



The light-curing alternative (Part 2)

Oliver Handwerk, CDT



Especially in Orthodontics, finding materials for patients sensitive to methyl methacrylate can be challenging. The complicated fabrication of delicate appliances with wire and screw elements makes thermoforming and thermoplastic procedures very costly; quite a few appliances can't even be fabricated with these procedures.

With Orthocryl LC (LightCuring) fabricating complicated appliances such as the function regulator becomes easy and convenient. Dental technician Oliver Handwerk writes about his experiences with this new material.

- Keywords: light-curing acrylic, free of MMA, orthodontic techniques, Orthocryl LC

Dentaurum in Ispringen, Germany, has developed a completely new acrylic based on the well-known Orthocryl acrylic: Orthocryl LC (LightCuring). The aim was to provide an acrylic that can be used for all types of orthodontic appliances without any restrictions.

The use of light-curing acrylics in prosthetics is not that new; however, essentially tray material or veneering acrylics made of light-curing acrylics have been available so far. Viscoplastic rods for bite splints (e.g. Primosplint from Primotec, Bad Homburg) have been available for some time. However, these viscous rods with a diameter of approx. one centimeter are not suitable for the fabrication of orthodontic devices. The advantage of light-curing acrylics is the higher polymerization degree. Only a lower monomer content remains in the polymerized product, which results in a much better biocompatibility and higher density of the material and thus also in a high

level of stability. Dentaurum presented the outcome of these developments in 2014: Orthocryl LC (LightCuring). The light-curing acrylic is available in six colors (red, blue yellow, pink, green, transparent) and delivered ready-to-use in opaque cartridges. The black cartridges contain only one component and are intended for storage and application (Fig. 23); i.e. it is no longer necessary to mix the material.

Orthocryl LC meets all the requirements that an orthodontic acrylic must fulfill:

- No restrictions regarding the application: active plates, orthodontic devices, but also splints etc. can be fabricated with
- Orthocryl LC
- Good reparability
- Easy Integration of complex elements such as screws, etc.
- Easy processing, quite similar to salt-and-peppering
- Available in different colors

- Good storability
- Suitable for people with allergies, since it does not contain allergenic substances such as MMA or BPO
- No restriction, since it is neither a dangerous substance nor a dangerous good
- No hazard to the technician's health from monomer vapors

The acrylic has an outstanding visual appearance: it is odorless, crystal clear and absolutely homogeneous. The colors are pleasant, but moderate to keep the dye proportion as low as possible and to ensure a uniform curing of all colors in the light-curing unit.

Application

The application is quite easy. As in the "salt-and-pepper" technique, wires, screws and other elements can be added to the model; special measures are not required (Fig. 24). Recommendation of the author: especially the screws and other oral



Fig. 23: The Orthocryl LC acrylics are available in six colors



Fig. 24: A separate preparation of the models is not necessary

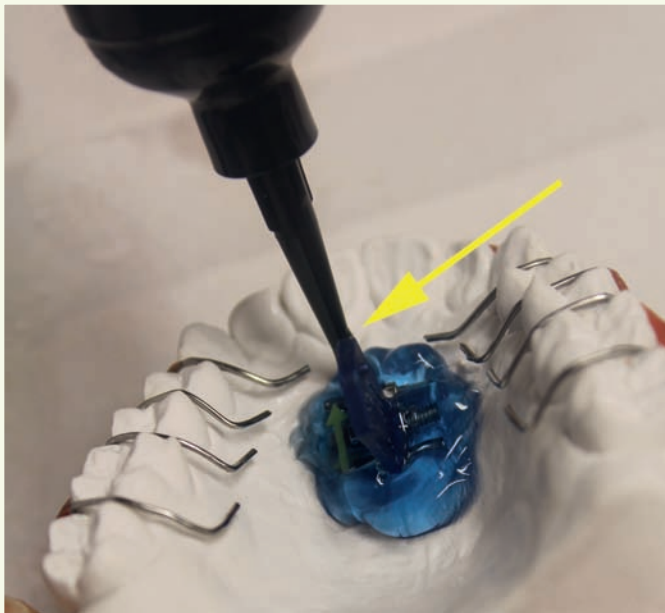
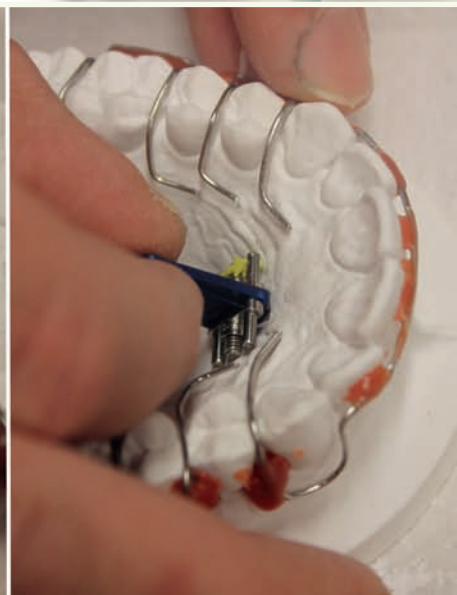
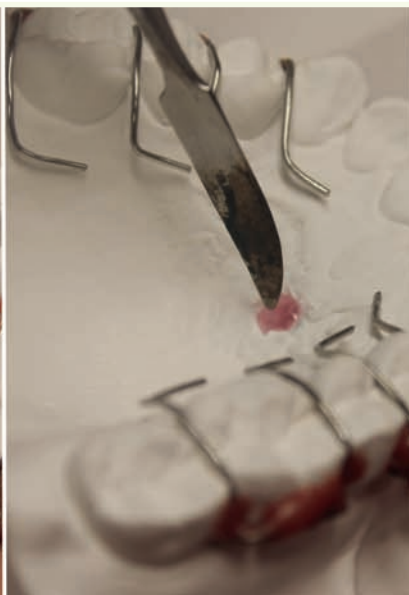


