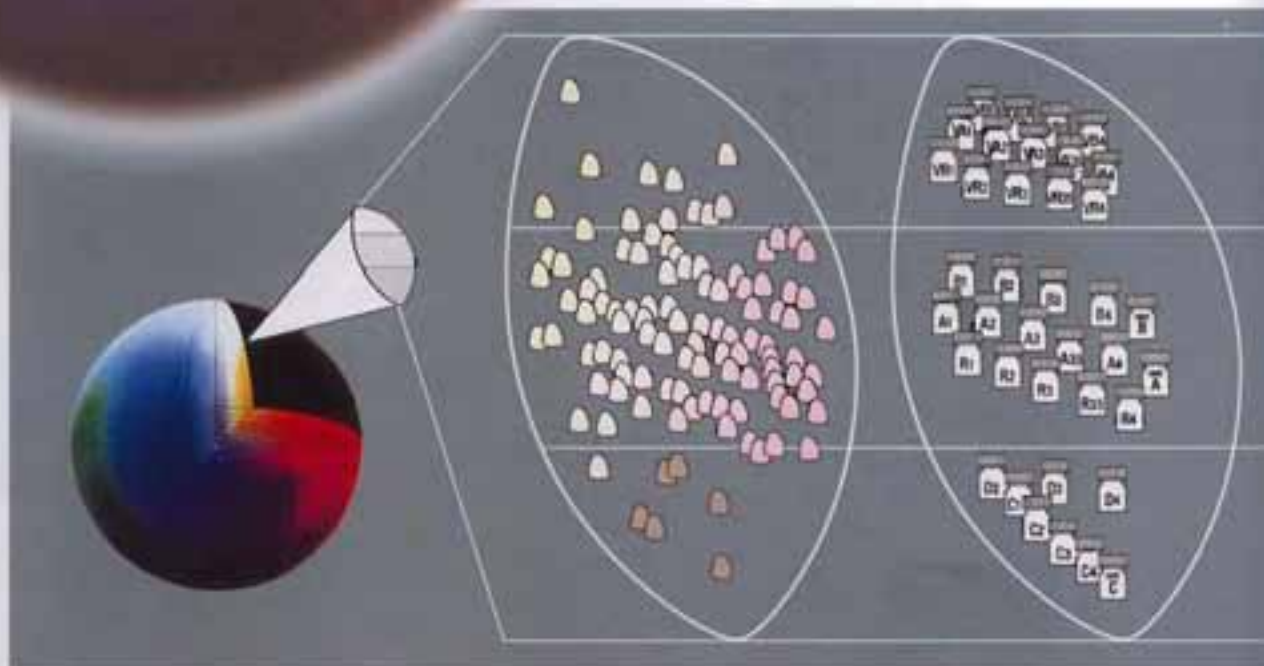


COMPREHENSIVE SHADE ANALYSIS

NCC[®]

Natural Color Concept

12



Determining the shade of natural teeth and reproducing that shade in porcelain is a challenge faced daily by dentists and dental technicians.

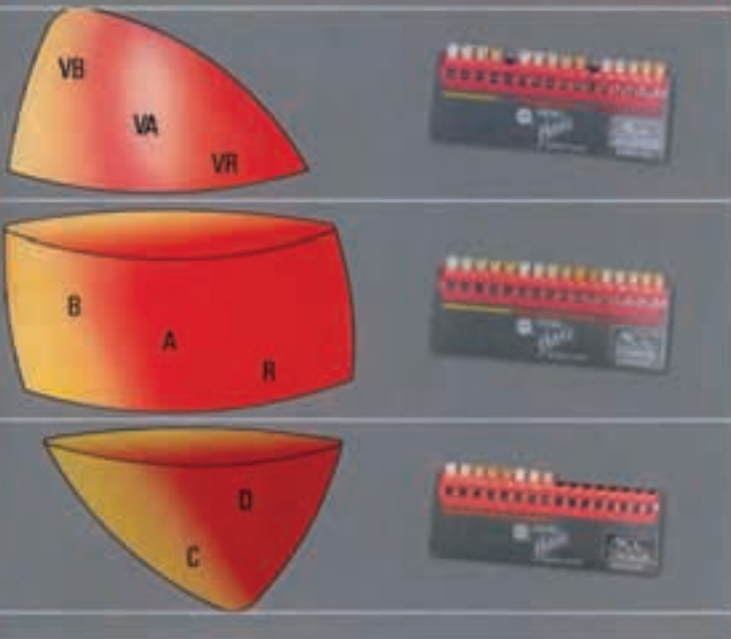
Comprehensive analysis and years of research of dental color has shown that using only 16 or 20 shade tabs from conventional shade guides to choose from is simply inadequate.

