

## “Dentist and Lab Communication: Key to better Restorations.”

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### Abstract:

Dental professionals must consider the health of surrounding soft tissues, reproduce the size, shape and surface texture of the adjacent teeth and select the proper shade and colour, which in and itself is a primary determination of clinical success. The parameters that define tooth color (hue, chroma value, translucency, opalescence and florescence's) are well known. The communication of this different parameter to the laboratory is difficult and requires the clinician and laboratory technician to use identical shade selection system in order to achieve optimal aesthetics. A Structural approach promotes communication and facilitates successful outcomes. The dentist must have knowledge of the basic principles of color. Along with the laboratory prescription, the technician should have a set of study models to use as a guide. With few exceptions, laboratory work authorizations do not request enough information from the dentist. This could be because there is not enough space on the prescription to record it. The parameters that define tooth color (hue, chroma value, translucency, opalescence and florescence's) are well known. In the practice of esthetic restorative dentistry, communication among the clinicians and laboratory technicians work as a team to restore both form and function of their patients. By using various communication aids between dentist-technician-patient, technician was better able to create an esthetics and successful restoration that address the patients need & desire.

**Key words:** Communication, dental technicians, dentist, photography, shade, Esthetics

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### Background:

The aesthetic restoration of anterior teeth involves numerous tasks and has always posed a challenge for even skilled clinicians.

Communication between the dentist and the dental laboratory is an often neglected aspect in density. The scenario fortunately, has been changing in the last few years with the advancement of technology in communication in our day to day life; this aspect has seen some advancement percolating into the dentist laboratory communication as well.

The communication should not be restricted to only the dentist and the laboratory, but patient also included in a way to form a communication triad<sup>1</sup>. (Fig .1)

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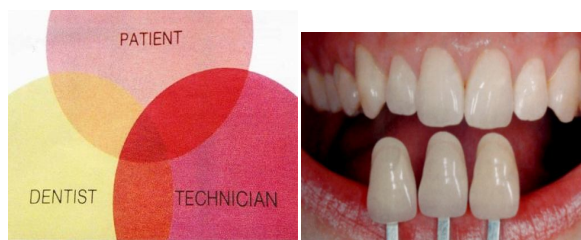
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(Fig. 1)

(Fig. 2)

There has to be an understanding and rapport between the dentist and technician with respect to

- Type of restoration and their indications
- Preparation requirements for particular types of restorations.
- Esthetic and function possibilities and limitations.
- Cementing and bonding techniques

Also the same way between the dentist and patient with respect to

- Type of restoration and their indications
- Clinical procedures
- Esthetic and function possibilities and limitations.
- Maintenance and follow up

A Structural approach promotes communication and facilitates successful outcomes. Shade selection is extremely important in creating natural looking restoration (fig-2); we divide the tooth shade into cervical colour, body colour and incisal colour. We ask the patient to bring photograph of their smile<sup>2</sup>

Developing a definitive surface texture with lobing and incisal translucency, approximating the age gender and personality of the patient are important in achieving success<sup>3</sup>. The contours of the teeth may be the most important feature for a beautiful aesthetic result.

It has been suggested that dentists use natural north daylight for shade matching. However, daylight is not at a constant throughout the day and therefore must not be used as the only light source for shade matching. Shade guides have become the standard for selecting shade, yet there have been many errors associated with the use of commercial shade guides<sup>4</sup> (fig.3, 4). Problems that may arise include the following:



(Fig. 3)

(Fig.4)

1. Porcelains do not match the shade guides that they are being compared to; shade guide tabs are 4-5 mm thick compared to the thin 1.5 mm piece of porcelain used for the restoration .Shade variations occur between different die lots of porcelain from the same manufacture.
2. Shade guides are not always made with fluorescent porcelain, which causes inconsistencies in color matching; it is difficult to predict the final shade after the layering of opaque, dentin and enamel.

3. Shade tabs are condensed differently; guide tabs lack a metal backing when using porcelain-fused to-metal restorations.

#### *Shade Selection Guidelines:*

The dentist must have knowledge of the basic principles of color. Munsell described the three dimensions of color as hue, value and chroma. **Hue** is the property of color that is determined by wavelength, which distinguishes one color from another. **Value** is a quantity of brightness. It is a qualitative term related to lightness or blackness of color. **Chroma** is the saturation of color.

Matching the proper shade is not carried out just by holding up a guide tab to the tooth in question. There are a number of methods that can be employed to intensify the shade selection. They are as follows:

1. If patient is wearing bright clothing, drape him or her with a neutral colored cover.
2. Clean the teeth and remove all stains and remove her lipstick or other make-up.
3. Determine shade at the beginning of the appointment to avoid ocular fatigue. Shade comparisons should be performed at five-second intervals so as not to fatigue the cone cells of the retina.
4. Obtain value levels by squinting and compare shade under varying conditions (i.e., wet vs. dry lips; retracted lip vs. pulled down lip).

5. Use the canine as a reference for shade because of the highest chroma of the dominant hue of the teeth, if unable to precisely match shade, select a shade of lower chroma and higher value.