Fig. 25: When applying the material the screw can be slightly detached from the application tip.



Figs. 26a-c: Fixating the screw in a drilled hole



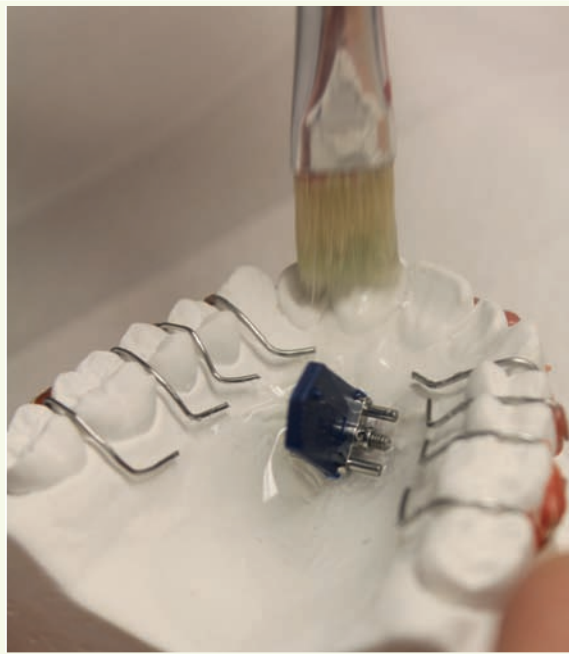


Fig. 27 Applying separating medium to the models, soaking is not necessary

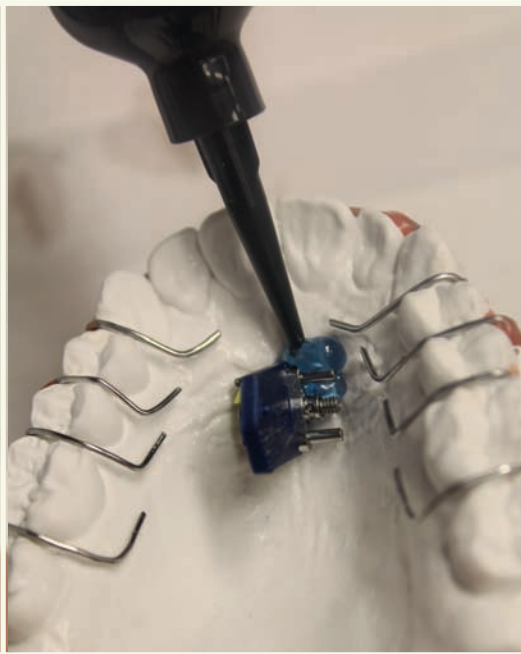


Fig. 28 The cartridge tip for the Orthocryl system



Fig. 29 First enclose the screw, ...