After intensive research, Shofu has developed the NCC (*Natural Color Concept*). This shade range and corresponding materials allows you

to create natural looking restorations with optimum esthetics in the dental color space.

NCC is an extensive shading system that consists of several components. The ShadeEye NCC Dental Chroma Meter digitally analyzes the tooth for base shade, hue and value. The VINTAGE HALO Porcelain system is keyed to the *ShadeEye NCC* readings in dental color space. The system accuracy makes shade taking "light years ahead".

GINGIVA INDICATION



GUMY® Bridges the Gap

Product Order Information
PN 7040

The reddish gingiva is influential for exact determination of the shade of the tooth. Interplay with the colors of the teeth results in contrasting effects leading to incorrect evaluations and assessment errors.

The GUMY is designed so that the contrasting effects of the gingival will be taken into account correctly for the patient when determining the proper shade.

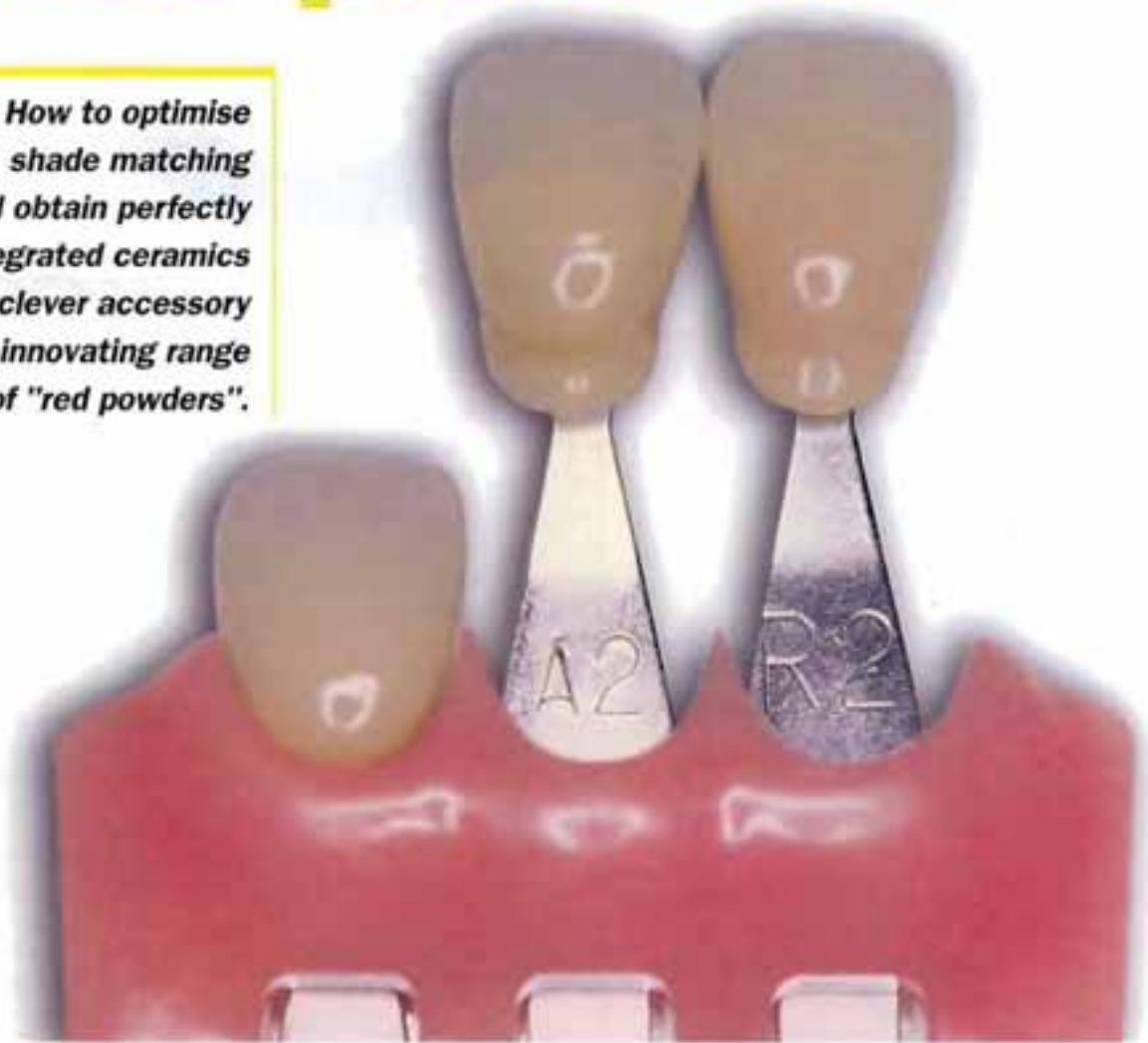
The GUMYs are available in three basic shades, light, medium and dark. This will help in the determination of correct visual shade selection with the corresponding gingival color.



