Case study: Herculite® XRV Ultra™ and OptiBond™ XTR
Supporting the future generations in dentistry

By Kerr

A 52-year-old patient presented with a request to replace defective, old restorations and improve the aesthetics of the smile.

A decision was made to remove the old restorations from teeth 11, 12, 21, and 22, as well as any carious dentine, removing the previous restorations from teeth 11 and 21, as well as a vestibular layer of tooth structure to allow proper stratification of the composite.

The patient’s health, the treatment was performed in two sessions.

For the bonding procedure, the 2-step self-etching bonding system OptiBond XTR was chosen. The clinical procedure consisted of the application of a self-etching primer that changes the morphology of the enamel surface depending on its pH, followed by the application of the adhesive.

The pH of Optibond XTR Primer is 2.3 and decreases to 1.7 during application. Then it switches to a value of 7, due to a chemical reaction with the calcium ions of the dental tissues. Optibond XTR performs very well on the dentine surface as well, dissolving the smear layer effectively.

The self-etching primer was applied using a microbrush with gentle and active brushing for at least 20 seconds in order to promote the remineralisation and the infiltration of the substrate (“continuous brushing technique”). The solvent was evaporated using an indirect and gentle air stream.

The composite was adapted using a microbrush with active “scrubbing”, waiting for 15-30 seconds in order to obtain the diffusion of the resin by capillarity into the substrate and the excess was removed through a capillary action into air stream and light substrate, and for 10 seconds, using the LED curing light Kerr Demi Ultra.

The main benefits of using the Optibond XTR Bonding System are:

1. Fast application and predictable results
2. No need to rinse and therefore no risk of issues related to moisture control of the dentine surface
3. Good bond strength to both enamel and dentine

Knowing the functional and aesthetic features of Herculite XRV Ultra composite, the cavity was prepared by completely removing the previous restorations and any carious dentine, without removing the discoloured/secondary dentine, which will be perfectly masked by the opacity of the dentine shade of Herculite XRV Ultra.

The opacity of Herculite XRV Ultra Dentine shade is able to cover the dentine discouloration without the need for further opaque shades. The application and sculpting of the composite was performed using the Kerr Comporell, a useful modelling tool that consists of a handle and interchangeable tips with different shapes to use depending on the type of restoration. Moreover, thanks to the unique material of which they are made, the composite doesn’t stick to the tips and therefore its placement is fast and easy.

Polishing and high gloss polishing of the restoration was performed in few fast and simple steps. Unlike other materials, Herculite XRV Ultra makes it possible to obtain high aesthetic results with a natural appearance in few minutes.

The results achieved show that use of Kerr Herculite XRV Ultra composite materials in the anterior can achieve a significant aesthetic improvement of the smile using conservative techniques and without recourse to prosthetic solutions.

In addition, the use of Herculite XRV Ultra as an anterior restorative can achieve a significantly improved aesthetic smile without using indirect restorations.

Finishing with Kerr Opti2Step polisher, 14. Silicone impressions of the teeth were taken for the manufacture of the mock-up technique. 15. Stratification of the Kerr Herculite XRV Ultra using enamel shade (Den- tine A2) at 11 and 22 was performed.

Supporting the future generations in dentistry

Marco Bambace

is currently a student at the University of Padova (Department of Dentistry) in his fifth year of studies. He will achieve the degree of Doctor in Dentistry in 2016. With his talent for direct restorations, Marco Bambace performed this in vivo case using Kerr restorative products and filling accessories. 17. Herculite XRV Ultra (Dentine A2) at 11 and 21 was performed.

The following case was conducted under the supervision of Dr. Emiliano Rossi (Chief of Department of Dentistry in the same University, Padova).
By Prof. Paul Tipton, UK

Most advanced restorative dentistry techniques, including those of full mouth reconstruction, have changed very little over the last 20 to 50 years. However, the impact of new dental materials, such as titanium and zirconia, has had a major influence on aesthetic dentistry and implantology during this time period. As a result, the profession may have an over-reliance on new materials rather than tried and tested techniques.

Some fundamental techniques are just as relevant today as they were when I started my Masters degree in conservative dentistry at the Eastman Dental Hospital in 1987. During the course of this series of articles on advanced restorative techniques, some old techniques will be revisited in light of today’s aesthetic and restorative requirements and some newer concepts will be discussed in greater detail whilst dealing with the overall topic of full mouth reconstruction. This article previews the restorative techniques that will be discussed during the next 10 clinical articles on advanced restorative techniques.

Occlusal concepts

During my Masters degree at the Eastman and prior to that, my training in occlusion has been in gnathology and its principles as taught at the University of Michigan and by Derek Setchell, Richard Holton and staff at the Eastman Dental Hospital during the last 20 years. This includes the five principles of occlusion, which are:

1. Retruded contact position (ICP) = intercuspal position (ICP) around retruded axis position (RAP)
2. Mutually protected occlusion
3. Anterior guidance
4. No non-working side interferences
5. Posterior stability.

The article on occlusion will review these concepts and also discuss when alternatives, such as long centric, are required (Figures 1-5).

Treatment of severe wear cases

One of the fundamental approaches to partial or full mouth reconstruction (and aesthetic dentistry) is envisaging the end result prior to starting the case. There is no better way to see the end result than the full and complete diagnostic wax-up. The aesthetic ability of both dentist and technician is stretched during this essential procedure. The article on diagnostics will review the procedures to complete a full mouth reconstruction at an increased vertical dimension so that the condyles are in their most relaxed, bone bruised and reproducible position. Increases and decreases in vertical dimension will be discussed showing positive changes in facial aesthetics as treatment is completed (Figures 10-12).