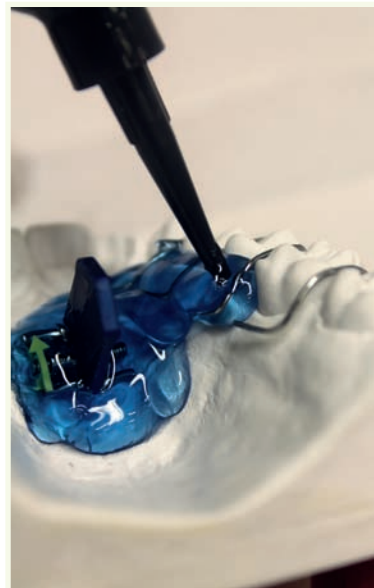


Fig. 30 ... then complete the base

elements should be firmly fixated, because the application tip may come into contact with the placeholder of the screw while applying the material (Fig. 25). The screws from Dentaureum are provided with an extension for the placeholder, which will be countersunk in the model (Fig. 26). It is NOT necessary to soak the model; just apply a separating medium for plaster or acrylic (e.g. separating

medium REF 162-800-00, Dentaureum) (Fig. 27). The acrylic is applied using a special dispensing gun (Fig. 28) and a small nozzle.

However, it does not have any mixing function but only facilitates the application on the model.

The thin strand coming from the cartridge flows easily on the model and

becomes a fairly homogeneous surface. Nevertheless, the stability is optimal; the acrylic does not flow to the deepest point but stays at the chosen spot. The thin tip makes it easier to enclose the screws and the springs without bubbles. This must be done first (Fig. 29). Only afterwards can the base be coated (Fig. 30).

The manufacturer recommends

extracting the screw from the wax for perfect enclosure, applying the acrylic and then reinserting the screw. However, it was not necessary to proceed this way in our laboratory, for the screws were easily enclosed by the acrylic. A bit unusual is the fact that a quite long “tool” is formed by combining the dispensing gun, the cartridge and the tip (Fig. 31). Exact guidance of the tip during application requires a bit of practice. Also unusual is the fact that the applied acrylic can hardly be preformed or reduced with instruments prior to curing, since it remains soft during the whole operation. The surface too, unlike with the “salt and pepper” technique, cannot be condensed through “smooth scattering” or tapping or shaking.

A plus: the acrylic is so clear that one can make a visual control of the layer thickness during the whole procedure. Potential air bubbles can be clearly identified and easily removed from the acrylic with an instrument (Fig. 32). The layer thickness should not be too thin, as the curing process produces a thin inhibition layer on the surface that has to be removed with a cleaning agent made of ethanol (Fig. 33). The curing process takes place in a commercial light-curing unit (Fig. 34) - it should have a performance of 4 x 150 Watt (600 W) and a wave length of 400 to 550 nm. The

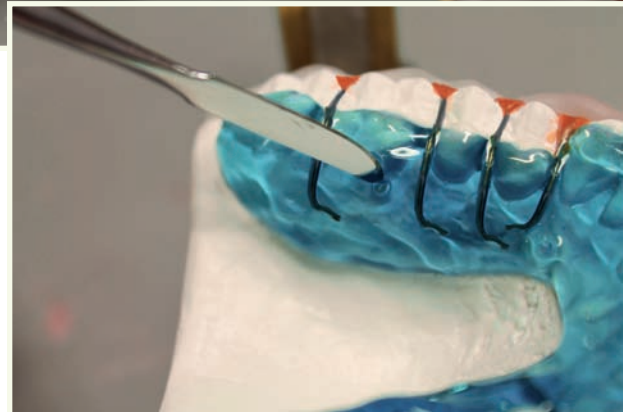


Fig. 31: Something one needs to get used to: the long way from the application tip to the hand

Fig. 32: Potential bubbles can be eliminated with the instrument

Live Demos. Par Excellence. See you at the Fairmont.



Joshua Polansky



Peter Pizzi



Nondas Vlachopoulos



Keyon Jack

Spectrum Day Chicago.

Featuring Harvest, MPF and HPdent premium brands.

