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DIAMOND –D TROUBLE SHOOTING

Trouble Shooting in the Processing Of Denture Acrylic

Porosity in Denture Acrylics

Generally, porosity occurs in denture acrylic because of one of two things; lack of adequate compression or curing too rapidly. Lack of compression encompasses many scenarios such as under-packing in the split flask technique or interrupting the cure in the pressure pot when using self curing or pour acrylics.

Manufacturers of acrylics, who have quality control managers, have fielded numerous calls for years regarding porosity, many possibly due to lack of compression. The laboratory technician out in the field needs to review quickly the different ways lack of proper compression can occur:

- **Not accurately measuring powder and liquid ratios.** This is a common occurrence and many technicians tend to eyeball their powder-to-liquid ratios. If it is too fluid of a mix, and in packing a denture, anything over three parts powder to one part liquid is too fluid, and then you can get lack of proper compression.
- **NO MIDA EL POLVO Y EL LIQUIDO A OJO**
- **Packing too soon**. This occurs usually when the technician is too rushed for one reason or another. If you are at the doughy packing stage and your dough is still sticking to the spatula or to the side of the mixing jar, you are not yet ready to pack. Do not confuse this with the dough being slightly tacky to the touch when packing. Diamond D will still have this slightly tacky sensation when ready to pack, but we find it goes hand in hand with the extraordinary tooth adhesion this acrylic exhibits.
- **NO HAGA EL EMPACADO MUY RAPIDO. ESPERE AL MENOS 10 - 11 MINUTOS A QUE EL ACRILICO NO SE PEGUE EN LA ESPATULA O EN LAS PAREDES DEL JARRO DE MEZCLA,.**
- **Injecting too soon**. If the acrylic dough has not reached the proper gelation for injecting, lack of compression may ensue. Try injecting slightly latter in the doughy stage and bench setting the case longer before introducing it into the curing cycle. If you are injecting, never loose your compression.
- **NO INYECTE EL ACRILICO MUY RAPIDO, ESPERE EL PUNTO JUSTO DEL MISMO PARA INYECTAR**.
- **Packing too late**. Both Diamond D and Sledgehammer are not like your father's denture acrylic, where you should wait for a "snap stage" before packing. If you do wait for this snap stage, then chances are you will have waited too long and you will

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have to crush a mix to pack a successful denture. You also run the risk of having a bleached appearance on areas of the denture.

- **NO DEMORE DEMASIADO EL EMPAQUE TAMPOCO , ESTOS ACERILICOS NO DEBEN ESPERARSE TANTO. PUEDEN SALIR AREAS DESCOLORIDAS**
- **Injecting too late**. Obviously the acrylic dough will be to stiff to flow through the sprues into the mold correctly and lack of compression will occur.
- **LA INYECCION DEMASIADO TARDE PUEDE TRER PROBLEMAS EN LA COMPRESION POR FALTA DE FLUIDEZ**
- **Closing flask, metal to metal, too quickly** can also cause lack of adequate compression. This situation does not occur as much in a lab that closes with a big boy press as it does with labs that use a hydraulic press. Generally, the slower you come down on your acrylic dough, the better off you are. Try trial packing and adding additional acrylic at least once, or back off on the closing of the flask for a minute as you get 1/8 of an inch from closure of your flask, and then slowly close the flask the rest of the way.
- **HAGA EMPAQUE POR ETAPAS . NO MENOS DE 2-3 VECES .**
- If you use any of the auto-polymerizing acrylics such as pour or repair resins, once you put them into the pressure pot to cure, do not interrupt the pressure during the cycle of cure. Make sure that the pressure pot maintains the initial pressure, which should be somewhere between 15 PSI to 30 PSI, for 30 minutes. This should be adequate in most cases.
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- In the Pour Technique again. Not soaking the model thoroughly enough to remover air that can cause air bubbles to rise up into the uncured acrylic from the model.

TECNICA RAPIDA DE TERMOCURADO

10-11 MINUTOS DE REPOSO ANTES DEL EMPAQCADO
EMPACADO EN 3 - 4 ETAPAS
UN VEZ EN LA COMPRESA , REPOSAR EN MESADA 30 MINUTOS
PONER A 73 c CENTIOGRADOS, 90 MINUTOS Y LUEGO 30 DE EBULLICIÓN
73 c CENTIGRADOS TODA LA NOCHE, SIN NECESIDAD DE LOS 30 MINUTOS DE EBULLICIÓN

