



"Our expertise in fibers is your strength"

Feature Interview:

Dr. Tony Pensak of Calgary Canada, addresses favorite techniques and materials for cementation of fiber posts.



Welcome to the 5th Edition of our Electronic Newsletter

Happy New Year.

Welcome to the new edition. As always, our editorial staff is making it easy for you to select; read, forward or download the entire newsletter, or only the individual stories that interest you.



This issue has more live links than previous issues, connecting you quickly to CE Articles, Webinars, Videos and related websites.

In the current age of electronic media, the world gets smaller, and it becomes much easier to share high quality information with professional colleagues with the "click" of a button. You can **forward the document**, find more information on social media websites such as **Facebook**, or just connect and browse the sponsor's website for additional information.

We often have updates between the regular issues of the newsletter , so we often send out smaller, one -page follow-up bulletins.

Lastly, we are hearing that many of our colleagues are finding the newsletter in their SPAM or JUNK folders. We feel that this is because their e-mail server does not recognize the "sender" address we are using at Constant Contact. WE URGE YOU TO COPY AND PASTE the following into your address book:

postings@rtddental

Pierre-luc Reynaud, President of RTD

In this issue, the editorial theme is POST CEMENTATION, and we feature the usual main components:

- **Feature Article: LIGHT CONDUCTIVITY.** Part four of four discussing the differences between the characteristics and qualities of fiber posts
- **Interview: Dr. Tony Pensak, of Calgary, Alberta, Canada; on Post Cementation Techniques.**
- **Clinical case; Post cementation by our Senior Editor, Professor Daniel Torassa, DDS , PhD.**
- **Product news: Corecem ®, The world's most radiopaque color-on-command, dual - purpose resin.**
- **Product review testimonials: New testimonials coming in all the time.**
- **Article Reviews: of several recent and relevant scientific and review publications.**
- **Other news: New product literature, how-to articles and links to FREE on-line educational opportunities.**
- **Happy Birthday Fiber Posts: Composipost was introduced 25 years ago! Dentistry has never been the same!**

FEATURE ARTICLE

PART 4: LIGHT CONDUCTIVITY OF FIBER POSTS

In this fourth and final segment of this series on the comparative properties of fiber posts, the editorial team will address the evidence that distinguishes the differences in the ability of fiber posts to **transmit or conduct polymerization** energy into the post space during the cementation process.

Let's begin by posing a couple of the most basic questions that clinicians want to know when selecting a brand of fiber posts.

“Is there a difference in the light transmission capabilities from one post to the next, and if so what makes them different?”

“Is the energy generated by my curing light, and passing through the fiber post, adequate to completely cure my resin cement to the end of the post?”

The simple answer to the first one is simple: **yes** there are major differences, and they will be explained. The simple answer to the second question is: “**no** not even with the best fiber posts.”

Let's explain:

Fiber posts differ in light transmission from one make and model to the next for many of the same reasons they vary from one brand to another in flexural strength, radiopacity, and fatigue resistance; with the raw materials the posts are made of, and the way the posts are manufactured.

The original fiber post (COMPOSIPOST /C-Post) from RTD were made of carbon fibers, which had absolutely no light transmissive properties whatsoever. The second-generation (AesthetiPost / Aestheti-Plus) were made of a high silica quartz fiber, but still had no significant radiopaque or light transmissive properties to speak of. This generation of fiber post had many imitator's, including e.g. FibreKor, Parapost Fiber White, Snowpost, and at the time dual cured adhesives and chemical cure resin cements were the preferred cementation media.

When RTD introduced the Light-Post (1997) and then the DT Light-Post (2001), we entered a new era of convenience for the clinician in terms of post cementation options.



