

## **THE IMPRESSION MATERIAL I USE FOR INDIRECT RESTORATIVE PROCEDURES**

A number of properties and characteristics need to be considered when selecting an impression material, although it is generally accepted that many of today's materials function satisfactorily and that no one material is necessarily superior to the others across the range of desirable properties.

The material that I currently use is Aquasil Ultra from DENTSPLY. This is a quadrafunctional vinyl polysiloxane and according to the manufacturer's technical manual it has the following advantages and benefits:

- a). Improved wettability
- b). Improved tear strength
- c). A range of viscosities
- d). It is user friendly and well tolerated by patients.

My own choice has perhaps been influenced by subjective factors, which include my relationship with the manufacturer's representative and previous experience with DENTSPLY products, feedback from colleagues and articles in dental publications.

I selected Aquasil Ultra as my material of choice after measuring its performance characteristics against the criteria I would expect from an impression material.

### **Hydrophilicity:**

This is often referred to as 'wettability' and is an important feature of impression materials. When the impression is taken, the material has to cover moist surfaces and record detailed information. Once set, it has to cover the surface of the completed impression to create an accurate cast.

The hydrophilicity of a material can be determined by measuring contact angles and is defined by the contact angle of a drop of liquid on set impression material. Clinically it relates to the ability of an impression material to develop surface contact with hard or soft moist tissue.

This property is enhanced by the addition of surfactants. Polyvinyl siloxane materials are inherently hydrophobic which is a disadvantage, as it reduces the wettability of the material. The surfactants in Aquasil Ultra overcome this to produce a material that develops low contact angles early in the setting reaction. This reduces voids and bubbles and results in more accurate impressions.

Aquasil Ultra materials therefore possess excellent wettability.

### **Tear resistance:**

The material must be strong enough to allow the impression to be removed from undercuts without tearing. Aquasil Ultra has high tear resistance which ensures the exact reproduction of preparation margins. **(1)**

Although high tear strength is a desirable quality it must be balanced against the ability to comfortably remove the impression from the mouth, which Aquasil Ultra appears to have achieved.

### **Adhesion to the impression tray:**

It is generally believed that a strong bond between the impression material and the tray is desirable to prevent the inaccuracies which lead to poorly fitting restorations. A study in 2005 suggests that the use of a universal adhesive provides higher adhesive values than that obtained with the recommended DENTSPLY product Fix™. I intend to research this further and will review my choice of tray adhesive according to the evidence. **(2)**

### **Delivery system and mixing/setting times:**

Aquasil Ultra can also be supplied in a small targeted delivery system Aquasil Ultra Digit™ which allows accurate intra-oral syringe delivery around preparation margins, especially in areas difficult to access. This delivery system is more controllable and easier to manipulate than the larger automix guns. A single, disposable unit dose also facilitates cross-infection control.

Ideally, an impression material will remain at low viscosity for as long as possible within the working time without increasing the minimum removal time (MRT) from the mouth. This enhances the flow of the material around the preparation area resulting in more accurate marginal detail.

For Aquasil Ultra, the MRT is 5 minutes for the regular set material and 3 minutes for fast set material. This allows a choice of setting times and compares favourably with other materials on the market.

#### **Effect of cross-infection control measures:**

In today's clinical environment, cross infection control is a prime consideration. Therefore, it is important that the impression material is not adversely affected by cross infection control procedures.

Some reports have suggested that the polymerisation of polyvinyl siloxane materials can be inhibited by contact with latex gloves, soaps or alcohol rubs. Peregrina et al reported that with Aquasil Ultra, no polymerisation inhibition was found in these circumstances. **(3)**

It is recommended that impressions should be disinfected immediately after their removal from the mouth, and there are a number of chemicals available for this task. However, research suggests that not all disinfectants are compatible with all impression materials.

A 2005 study concluded that Aquasil Ultra impressions were unaffected by immersion in 3.5% glutaraldehyde solution used as a disinfectant, with dimensional accuracy and stability remaining acceptable post exposure **(5)**. A more recent study showed a less than 0.5% dimensional change when Aquasil Ultra impressions were immersed in a number of different disinfectant solutions **(6)**.

I am therefore confident that I can disinfect my impressions in a wide range of chemicals without threatening their accuracy and stability to any significant degree.

#### **Implant restorations:**

Implants are becoming more routine in General Dental Practice and accurate impressions are vital for success. Recent research suggests that modern polyvinyl siloxane materials generally produce more accurate impressions than polyether products. The range of viscosities available with the Aquasil Ultra range also allows a choice of techniques depending on the clinical circumstances.

Some clinicians have suggested that a Heavy Body/Wash technique is preferable to Monophase as it does not produce flow folds in the impression **(7)**. Good wettability combined with high tear strength makes Aquasil Ultra a good choice for restorative cases involving implants.

I am content with the clinical performance of Aquasil Ultra. I like the ease of use, packaging and the confidence afforded by using a well known, well-respected impression product. I am satisfied that my choice is based on objective evidence as well as the inevitable subjective factors which influence all our purchasing decisions.

I am aware that there are other excellent impression materials available and while researching for this essay I found many papers that praised polyether materials. These are chemically hydrophilic and generally should give better accuracy in a moist environment. **(8)**. However, I feel the use of the specialised surfactants in Aquasil Ultra help to overcome this difference, and when used appropriately I find that it gives consistently good results.

It seems likely that any difficulties encountered in obtaining accurate impressions with Aquasil Ultra are due to technique and handling issues rather than any inherent deficiencies in the material itself.

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