Dahl appliances

Bjorn Dahl first described the Dahl appliance in the early 1970s. Since then they have graduatedly been incorporated into the field of restorative dentistry although many Orthodontists still dispute their efficacy and relevance.

Speer and Monson and anterior guidance prior to preparation, prototypes and fitting of the final restorations (Figures 4-6).

Full mouth reconstruction

Following on from diagnostic procedures in the previous article, the techniques of full mouth reconstruction will be reviewed including the use of various forms of articulators from the fixed condyle (average value) articulator through to the semi adjustable and on to the fully adjustable for the customisation of the condylar settings. The programming of these will also be looked at and discussed from ‘fixed’ settings to use of lateral and protrusive check bites, and finally the pantograph and newer ‘Cadi-ax’ machine (Figures 7-9).

Vertical dimension

Changes in vertical dimension are often required for either gaining restorative space during restorative procedures or for improving facial aesthetics. Occlusal splints are used to first verify that the increase in vertical dimension can be tolerated and this is easily accomplished in most cases as long as this increase is done around RAP or centre relation so that the condyles are in their most relaxed, bone bruised and reproducible position. Increases and decreases in vertical dimension will be discussed showing positive changes in facial aesthetics as treatment is completed (Figures 10-12).

Figure 1: Severe aesthetic problems
Figure 2: Diagnostic waxing
Figure 3: Final restorations
Figure 4: Severe anterior wear
Figure 5: Diagnostic waxing
Figure 6: Final restorations
Figure 7: Anterior wear and erosion
Figure 8: Increased vertical dimension
Figure 9: Final restorations
Figure 10: Pre-treatment
Figure 11: Facebow recording
Figure 12: Post-treatment
Figure 13: Palatal erosion
Figure 14: Dahl appliance
Figure 15: Space for final restorations
Figure 16: Combined periodontal/restorative/implant case
The article on Dahl appliances will cover its history and usage in today’s modern restorative dentistry, focusing on the use of traditional chrome cobalt ‘Maryland wings’ style of Dahl appliances and also the use of splinted temporary or prototype restorations used to gain space during crown procedures (Figures 13-15).

Duralay bonnets

Impression techniques demand a high degree of accuracy for the completion of the advanced restorative case. Often this is a difficult procedure for the restorative dentist when taking impressions both sides of the mouth at the same time (as a full arch impression where there are multiple teeth present) or undertaking an impression of mobile teeth as in the Linhe/Nyman bridge.

Both of these procedures will be reviewed and clinical examples shown of how the duralay bonnets and coat hanger wire technique can be used not only for impressions but also for jaw registrations (Figures 16-18).

Periodontal prosthesis

The article on the periodontal prosthesis, commonly known as the Linhe/Nyman bridge, reviews all the literature from the 1970s on this exciting technique, which allows multiple pontic replacement in fixed bridgework on often severely mobile and reduced number of abutment teeth. The science is overwhelmingly in favour of this type of bridge in certain situations where conventional dentures or implants are not possible (Figures 19-21).

Peter Wohrle bridgework

The duralay bonnet technique also crops up in this article on individual crowns cemented onto a pink porcelain fused to metal bridgework cemented onto gold copings and then onto abutments screwed into dental implants – hence the abbreviated name ‘Peter Wohrle bridgework’ for ease of use after the dentist who first described the technique. Several cases will be described using slightly different techniques to illustrate the technical difficulties in producing this bridgework but demonstrating the overall superior aesthetic result, optimal fit and maintenance potential (Figures 22-24).

Aesthetic periodontics

The last article in the series reviews the latest techniques in periodontology used to enhance optimal aesthetic restorative techniques. The periodontist is an essential team member of the aesthetic restorative practice and an increasing amount of patients are requiring pink as well as white aesthetics. Connective tissue grafting, pontic site development, crown lengthening etc will be reviewed and discussed with step-by-step protocols (Figures 25-27).

Conclusions

Restorative dentistry has come full circle with old techniques revisited and amended for today’s dentistry. These techniques do not, however, get enough ‘air time’ in many journals as the importance of aesthetics takes over. It is my aim to help the reader understand these advanced restorative techniques and encourage them to put them into their everyday practice in order to help their patients and gain more clinical satisfaction.

For the writing of this article on advanced clinical techniques, I would like to thank certain members of my team, including Dr. Ibrahim Hassain, BDS, M.Med.Sci. Implantology – implant surgeon, Mr. Bradley Moore – dental technician, ADS Laboratory, Harrogate and Dr. Andrew Watson, BDS, MSc, specialist in endodontics.

Article was published in Private Dentistry.

About the Author

Prof. Paul A. Tipton BDS, MSc, DGDP UK, gained his MSc from the Eastman Dental Hospital in 1989. In 1999 he was certified as a specialist in prosthetics. During the last 20 years he has established his private practice and established for Tipton Training Ltd on restorative, aesthetic and implant dentistry. Over 2,000 dentists have been through one of his one-year dental programmes of which there are four levels (for more details visit www.tiptontraining.co.uk).

Prof. Tipton is currently president of the British Academy of Implant Dentistry and in clinical practice at the Yorkshire Centre for Advanced Dentistry outside Leeds where he takes referrals for restorative, aesthetic and implant dentistry (www.centreforadvanceddentistry.com).