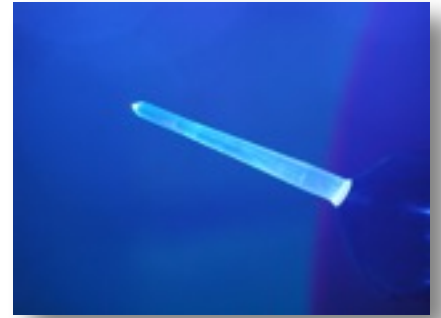
Although there is no universally accepted ISO specification test to measure the light transmission for composite beams or posts, there are many ways to compare and contrast them. The simplest way is to introduce light at the coronal end of the post, and measure it along the sides and at the apical end of the post (Goracci, 2008). Not only are the differences between posts visibly obvious, but the difference will impact the overall polymerization of the adhesive/cement used to system at the post. Some methods of measuring are very sophisticated (Cattini/Rovati, 2011), and RTD has developed hardware and software to quantify light transmission (Fig. 1). It is fairly simple to set up a test to demonstrate visibly the dramatic differences.

(See photos at the end of this article)

The factors that affect the differences seem here include any combination of:

- the composition, quantity (density), diameter of the fibers
- the composition and quality and percentage of the resin matrix
- any fillers that might be incorporated between the fibers to enhance coloration, or radiopacity. These fillers tend to impede light energy flow.

Oddly, even a post that appears to be translucent “to the eye” may have very bad light conductivity from end-to-end.



However, when cementing a post, there are many other factors that can influence the effects of the post in its transfer and dissemination of valuable polymerization energy in addition to the post composition:

- The shape of the post (tapered or parallel) (Sawada, 2002)
- The length and width of the post (wider posts can carry more light)
- The type and condition (health) of the light source
- The position (angle and distance) of the light source tip relative to the coronal end of the post (Urapepon, 2014)
- The amount of cement surrounding the post (influenced by the shape of the canal)
- The exposure time of the curing light (Teixeira, 2009)
- The sensitivity of the particular adhesive system or cement being used

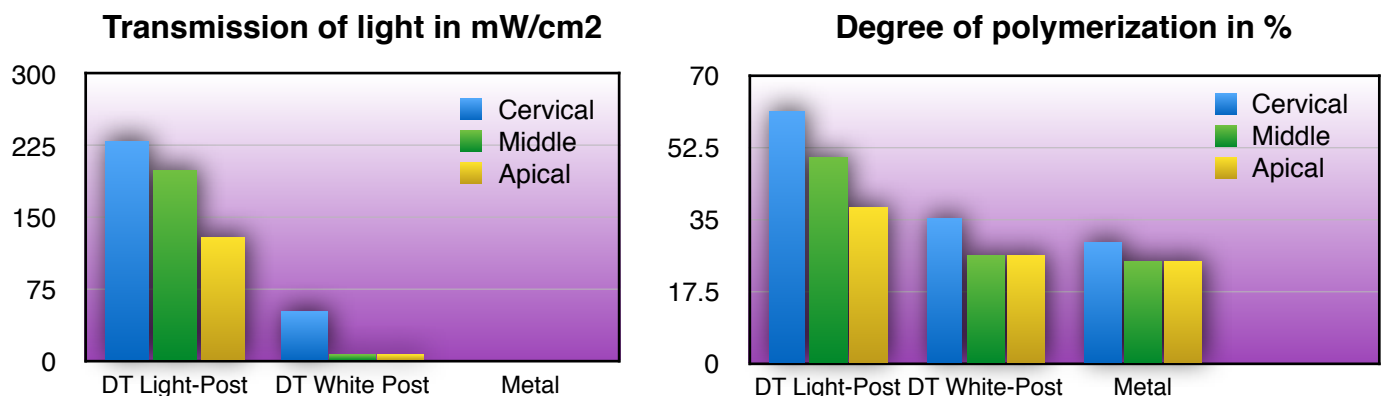
Since there is a wide variety of cementation systems available and being sold for post cementation, there are many ways to try to quantify the efficacy of the post and/or cement, the most common is to measure the "Degree of Conversion" (Kim, 2009, Faria e Silva, 2006, Navarra, 2012, Urapepon, 2013, Taneja, 2013). Materials scientists know that anything cured at the hands of the dentist- in the patient- will NOT normally exceed ~65% conversion/cross-link.