Placed in a GUMY®, you will always achieve an optimum match of your shade tabs to the patient's gingiva situation.

Red Shift: putting theory into practice.

*How to optimise
shade matching
and obtain perfectly
colour-integrated ceramics
thanks to a clever accessory
and an innovating range
of "red powders".*



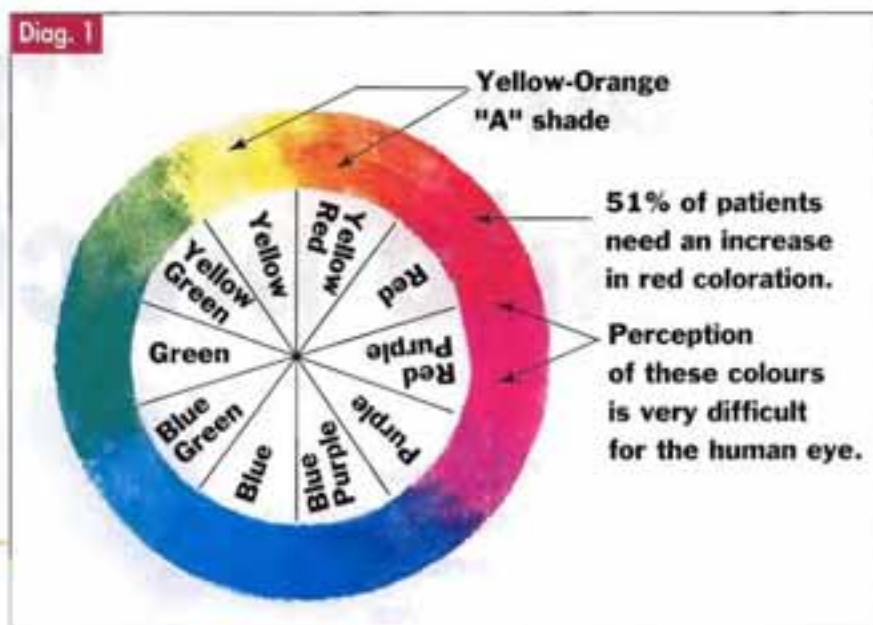
The Shofu company including Makoto Yamamoto have conducted extensive research studying 3,500 patients with the aid of computer colour analysis.

This has led to a greater understanding of shade matching. This research also concluded that it is very difficult to reproduce optimal aesthetic results with existing porcelain systems.

WHAT IS RED SHIFT ?

The main area lacking in porcelain is the reproduction of red coloration. In the studies 51% of patients showed more red colour than the standard shade guides. For many

Figures 1 and 2 A separate shade guide is available for Red Shift. Along with a colour wheel.
Diagram 1 Position of red-violet on the spectrum.



years ceramists have been mixing pink to their porcelain especially at gingival margins to compensate deficiencies - this is very hit-and-miss.

Now Shofu has, as part of their "Halo" porcelain system, a 5 shade system which runs parallel with the "A" shades but includes red - R1, R2, R3, R3.5, R4 - and another 5 shades with red but also higher value (brighter for younger dentition) VR1, VR2, VR3, VR3.5, VR4 (figs. 1 and 2). The powders in the Red Shift system include an opaque (powder or paste) and a body dentine for all ten shades. The build-up is the same technique recommended for all Shofu crowns, only the opaques and body porcelains are different.

SHADE TAKING

Porcelain restorations are often constructed without a knowledge

of the surrounding oral cavity and soft tissues of the patient. The oral cavity and especially the colour of the gingiva is important when shade matching because of the contrast between the red-violet colour of the gingiva and the tooth.

Because of the position of red-violet coloration within the spectrum, the perception of these colours is made difficult, creating the impression of only green-yellow colours being present in a vital tooth. Consequently inaccurate shades are selected leading to a disappointing finished result (Diag. 1).

Shofu Halo offers a new approach to shade taking - gingiva coloured shade indicators available in three shades of pink, light, medium and dark - called the "Gumy". They can be used with a conventional shade guide to neutralize the colour saturation of the gingiva

and put the shade guide in the same context as the tooth we are aiming to match.

