

Light Cure Waxes: A Cost & Time Effective Method In Dental Technology

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Abstract

To simplify the dental procedures, always a newer materials and techniques are introduced. Applications of such materials like Light Cure Waxes are one promising time and cost effective technology to meet our demands. Light cure wax offers completely new ways of waxing up metal structures with maximum passive fit and highest productivity. It had been recently introduced as a new approach towards fast, high-quality, cost-efficient combination dentures, clasp- retained dentures without duplication procedures, directly on the master cast and implant supported fixed and removable prosthesis. This article discussed the simplified method of fabricating different kind of fixed and removable prosthesis by using light cure wax system.

Keywords light curing wax, metacon, metawax, metaform, modelling wax

Introduction

Over last 50 years dentists and technicians are using “Taggart’s lost wax principles” to fabricate various Dental prosthesis.¹ Casting techniques that involve the burnout of the pattern traditionally use wax or acrylic resin for the development of the patterns.² Different type of waxes are always been among the most popular and useful dental material. They generally show relatively little contraction after they had been heated up. However, distortion may occur when lifting a complex bridge or implant case off the model. To overcome the distortion problem, modelling resin was introduced which provide the needed stability to avoid distortion and could be tried intraorally. But the major disadvantage of resins is its high polymerization shrinkage, to overcome the drawbacks of resins, a newer material that combines the advantage of waxes and resins had been developed and are known as Light Cure Waxes.³ These waxes have better stability and fit due to low polymerization shrinkage, ease of manipulation, reduced chair side time. The light cure waxes with same limitation have a good scope in dental laboratories.

Light Cure Wax System

These are similar to conventional waxes and can be melted with an electric wax knife, over Bunsen burner with an instrument. These waxes consist of long chain polyolefin acrylic, additive to reduce surface inhibition, stabilizers to guarantee sufficient long-term stability and catalyst for curing. These are available to their shade and degree of opacity. These waxes can be modeled into desire shape, as it becomes soft play – dough like consistency and will not start curing under normal lighting condition. A special light curing unit is required to turn into acrylic. The

set acrylic is highly stable and strong enough to grind it with rotary instruments. Even the passive fit of wax pattern of prosthesis can be tried intraorally before casting. This new concept of converting a light cure wax into acrylic is a part of Metacon System. Which include “standard” modeling wax “metaform” for prefabricated component like bars & clasps, stipple sheets and “metawax” for crown & bridges, partial casting, Implants and combination cases. This system have QX1 light curing unit, which supplies the exact UV light wavelength.⁴ It has a cooling system that insure temperature not to exceed 10° F that prevents distortion or melting of wax during curing. The time of curing varies according to the thickness of the patterns made. Since, material is used as a light cured it is necessary to close the boxes of waxes after they are taken out, if not polymerization will start. It can be used in two ways: Hot application by electric wax knife or spatula and Cold application by dough method. Waxes already light cured or not cured cannot be bond together.⁵ To connect already light cured waxes, a metabond or cynoacrylate glue is used.

Advantages

- Eliminates refractory models
- No need for duplicating materials
- Handles like wax before it is cured & after it is cured, it handles like acrylic⁶
- No shrinkage or distortion after curing
- Material is strong yet flexible, can be trimmed before investing
- can be trimmed before investing
- No residue after burns out
- Time & Cost effective

Indications It may be used for making patterns in various prosthesis.

- Fixed partial dentures
- Modellations for Pressable ceramics
- Partial dentures with clasps

- Combination cases with attachments
- Complete denture with metallic palate
- Implants Bars and Bridges

Procedure For Different Kinds Of Prosthesis

Fixed Partial Dentures

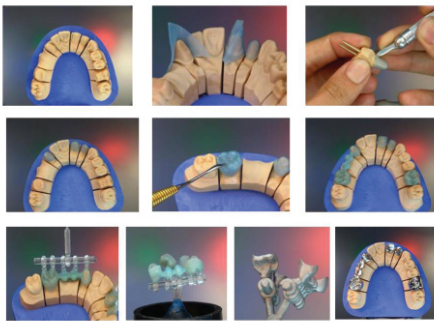
For ceramics or acrylic veneered bridges, the stone master model is prepared conventionally. Die spacer application is done as we do in conventional wax. It is advice to use white ,grey or blue color die spacer, as during curing UV light is used⁵. These doesn’t have any effect on light curing process. Metacon system have two different types of die separators which avoid sticking of wax to model.