Still other studies compare the Micro-hardness (Ozcan, 2011), Knoop Hardness (Patyk, 2004) or the Microtensile Bond Strength, Vickers Hardness (Radovic, 2009), "Push-out" Bond Strength (Faris e Silva, 2007), Polymerization Depth (Dogar, 2012, Morgan, 2008),

Since there are so many test protocols, and so many variables, it is difficult to reach scientific consensus. However two themes run through the growing body of evidence:

1. Some fiber posts are better at carrying light energy, and this will affect the cure of the cement
2. There is a decrease in the effect of the light energy from the Cervical third to the middle third to the apical third
3. the energy available in the apical third is inadequate to polymerize a light-cure resin cement, and therefore DUAL-CURE OR SELF-CURE CEMENT IS ALWAYS RECOMMENDED BY RTD.

The charts here, from Teneja, 2014, might generally reflect the **typical results** in this area of study, comparing a highly translucent fiber post, a non-translucent fiber post (same size, shape, same company) and a metal post. In its Instruction for Use, RTD universally recommends light-curing the Cervical area, right after post placement, if ONLY to stabilize the post, and to cure the top 2mm of resin. This allows expedient progress to the next steps, while the cement cures chemically, and undisturbed, in the Middle and Apical regions.



Some clinicians, however, advocate waiting momentarily before light curing, to help minimize shrinkage. Here is a very revealing visual of the difference in the light transmission of several fiber posts.



TESTIMONIALS

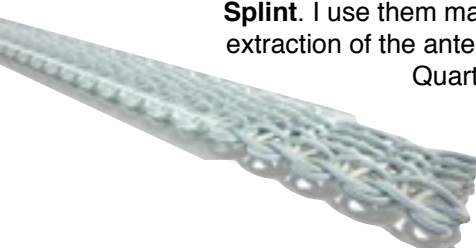
RTD and its business partners around the world continue to receive positive comments from the dentists and dental laboratories that use and evaluate our products. The following have been received since our August Newsletter Edition.



“Ten years ago I was introduced to fiber products for reinforcing and splinting periodontally involved teeth. Since then there have been many products available but one “go-to product” that I really like is **Quartz Splint**. It is extremely versatile beyond splinting mobile teeth, so I can use it for creating temporary bridges, repairing acrylic prosthesis, or even customized fiber post/core restorations. My personal favorite is the Woven, which I use for intra-coronal and extra-coronal splinting. If the case involves a long span, long term provisional bridge, I use the Rope. “

Dr. Howard Glazer, Private Practice, Fort Lee, NJ. Past President of the AGD, Former Assistant Clinical Professor in Dentistry at the Albert Einstein College of Medicine (Bronx, NY) USA

“My adventure with fiber splint has begun in 1997. I have worked with variety of fiber splints from many different companies. For two years I am using in my practice only RTD **Quartz Splint**. I use them mainly for indirect restorations , but I also love the moment when after extraction of the anterior tooth I can quickly and easily make the direct restoration on the Quartz Splint Woven and the Patient can leave my surgery with a smile.”



Dr. Danuta Bukowska, Medical University of Warsaw and Private Practice, Lodz, Poland.



“I have been using **Quartz Splint** primarily to reinforce transitional bridges, using both the woven and UD materials. They are extremely easy to use and have solved many situations in which the patient was experiencing transitional bridge fracture. The esthetics are excellent and patients are very satisfied with the results. There are many other applications for the Quartz Splint materials which I will take advantage of, having seen the outstanding results so far.”

Dr. Richard H. Nagelberg, Private Practice, East Norriton, PA. USA. Editorial Director,



“**Quartz Splint** is the finest material available for the enhancement of resin bonded restorations. I have used it successfully for long term provisionals, periodontal splinting, orthodontic retention, post and core buildups and denture repair. It is truly a universal aid whenever I need additional strength and prevention of a catastrophic failure. The pre-impregnated resin makes it ready to use out of the box. It just doesnt get any easier than this!”

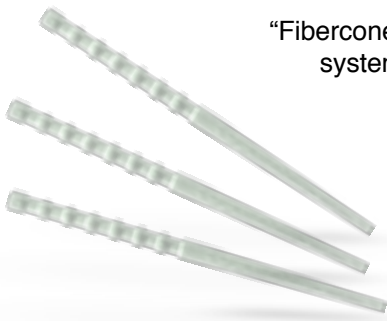
Dr Ian Shuman, Private Practice, Pasadena, MD, USA

“For the past 10 years I’ve worked fiberglass on hundreds of cases solving different clinical situations, such as reconstruction of critically damaged tooth; rehabilitation using fiber posts; bridges of one, two or more teeth; periodontal splinting and to increase vertical dimension (Bruxism), obtaining excellent results over time.