TECHNIQUE

Select the "Gumy" which best matches the patient's gingival shade. Using a conventional guide select the shade as normal (fig. 3).

Then place in "Gumy" and check the shade again, you will notice the "A" shades appear to loose chroma and are slightly yellow-green.

A more intensive tooth colour or a Red Shift shade is selected e.g. R1 and colour matched again in the "Gumy". Very often the red shade looks more natural (fig. 4). The reaction is very noticeable when the patient has a dark gingiva.

If we compare for example A2 and the R2 shade out of the "Gumy" you can perceive the difference

Figure 3 After choosing the gingival shade, we used a conventional shade guide.

Figure 4 Comparison between sample A and the corresponding Red Shift shade from the "Gumy".



Figure 5 Comparison between A2 and R2 samples out of the "Gumy".

Figure 6 Comparison between sample R2 in the "Gumy" and A2.



THE EYE AND COLOUR PERCEPTION

To fully appreciate the use of the Gumy gingival shade system and of the new range of Red Shift reds and pinks, a brief outline of a few physical characteristics may not come amiss:

The retina, area which analyses light, is made up of different cells, in particular cones which capture shapes and colours. These cones can be broken down into three types, each of which is sensitive to one of the three primary colours: blue, red or green. The eye works like a muscle and has a tendency to tire after a few seconds' effort. The cones which are sensitive to the colour under observation, transmit less and less information back to the brain. The other cones however produce more energy in the complementary colour. In this way, the real balance between colours becomes distorted by a coloured environment.

When shade taking, the cones sensitive to the red-violet soft tissues and the gingiva begin to tire after a few seconds, emitting less energy, which means that we perceive the colour as more green-yellow (complementary colour) than it actually is in reality.

The brown shades (A) contain red (long waves). Placed near the gingiva, they will be perceived with less long waves and more shorter ones (blue and green). The shade thus appears to be colder and greyer.

When shade taking, the tooth of the shade guide is placed before the dark oral cavity whereas the natural tooth is in contact with the gingiva and therefore in a red-pink environment. Hence the significant variations in shade perception.

It was as a result of observing this phenomena that the Gumy shade guide and the Red Shift colours were born. The 10 new shades (5 more red-pink and 5 more red-pink with higher value than the traditional A shades), associated with the false gingiva Gumy, provide a solution that compensates for the differences in perception due to the gingival environment and enables much closer shade matching than that previously possible with the A shades, that accounted for some 80% of work produced.

The key to the solution is eliminating the grey effect in the dentine.

Christophe LOIR



between the red shade as opposed to the yellow-green shade of the "A" tab (fig. 5).

To prove our theory, when the R2 shade is placed in the "Gumy" and

the "A" shade is compared, they are a good match. This proves that what we think is an "A" shade in the mouth is really a red based colour.

CONCLUSIONS

When I first learnt about the Red Shift concept I had to give my opinion - I stated that it seemed very good in theory but we, as ceramists, have to see the results in the mouth. I have now worked with Red Shift for nearly 2 years and with great success - not all cases need red, but many do and I have listed some hints from my experience.

- Most shades can be included-mixed with Red Shift but if natural teeth are the "B" shades, no red should be added.
- If the dentist has asked for "A" shades the laboratory can opaque with corresponding red opaque to give crowns a very natural shade e.g. R3 opaque + A3 body.

- I very often mix red shade with "A" shade 50:50 e.g. A1 & R1 50:50 especially in conjunction with the light "Gummy" because the red effect is least affected by light gingiva.

- If I have chosen the dark "Gummy", I will use pure Red Shift shade opaque and body.

- In some cases, it is useful to use a red colour for the gingival 1-3 e.g. R3.5 neck and D3 for body and tip

Mark BLADEN
Dental Technician
WORCESTER (U.K.)

**51% of patients
showed
more red colour
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shade guides.**

CASE STUDIES

Fig. A I constructed a porcelain Veneer [1]. The natural dentition displayed the red 2 shade, without the red porcelain the veneer would have looked yellow-green.
Surgeon: David Watson.

Fig. B I constructed a resin bonded crown for [2] using a 50:50 mix R3, A3.
Surgeon: Peter Jones.

Fig. C Beautiful natural lower dentition had to be matched by a porcelain fused to metal bridge at 54321|12345 using R3 and R2 opaques and 70% R2, 30% A2 mix for body porcelain for centrals and laterals, canines and premolars are R3, A3 50:50 mix.
Surgeon: Edward Tulacz.