1. Metaseal-it’s a liquid material that penetrates the pores of dental stone and seal it .Application should be two layered and second application is done 2-3min after first layer application.
2. Metatouch-it’s a pink color separator with soft paste like consistency. These are used basically on finger and instruments and on all surfaces that are dense and do not allow penetration of a liquid.

For manipulation of metacon wax coping, pontics can be waxed up using material in its cold stage (play-Doh like consistency) by the use of finger & appropriate instrument so as to give desired shape onto die. Other method involve use of strips, triangles of preformed sheets patterns which we wrapped around die, dipping the die in warm liquid wax or waxing up with electric wax knife or regular wax up instrument over Bunsen burner. Coping should be light cure for 10mins in a special metalight curing unit. Remove the coping from dies and finish them with carbide burs or silicon polishers as desire thickness and shape. For making of pontics we use self-made silicon matrix .we can make desire uncured pontics by



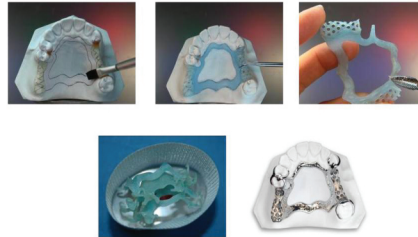
pushing metacon wax in moulds manually or with an instrument or we pour the heated liquid state of metacon wax in moulds. So as to achieve needed connection between pontics and coping we use metabond (this liquid metabond is a light cured connecting adhesive, with same basic chemical composition as metacon wax, but with different consistency). We position & connect the desired pontics and light cured complete bridge on more time 5-10min. Even curing of wax is indicated by color change from blue to light blue. We can lift the bridge off the model without any worries about distortion. Final cured wax appears to be acrylic, so can be easily grind than metal and ceramics, we can do desired surface trimming and finishing before casting. Its stability has virtually eliminated the need to weld or solder bridges. This not only saves our time and cost but also increase better fit, more castings per unit of time. After castings no rocking action seen in framework, because the polymerized material is impervious to temperature changes and cannot bend irreversibly during lifting from cast. (Fig 1)



Removable Partial Dentures

For preparation of model light color dental stone should be as it supports the light curing process much better than dark dental stone colors. After checking the model preparation, designing and surveying is done for partial framework. Undercuts are block out and relief wax is placed where it is needed⁷. After that Metaseal separator is applied to the model and metatouch is used on block out and relief areas. Wax up done using metaform wax as per design. It is important to make sure that all patterns are connected thoroughly i.e. bar or plate to retention or clasp by melting the two parts in their connecting zone with electric wax knife or by applying metabond "glue". For polymerizing partials or large fixed restorations structures curing is done in a metalight curing unit, the metavac vacuum suction device is used so as to avoid any deformation and the position of the clasp during the vacuum suction process due to its latex cover the waxed up structures is adapted with controlled vacuum s in metavac, they can be cooled down with a cold spray prior to evacuating. The light cured model should be cooled down before lifting the cured Pattern off the model. Cured patterns can be

trimmed to final shape with carbide burs and /or silicon polisher. After trimming is final the case is sprued, invested and cast. Due to its "Memory Effect" the partial can be lifted off and placed back onto the model as desired. The clasp open and close accordingly. The main advantage the metacon material offers when producing partial frameworks, is the possibility to work right on the master model without duplicating and making a refractory model. This not only increases precision, but also saves us many steps in the work flow.⁸ (Fig 2)



Complete Dentures

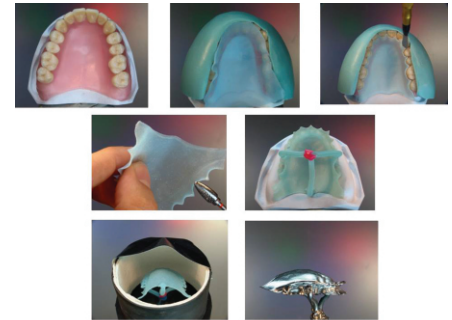
In case of acrylic finished denture with metal reinforced for additional metal support. We make space on denture where the metal reinforced by grinding out amount of acrylic needed. After putting separator on the denture in the area, we apply a preformed stipple sheet pattern (thickness 0.55mm) to the desired shape and adapt it properly by using the metavac vacuum suction device. After light curing in one of the metalight units, we can lift the case off the denture, contour and finish it with carbide burs or silicon polishers, then spure, invest and cast it. Casting of the finishing work in metal is absolutely minor.

