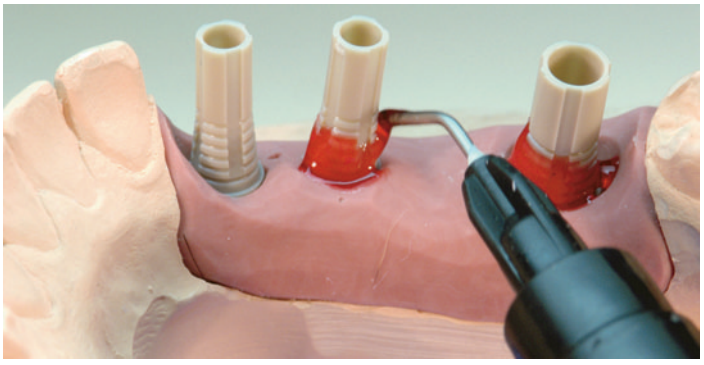

Fig. 7: It is no problem if any primopattern gel would flow over the implant shoulder into the Sulkus. The material will just not polymerise in these areas as no light can reach there during the polymerisation process.

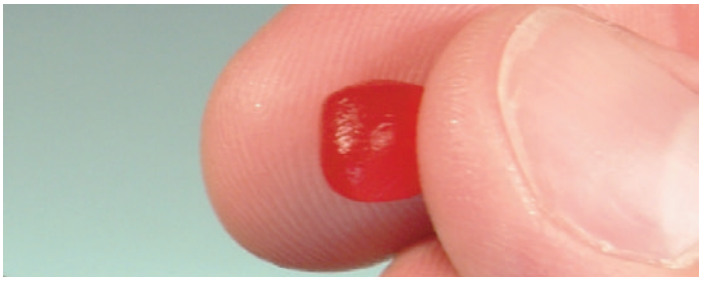

Fig. 8: Pontics, bars, etc. are built up with primopattern LC Paste. This is much faster.

Fig. 9: Any corrections before light curing are done with the gel

Fig. 5: After light curing all necessary trimming is done with carbide burs or rubber polishers

Fig. 6: The custom zirconium implant abutment back from Procera and ready for insertion

Fig. 10: No condition, but helpful: the Metalight units with integrated cooling system provide even, gentle and distortion free light curing

Fig. 11: The finished build-up. Now the case could even be tried in before the CAD/CAM processing

Fig. 12: The implant-borne custom bridge milled in zirconium at the Procera facility

Fig. 13: The perfect passive fit of the primopattern build-up guarantees a perfect fitting zirconium frame

After the pontic is placed between the abutments, the final touch-up is again done with the gel (Fig. 9= 09 DSC00411.JPG). Once the build-up has reached the desired shape, the bridge is light cured. Primopattern cures in most conventional light curing units that provide a light spectrum between 320 and 500nm. No matter if the light source is UV/UV-A, halogen or stroboscope. For best passive fit however, UV/UV-A lights such as the Metalight curing units (primotec/Westport/CT) are preferred. Especially the

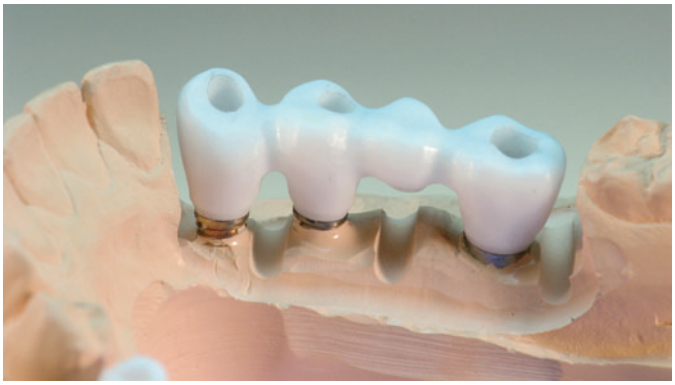

Fig. 14: Once the bridge is completed with porcelain and inserted, the screw channels will be closed with tooth colored composite

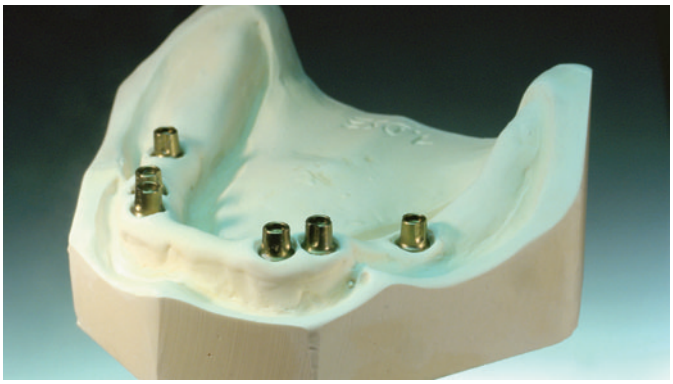

Fig. 15: Six Nobel Direct implants inserted in perfect position with the Nobel Guide system

Fig. 16: Due to its thixotropic behaviour, the Gel can be applied directly to the spot and will not slump.