Friday, February 27th at The Fairmont Hotel Chicago, Millennium Park





Fig. 33: A cleaning agent made of ethanol for removing the inhibition layer

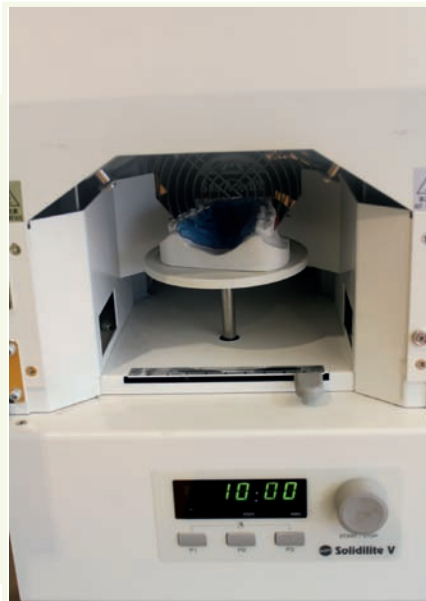


Fig. 34: Primary curing process takes 6 minutes



Fig. 35: The appliance can be easily removed

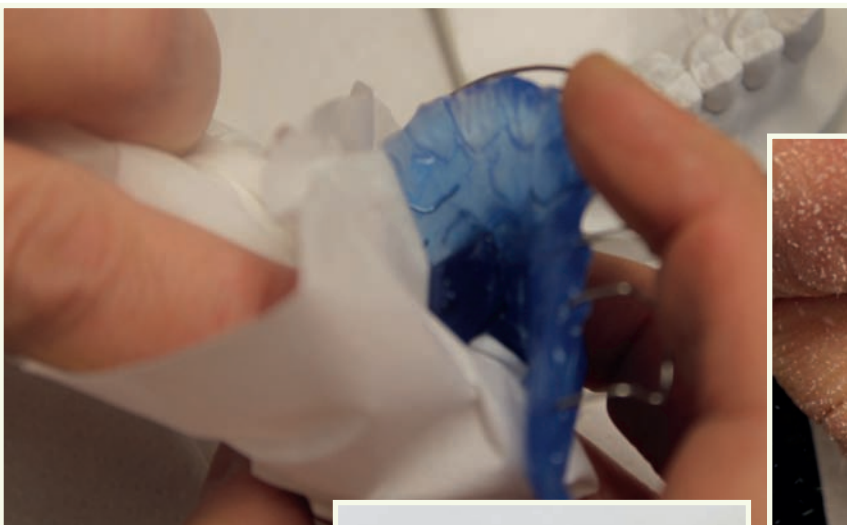


Fig. 36: Removing the inhibition layer



Fig. 37: For finishing, use hard metal burs or burs for soft acrylics

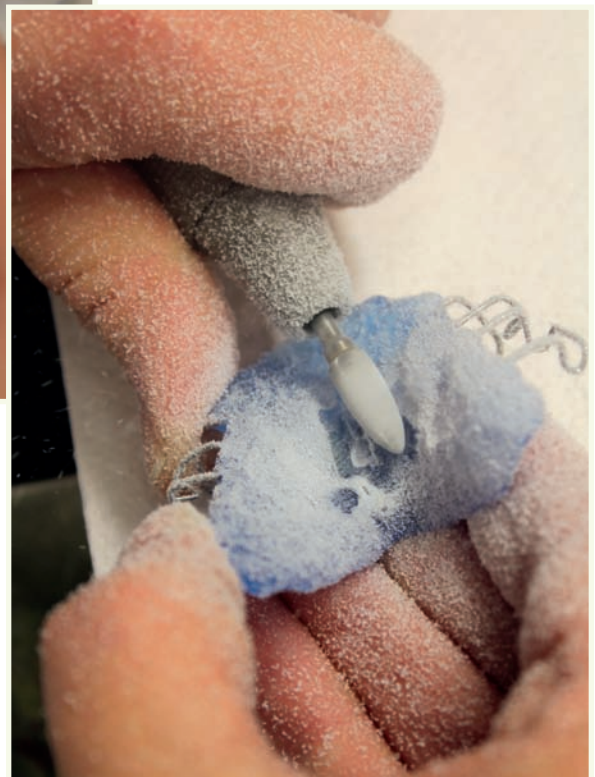


Fig. 38: Machining produces a fine-grained, soft dust



primary curing time is six minutes. After that the base can be easily removed (Fig. 35). The appliance is then polymerized for three minutes without model from the basal side.

Afterwards the oxygen inhibition layer that appeared in form of a dull, slightly sticky smear layer is removed. This is achieved by wiping it with an ethanol-impregnated fabric.

Finishing is performed as usual. The manufacturer recommends hard metal burs with transversal tothing or burs for soft acrylics. During the test period, we used hard metal burs with transversal tothing, which have led to equally good results. The acrylic produces a very fine-grained dust during finishing, which recalls the tray material (Fig. 38). Fine surface finishing is performed as usual with

sand paper or pumice powder. The result: a homogeneous plate base with a pleasant color (Fig. 39) and smooth surface. The model details are superbly reproduced on the bottom of the base; this is also reflected in the very good fit.