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Curing too rapidly is the next area to address in dealing with problems of porosity.
Again, this occurs generally when the technician is rushed. The thicker the case, when packing a denture, the slower the cure should be. On thickly packed cases, it is sometimes advisable to let the case sit on the bench under compression overnight, however, if you

cannot do that, then at least let it bench sit for thirty minutes. Do not put your flask into boiling water unless the manufacturer tells you that this is okay. Twenty and thirty minute monomers have lately come into vogue and if you wait for the dough to start polymerizing before submerging into boiling water, you should meet with more success. This takes place anywhere between 15 to 30 minutes. Most packing acrylic manufacturers recommend submerging the flask in a 165° F water bath for a ninety-minute period followed by a thirty-minute boil. The other option is to cure the denture overnight at 165° F for a nine-hour period. The same is true for pour and repair acrylics cured in a pressure pot. Do not cure at over 120° F unless you want to take the chance of having a porous denture or repair.

If there are still porosity problems after processing heat cure denture acrylic with heat cure monomer and curing with the conventional 90 minutes at 165F (73C) followed by a 30 minute boil with a normal cool down or with the over night cure of 9 hours at 165F (73C) then follow this suggestion. Make sure you have trial packed each case and have added new acrylic at least once. After you have made your final close, bench set the flask under pressure in the compress for a minimum for 30 minutes before introducing the flask into the water bath for processing. Make sure your water bath curing unit's temperature has been calibrated recently and that it can maintain a temperature of 165F (73C) for a period of 90 minutes or longer.

If you are still getting porosity in your finished heat cure processed dentures then call your manufacturer with your powder and liquid containers in front of you so you can read the labels and lot numbers correctly when giving that information to your dealer or manufacture representative.

Frequent causes of problems:

Porosity

- Under packing of denture.
- Not using enough acrylic dough to pack or inject denture.

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- Pressing out denture too rapidly.
- Over extension of dough time. (dry dough)
- Improper polymer/monomer ratio.
- Curing too quickly
- Starting to pack or inject the acrylic dough when it is still too fluid. (acrylic dough has not reached gelation stage)
- Improper time or temperature control during cure.

Discoloration (Bleaching)

Is usually caused by contamination of the mould and/or cast by one of the following:

- Water, wax, oil, wax solvent or detergents that contain bleach and possibly triclosan.
- Excessive amounts of separator or using a separator that is too wet.
- Some impression materials will leave residual impurities on the cast or mould which affects the surface of the final denture.

Discoloration may also be caused by the following packing problems:

- Air entrained in mass during mixing or packing.
- Insufficient packing pressure due to under-packing.
- Material packed prior to proper gelation or packed too long after gelation has occurred.
- Packing in too hot a flask. This can result in premature polymerization, which may cause bleaching or porosity in the final denture.
- Improper time or temperature control during curing.
- Moisture is uncured acrylics worst enemy. If the mixing jar had moisture that incorporated itself into the acrylic dough or the technician moistened their hands before handling the acrylic dough to old foil substitute breaking down and not protecting the acrylic from moisture inside the flask, all this will cause acrylic bleaching.

The patient may cause denture bleaching inadvertently in the following ways:

- Patients exposing denture to improper cleaning agents such as solvents, bleaches and alcohols.

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- Diabetic patients produce ketones, which may have an effect on denture color over time.
- Heart patients may be taking coumadin or other medications, which may have an effect on the color.
- Acid reflux medications may also affect the color.

Tooth pop-offs

A problem that occurs occasionally in new dentures is the loss of bond between the base denture material and the plastic teeth. This may be due to:

- Contamination of the bonding surface of the tooth. Anything that could leave a film on the tooth is a potential problem. Wax from unclean boil-out tanks can be a big problem or detergent or oil from wax solvents. Even oil from your fingers may
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- leave a film if you touch the tooth surface after the final rinse with clean boiling water. The tooth surface must be kept absolutely clean to ensure proper bonding with the denture material.
- The acrylic dough has reached beyond the gelation stage or "Packing Stage" during packing. Do not wait for a snap stage. Always measure materials according to the manufacturers suggested powder-to-liquid ratio. Mix the material in a glass jar using a lid that can be tightly closed to prevent liquid evaporation. Trial pack when material has reached a soft doughy consistency. Once the "SNAP STAGE"* has been reached, there will not be sufficient monomer available to adequately attach the plastic teeth to the denture material. Allowing the flask to remain under pressure for 30 minutes prior to starting the cure cycle, will give the liquid more time to develop a strong bond.
  *Snap Stage- When the acrylic dough is rolled into a cigar shape and is quickly pulled apart. The acrylic breaks away with a "snap", leaving no residual acrylic strings.

Written by C. Rogers in collaboration with R. Raney. More information may be added or deleted at a later date as we obtain more information specifically pertaining to the Diamond D Heat Cure Denture Acrylic.

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