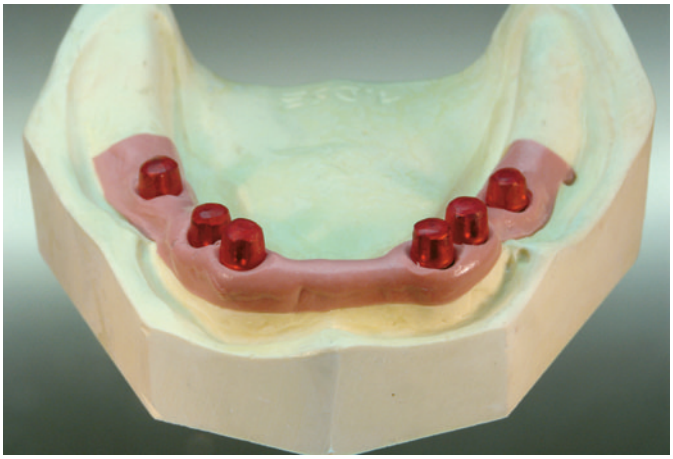

Fig. 17: All six copings with perfect margins and wall thickness. Now the bar segments need to be placed

Metalight units provide most gentle polymerisation due to their innovative cooling system (Fig. 10= 10 DSC_9110.jpg). During the light curing process primopattern remains polymerisation neutral and absolutely dimensionally stable with great fitting properties. It is really pleasing how well primopattern cases fit after light curing. There is no need at all i.e. to separate the bridge and reconnect it or make any relief cuts, like it can often be seen when powder/liquid resins are used. The necessary trimming is done with carbide burs and/or rubber polishers, then the case is ready for scanning (Fig.11). Just like with the custom implant abutment, after scanning, the implant-borne bridge data files were sent to Nobel Biocare (Procera), a zirconium bridge was milled and sent back to the lab shortly after (Fig.12, 13 and 14).

The second case to be introduced is an implant bar on six Nobel Direct implants (Fig. 15). First, the copings over the abutments will be built up one by one and then light cured all together since the curing time is only five minutes or less depending on the curing unit. It is very helpful that the primopattern gel, unlike wax, does not pull away from the margins. Due to its adjusted translucency, it is also easy to control the applied thickness (Fig. 16).

It is convenient that the copings can be finished individually and checked for marginal integrity as well as wall thickness with a caliper. Since primopattern cures towards the light and does not shrink onto the abutment, the passive fit is just perfect (Fig. 17). There is no gripping to the abutment as commonly known when working with powder/liquid resins.

The bar segments between the copings are built up with primopattern paste (Fig. 18). After an equivalent amount of paste has been taken out of the container, the bar is pre-shaped by hand (Fig. 19) and placed between the copings (Fig. 20).

Fig. 18: The primopattern LC Paste can be easily retained from its packing with a spatula or wax knife.

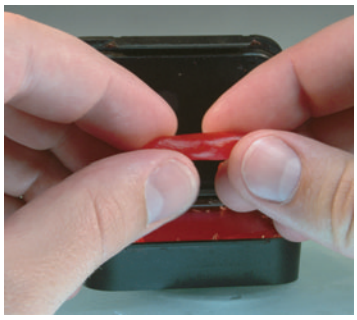

Fig. 19: Processing and shaping are most efficiently done by hand as the paste consistency is similar to soft putty and not sticky.

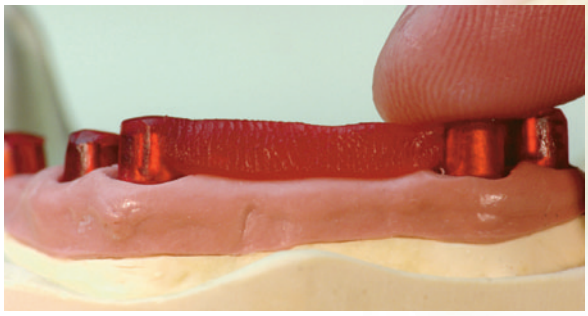

Fig. 20: The bar segment is connected to the interproximal surfaces of the two "canine" copings and brought to final shape manually.

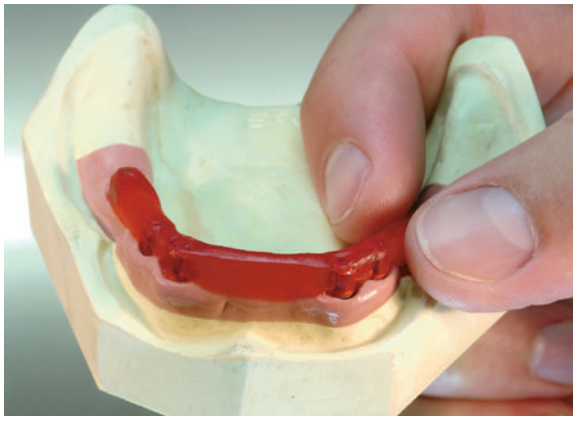

Fig. 21: Primopattern modeling paste works not only great for bar segments, but also for transfer or insertion guides, implant jigs, verification indexes, etc.