Having used a range of existing products in the market, I came to realize that the RTD Quartz Splint is the best alternative to achieve long lasting quality and beautiful results in the treatments I’ve performed; and I’m convinced that we will be using more and more of this products in our profession for years to come.”



Dr. Mario Rodriguez Pasado, Private Practice, San Jose, Costa Rica



"Fibercones are a "must-have" for every restorative dental practice. Root canal systems rarely are uniformly round or tapered. Fibercones create the most retentive post-core system available today by locking in to irregular canal shapes. They also allow for a minimally invasive approach to post space preparation. I can't imagine practicing without them!"

Dr. Brian Gray, Washington DC, USA



"I have used these Accessory Posts for a number of years and it is a very good clinical tool for situations where we have very wide canals and we should reduce the amount of cementing medium, so as to minimize contraction stress, and maximize the final mechanical properties. Modern dentists look for reversibility in their therapies, and that the restoration matches the tooth mechanically. Fibercone completes all of these expectations"

Prof. Abelardo Báez Rosales Chief, Dept. of Restorative Dentistry, University Andres Bello, Vina del Mar, Chile



"On completion of my evaluation of the RTD Fiber Post Removal Drills, I was very impressed. They cut efficiently and stayed centered perfectly. Fortunately, I don't need to remove many fiber posts, but I'm sold; this is a much simpler, better method than other removal systems that I have used in the past."

Dr. Richard S. Schwartz, Private Practice limited to Endodontics & Clinical Assistant Professor, Graduate Endodontics, UTHSC at San Antonio, TX, USA.



Fiber posts become 25 years old

The year 2014 marks 25 years since RTD introduced Composipost; the first patented fiber reinforced endodontic post. The original Composipost was composed of non-radiopaque, UNaesthetic fiber carbon fiber, but five generations and a quarter of a century later, fiber posts are the standard of care in most of the world's largest markets.

The goal of the dentist/inventors, Drs. Mark Reynaud and Bernard Duret, was to find a material more mechanically similar to tooth structure, that would retain in

the (composite) core buildup, but without predisposing to root fractures the way metal and cast posts traditionally do.

Reynaud and Duret introduced in the composite post to the world in 1989 with their groundbreaking publication "Un nouveau concept de reconstitution coronoradiculaire" and, combined with the then-emerging technologies for adhesion to dentin, they represented a paradigm shift in restorative dentistry.

25 years after introduction, the original two-stage Composipost is "retired", but RTD fiber posts are well-documented in more than 90 in vitro and 10 clinical studies, with the current generation DT Light-Post and Macro-lock Post and Fibercone being used in nearly 100 countries.

Last year alone, RTD manufactured 5.2 million fiber posts for their various customers.



CLINICAL CASE

Each issue will feature at least one case study showing clinical steps using RTD products. The complete cases, with as many as 24 step photos, can be reviewed at www.rtd.fr website.

The clinical cases have been donated by recognized clinicians and teachers from all over the world. The cases are selected by a committee and the editor does not bear responsibility for the accuracy or appropriateness of the treatment plans or step sequence.

This case was submitted by Dr. Professor Daniel Torassa of Cordoba Argentina: ***Simplified technique for Cementation and core building in one step with Fiber Post.***

Nowadays is possible to use materials which allows to do core build-up and adhesive cementation of fiber post in one clinical step.

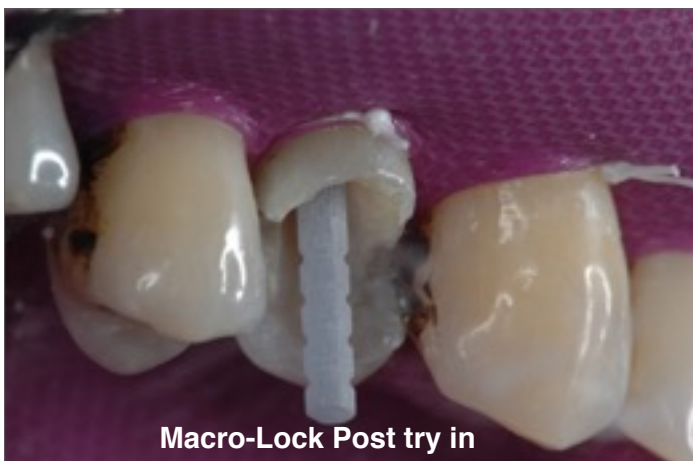
In this clinical case, the steps to do such procedure with a dual resin cement are shown and can be used to cement a principal post, accessory posts if necessary and core build up to achieve the restorative goal with this fiber post system.