The use with functional orthodontic appliances - easy and problem-free with special bite paste. The fabrication of orthodontic devices with alternative acrylics is too laborious to work successfully with the existing thermoforming procedures. With Orthocryl LC however, the fabrication of a base is even easier than with the "salt and pepper" technique.

To facilitate the application in the interocclusal layer, the manufacturer

offers a special bite paste. This is significantly more viscous and stable than the standard material. As the paste is too viscous for the cartridge gun, it is supplied in a small opaque glass jar (Fig. 40). To fabricate an activator, the models are prepared as usual and plastered in a fixator. The wire elements are bent and waxed as usual (Fig. 41). There too, no soaking is necessary; separating is performed with alginate separating medium. At first, the standard material is applied on the two quadrants (Fig 42a and 42b). The application of the bite paste comes next. The best in this case is to use a small spatula. At first, the occlusal surfaces are thinly but entirely coated (Fig. 43). One should try to fill the occlusal surfaces as well as possible. The bite plane is then fitted (Fig. 44). It is recommended to

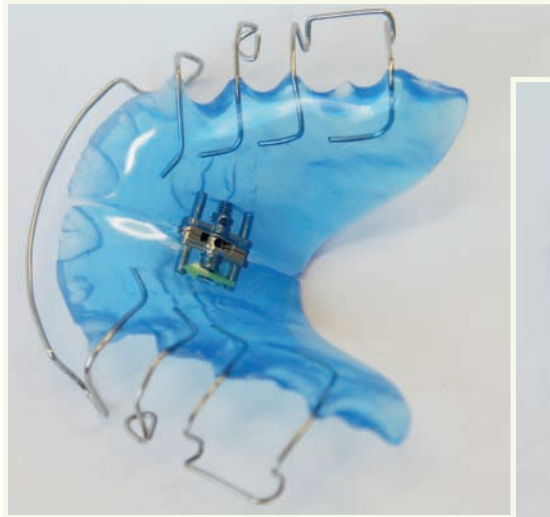


Fig. 39 Soft, homogeneous base ...

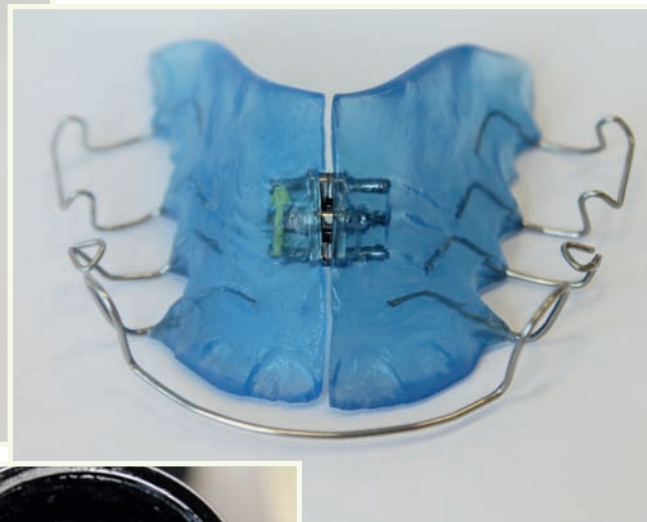


Fig. 40 ... that reproduces the details of the model base very well



Fig. 41:
The bite paste in
the opaque glass





Fig. 42: Prepared models on the fixator

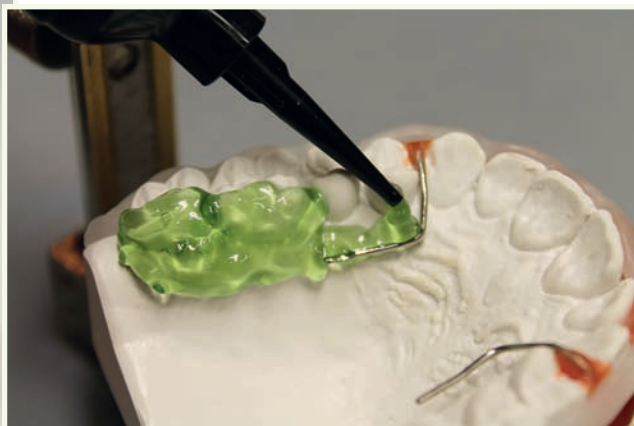


Fig. 43a: The bases in the upper and lower jaw...