#### *Models:*

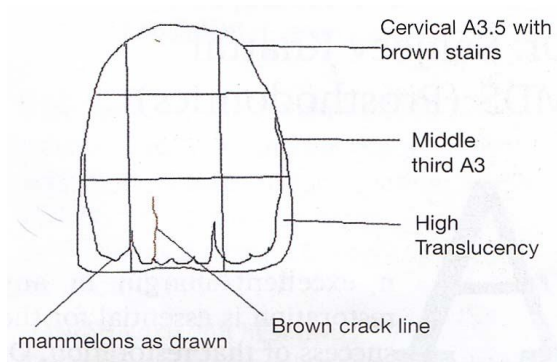
Along with the laboratory prescription, the technician should have a set of study models to use as a guide. Pre-operative models give the ceramist information about occlusion, tooth alignment, position of soft tissue, distema, surface texture, wear facets, and more. A diagnostic wax-up will aid in the occlusion and form of the restoration. Matching shade is obviously only part of the task of replicating the natural tooth<sup>5</sup>.

#### *Laboratory Prescriptions:*

With few exceptions, laboratory work authorizations do not request enough information from the dentist. This could be because there is not enough space on the prescription to record it. It is, therefore, important to use a laboratory that fully understands the need for shade matching. Each laboratory prescription should contain enough space to record clinical information about each ceramic component of the restoration-for example, different shades of porcelain and opaque, and where to place them on the tooth<sup>6</sup>. The authorization should include numerous diagrams of the tooth so that the dentist can draw helpful notes on them (i.e., shade, translucency, staining, glaze and surface texture).

And the dentist should be in contact with the ceramist to ensure that the technician fully understands what the dentist is requesting<sup>7</sup>. It is through these methods that the dentist builds a relationship with the technician. Ceramists will usually return the quality that the dentist sends to them<sup>8</sup>. (fig.5)

(Fig. 5)



### Photographs:

The photograph with macro lens has become an important tool in communicating with the laboratory. It has been said that, "The photograph is the cosmetic dentist's radiograph." A magnification of either 1:1 or 2:1 enable the technician to evaluate the color of a particular tooth, see craze lines, stains, surface texture and luster. Multiple pictures should be taken at different angles and under different light sources. The patient's occlusion should also be photographed (fig 6). Along with photographs of the teeth being worked on, it is best to include pictures of the patient's smile. These photographs can tell the technician about the patient, his or her age, personality and character and possible to reproduce a natural life like appearance of restoration<sup>9</sup> (fig 7).



(Fig. 6) Pre operative Intra oral & extra oral view



(Fig. 7) Post operative Intra oral & extra oral view

It is a good idea to photograph the prosthesis at the try-in stage. If color adjustments are necessary, the technician will have a visual aid to help make the proper corrections. Written instructions alone are not enough information for the technician..

### Computers :

Computers have become a valuable communications tool for the dentist and laboratory. The dentist can take a picture with an intra-oral camera and send it over the internet to the laboratory. The ceramist can use these images to fabricate the proper prosthesis. E-mail can be sent between dentist and laboratory to facilitate discussions of shade matching. The ceramist may decide to offer suggestions to the dentist based on the original images sent over the computer. This has the potential to allow for making immediate decisions about the restoration and will decrease the number of office visits the patient has to make.

### Colorimeter :

Colorimetric is "the branch of color science concerned with numerically specifying the perceived color of an object." Photometric analysis techniques of porcelain surfaces may enhance our abilities to evaluate and design an esthetic restoration. However, research is being conducted continuously to create a computerized shade matching program. This program may change the way color matching is performed and may allow for more accurate shade selection and communication. (Fig.-8)

**(Fig. 8) Newer aids in shade selection**



### COMMUNICATION AIDS:

- Study models
- impressions
- Intra and extra oral photographs
- Mock preps and / or wax up
- Shade guides
- Bite registration
- Prescriptions with diagrams and proper instructions
- Provisional restoration model

### Discussion:

Often, laboratory results do not meet the expectations of the dentist or the patient. Disappointment are not limited to discrepancies in tooth length, size, proportion and position but also in occlusion, function, vertical dimension and phonetics which give a negative impact on the out come of a case. In most cases, these disappointments can be eliminated if a strong relationship and an educated respect exists between the dentist and the technician.

Once the clinical examination has been completed and treatment objective addressed the first tool of communication has to be an accurate quality set of study model. Full arch maxillary and mandibular impression with precise anatomic replication must be made. When the model are completed, they must be mounted and registered correctly together .

Two- dimensional communication tools include a prescription, color mapping form or drawing, and a smile catalog reference. Properly completed laboratory prescription should include all information relating to esthetics, function, color and patient expectation. Three-dimensional communication tools include diagnostic wax up and the approved provisional model. The approved provisional model is the model of the provisional restoration that has met the approval of the dentist and the patient functionally and esthetically.

When the dentist and patients are satisfied with the function and esthetic of the provisional restoration, an impression of the approved provisional is taken and sent as one of the most crucial communication tools along with the rest of the case. The approved provisional model is the blueprint from which the final restorations evolve. Anterior ceramic restoration, the provisional model is the used to fabricate a custom incisal guide table for the lingual counters of the anterior teeth.

An incisal edges matrix for incisal edge position of the anterior teeth and a soft tissue matrix for soft tissues contour to insure correct emergence profile and anatomic harmony between the teeth and the tissue also fabricated. The final ceramic restoration can be created with tremendous confidence using the precise instruction set in place by all the tools of communication described the likelihood of satisfaction for the dentist and the patient is high.

### **Conclusion:**

The introduction of advanced materials and techniques will continue to increase the degree of success in shade communication. As stated previously, "How much information is enough?" This decision is left up to the dentist. It depends on the dentist's philosophies in practicing dentistry and how much pride he or she takes in his or her work. As a conclusion, in order to communicate effectively, one needs to use most, if not all, of the communication aids in order to

achieve good Esthetics and proper function.

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