Finally the reinforcement is attached to the denture. For adaptation of clasps, use of preformed retention pattern and get a clasp retained high strength metal insert with perfect passive fit. Using metacon light cured wax is useful as we can wax up right on master model and consequently come to casting at no time. Therefore, metacon wax is ideal to use as it can not only fully replace the conventional dental waxes but also provide us a lot of time and enables us to work much more flexibly.

In implant retained complete dentures we should always design them with metal reinforcement to avoid any damage from high pressure applied occlusal during chewing movements. This can be easily modelled using a 0.55mm metaform stipple sheet pattern. After light curing we place the necessary retention per tooth. After casting, finishing and polishing we apply a metal acrylic bonder. The basal surface of the reinforcement will be covered with pink opaque to avoid graying of metal. The retention for acrylic teeth are covered with tooth colored opaque.⁹

Even the extension of partial denture can be design easily in no time consuming .bite splints, which we always design with gold canine guidance to avoid premature wear,

working with light cure wax is highly comfortable. After light curing we place retention pearls on the bottom side of the modeled canine parts. Due to extra retention we can easily bond these gold canines guidance piece to the bite splint. (Fig 3)



Implants Supported Prosthesis

The Metacon system simplifies the creation of implant structures as well as all other dental modulations and offers substantial material and time-saving benefits. The light-cured wax can be used for any kind of fixed or removable implant supported dentures. Once the models are mounted with centric bite registration in a semi adjustable articulator, the acrylic implant abutments are placed over model in order to wax up the implant structure. Apply separators onto the models. metabond used so as to achieve the needed bonding between the acrylic abutment and light curing wax.¹⁰ Preformed sprue patterns were used for contouring the superstructure, which form to rod shape and apply manually along the alveolar ridge. For basic shape of superstructure cold modelling technique with proper instruments is used, considering all functional and esthetics aspects. Final corrections are made "hot" by using an electric wax spatula and applying metacon modelling wax. Once the initial 'wax up' is finished, we clean the openings for the screws and polymerize the structure in one of metalight curing units. After light curing the material color changes from bright blue to pale green and appear as, acrylic and can be trimmed with carbide burs, separating dies, silicon polishers to get desired shapes. Trimming polymerized metacon material is very comfortable because it's easy and fast to grind. For sub gingival areas, the soft tissues is removed from the model, and a thin layer of adhesives applied to the remaining uncovered part of the burnout coping. Then application of light cured for 3minutes, next we add hot metacon modelling wax with an electric spatula, to obtain desired profiles, again we light cured it for 15min. During modelling of framework. Care should be taken to over model a little around margins. The pattern can be light cured and the material will change color. Once this cycle is finished, all the light cured wax that has overflowed the margins must be eliminated using small bur. once margins are clean, the pattern can be removed

carefully from the abutment. Final light cure should be complete within 5 minutes. Eventually, final shape and desired thickness can be achieved using carbide bur.¹¹ (Fig 4)

Conclusion

The demands of highest technical standards at each stage of restoration fabrication and knowledge of the materials involve optimizing their performance. Light cure wax system doesn't affect the fabrication procedure. It does offer greater flexibility when handling and allow for safe fitting, removal, additions and eliminations, offers refinement at work. The system can be used for validation before casting and try-in required at the clinic. It is compatible with all convention wax once it is light cure. The metacon acrylic burns out cleanly and completely and does not in ring during preheating. Light cure wax offers us new way to "wax up" over metal structures in the labs. We can use this versatile material in dentistry. The light cue wax system indeed constitute a problem solving approach. It can solve a great variety of purposes in lab. It helps saving time improving the quality of the procedure and at very low initial expenses. This article intended to show a way to help in removable, fixed implant supported prosthesis related to



their productivity, deadlines and cost efficiency.

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Product Talk

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