Fig. 43 b:
...are first coated



Fig. 44a: Then the occlusal surfaces are coated with the bite paste



Fig. 44b: ...and the bite planes are formed.

apply a layer that is approx. 3 mm thicker than actually needed on the bite plate, so that when the fixator parts are joined together some pressure is created on the acrylic paste, making it possible to compress it bubble and gap-free.

During the curing process, first cure for approx. six minutes, as with plate appliances. When positioning in the curing unit, make sure that sufficient light comes through the oral area (Fig. 45). After completion of the first curing

process, the device is removed and cured for another six minutes without models (Fig. 46). Finishing is performed once the inhibition layer has been removed with the recommended abrasives. Polishing can be significantly facilitated if the





Use Our **Lists**

Palmeri Media Group

Today



Our lists are:

**CASL compliant and
are delivered directly to our readers and
online visitors.**

These are your clients and potential buyers.

The Spectrum Program gives you the analytical information in an easy to use spreadsheet so you can mine the data and you can research, prospect and target.

Reach thousands of top decision makers by using one or more of our targeted lists

- **English Speaking Canadian Dentists**
- **French Speaking Canadian Dentists (in Quebec)**
- **English Speaking Dental Lab Technicians**
- **French Speaking Dental Lab Technicians**
- **English Speaking Denturists**
- **French Speaking Denturists**

Simplify your digital marketing initiatives

Call Sheela today at 905-489-1970 Ext. 208





Fig. 45 The light waves must reach the base very well



Fig. 46: Important: post-exposure without models

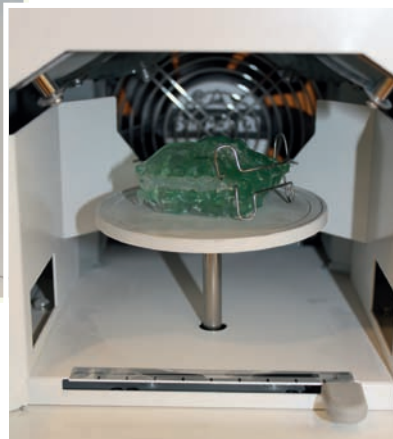


Fig. 47: Additional smoothing with silicone polisher facilitates polishing



Fig. 48: Polishing is performed with a pumice polishing paste on the handpiece

oral parts of the acrylic base are additionally smoothed with a silicone polisher (Dentaurum) (Fig. 47). In our laboratory, we use a pumice polishing paste (Art. 52000160, breident, Senden, Germany) to polish devices that cannot be finished optimally at the polishing lathe and a canvas buff for the handpiece (Fig. 48). After polishing (Fig. 49), one can clearly see how excellent the fit is despite the viscous texture of the paste (Fig 50). Due to the similarity with the “salt and pepper” technique, the fabrication of complex appliances

such as function regulators etc. is not much more elaborate with Orthocryl LC than with the “salt and pepper” or the doughing technique.

Summary

Orthocryl LC is an excellent alternative to conventional PMMA acrylics in orthodontics. There is no appliance that cannot be fabricated with Orthocryl LC because of the manufacturing method. Apart from fabricating all orthodontic devices, we also routinely produce

adjustable bite plates (Michigan, yellow plates, etc.) in our laboratory with Orthocryl LC.

Even the repair of appliances made out of Orthocryl LC has so far been unproblematic. The reparability is good. However, roughening a large surface around the fracture/repair point to ensure a good bond between the repair piece and the material has proven effective. We always use Orthocryl LC in our laboratory when there are known allergies to PMMA. Even patients who have tested




positive for PMMA can be treated with Orthocryl LC. Light-curing acrylics are certainly no general substitutes for the conventional “salt and pepper” technique, as material costs alone are higher than those of conventional cold-curing polymers. But also the application itself requires a bit more time. However, Orthocryl LC is a perfect substitute for sensitive patients and for those with allergies. It is perfect for orthodontic applications, since it does not considerably complicate the fabrication process but ensure reliable and predictable results. Orthocryl LC is free from methyl methacrylate, dibenzoyl peroxide and bisphenol. 



Fig. 49:
Homogeneous,
bubble-free
acrylic body
Impressive fit



Fig. 50:
Impressive fit



UDS Unique Dental Supply Inc.

Quality • Service • Innovation



Contact us to
receive your new
UDS Product
Catalogue

We Bring World Quality Products to Enhance your Business













Panadent
Articulating System

NEW



Unique Dental Supply Inc.
905.532.0554 1.888.532.0554
orders@udscanada.com www.udscanada.com