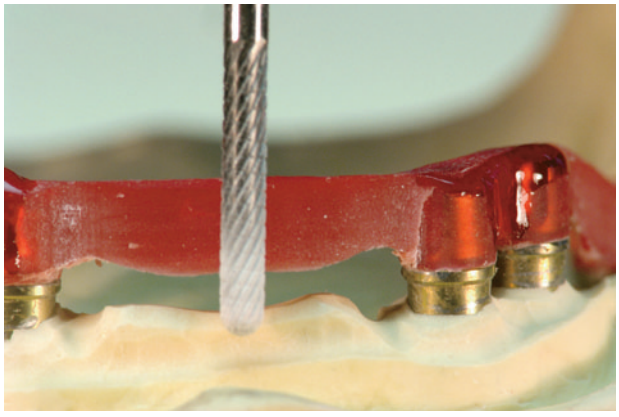

Fig. 22: No clinically relevant shrinkage. Even though light cured in one piece, the implant bar modellation shows a perfect passive fit after light curing

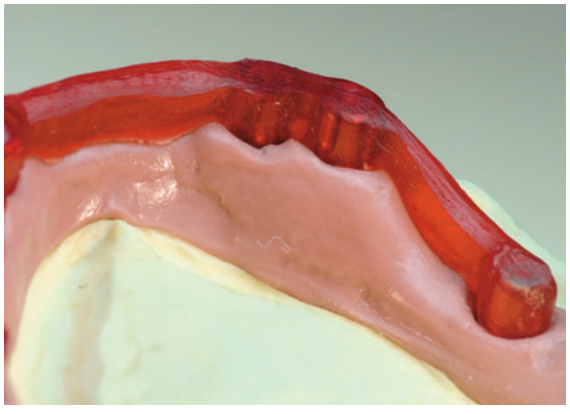

Fig. 23: No matter if the case is now sprued and cast, copy milled or scanned for CAM, …

Fig. 24: … the final result will be a perfectly fitting implant bar.

In general, it is sufficient to just connect the bar on either side to the interproximal surface of the coping, a special bonder is not necessary (fig.21). Since primopattern has no clinically relevant shrinkage, even such extended cases will show perfect passive fit without any distortion after curing. They can be lifted off easily and stress free, and provide a high surface hardness and great strength. Consequently, after polymerisation only very little trimming and shaping needs still to be done (fig.22). Once this is taken care of, the bar could either be sprued and cast, scanned or copy milled (fig.23).

If the bar should be cast, it must be noted that

depending on the investment material used, for best casting results it might be necessary to cover the outer surfaces of the bar with a thin layer of wax. For scanning, in general a scanning spray is not needed, for copy milling the primopattern bar provides a much more than sufficient strength (Fig. 24).

So whichever way the case proceeds, primopattern as a one-for-all material makes efficient modeling much easier than using wax or cold cure powder/liquid acrylics.

For more information on the technique or product application call the author under 866-643-3129 or check www.primogroup.net.

About the authors

***Joachim Mosch, CDT**, born in 1959, studied dental engineering and technology and is well experienced in international business. He has been managing the European headquarters of an American dental company for 18 years before he started his own businesses (primotec /primodent) in the year 2000. Mr. Mosch has published various articles on different dental subjects such as Light Cured Wax (the Metacon System), functional bite splint therapy using light cured splint materials (primosplint), welding techniques with pulsed micro arc welding (phaser), laser welding, esthetic dentistry with veneers, a.s.o. He lectures and teaches on these subjects throughout the world. Mr. Mosch is married, has two children and lives with his family close to Frankfurt in Bad Homburg/Germany.*

***Andreas Hoffmann, MDT,** born in 1956 achieved his German Master Dental Technician degree in 1985. As of then he was managing director and shareholder of a German dental laboratory group. He sold his shares and started his new laboratory 1. DSZ in the year 2000. At the same time he was appointed director of the "Akademie Umfassende Zahntechnik", a highly respected post graduate education program by one of the major German laboratory associations (VUZ) where he is also a member of the board of directors. 2004 he was appointed associate professor for joining techniques (phaser/laser) at the University of Osnabrück/Germany. Since 2006 he also teaches for the Donau-University Krems at the Master of Science Dental Technology curriculum. He received the Straumann prize in 1998 and is know in Germany and Europe for his outstanding publications, lectures and courses on Metacon (light cured wax), phaser and laser welding techniques, Procera, NobelGuide, Cerec, Cercon and Galvano. Mr. Hoffmann is married, has two children and lives with his family in Bilshausen, Germany.*