The advantages are to reduce clinical time, clinical steps, and adhesives interfaces are also diminished when the adhesive procedure is done for the cementation and core build- up in one step.

Lets see a clinical case...

In this situation a premolar with a fracture is going to be restored with a post and crown restoration.

As the fracture is in the vestibular cusp, the main channel to be prepared is the vestibular as in the endo procedure was shown to be similar to the lingual one, is important to take into consideration that vestibular roots are not usually intended to support a post as their anatomy might have concavities.



CLINICAL CASE



Acid etching of channels & coronal dentin



Water spray to wash and clean surfaces



Paper points for selected drying of dentin



Adhesive system is applied in dentin and enamel



A matrix is used for the core build up



After cleaning the post, adhesive is applied and polymerized

CLINICAL CASE



Corecem Illusion Blue was used as cementation and core build up.



Once the cement is placed in the channel the principal post and accessory posts are seated.



Coronal view of the principal post and accessory posts with core build ups



Tooth prepared for crown restoration



Coronal view of tooth preparation before cementation



Final restoration

OTHER NEWS

RTD sponsors 3-part CE seminar series

RTD, working with Dental Tribune Learning Systems, announces the availability of a 3-part on-line lecture series, addressing important aspects of restoring badly compromised endodontically-treated teeth.



Part 1 features Dr/Professor Marco Ferrari (University of Siena, Italy) showing clinical evidence of the long-term benefits of placing a Quartz fiber-reinforced post, versus metallic posts or composite alone, without a post. The contribution of the amount of remaining tooth structure is also assessed.

<http://www.dtstudyclub.com/State-of-the-art-on-reconstruction-of-endodontically-treated-teeth-1925.html#.VDZ7LMf0s5O>



Part 2 offers in-depth analysis, by Dr./Professor Leendert (Len) Boksman (Schulich School of Med and Dentistry, London, ON Canada, Ret.) of the abundance of published in-vitro and clinical evidence that points to the possibility of actually reinforcing endodontically-treated teeth, using fiber posts and appropriate cementation/bonding procedures. Discussion of the relative value of different test protocols is included.

http://www.dtstudyclub.com/Do-Quartz-Fiber-Posts-Actually-Reinforce-Compromised-Endodontically-Treated-Teeth*qm*-Evaluating-the-Literature-1938.html#.VDZ7Kcf0s5M



Part 3 offers Dr/Professor Alejandro Bertoldi Hepburn, (Universidad del Desarrollo, Concepcion Chile) describing clinical techniques for restoring endodontically- treated teeth with large, irregularly-shaped canals using materials with mechanical properties matching those of natural tooth structure, and a rationale for distinguishing between those materials.

<http://www.dtstudyclub.com/Treating-the-oddly-shaped-canal-1936.html#.VDZ7J8f0s5M>

Each webinar lasts less than 1 hour, and RTD's sponsorship allows dentists world-wide to watch the lectures at NO COST, by simply registering with an e-mail address and creating a password.

NEW LITERATURE



As the **Quartz Splint** product line grows in worldwide popularity, RTD has taken the opportunity to create a new 12 page full-color booklet which describes each of the four varieties of the product in detail, with full-color pictures, clinical cases, packaging, reference numbers, charts and graphs.

The last page of the booklet also includes a new table; "**Indications by Type**", showing which versions of the product should be used for which clinical or laboratory technique, and which techniques are optional for the version.

RTD distributors can procure these booklets for distribution in their own countries, and dentists or business partners can access the electronic version (PDF file) at:

English: <http://www.rtdental.com/images/pdfs/CAT5010GB50-201409-01br.pdf>

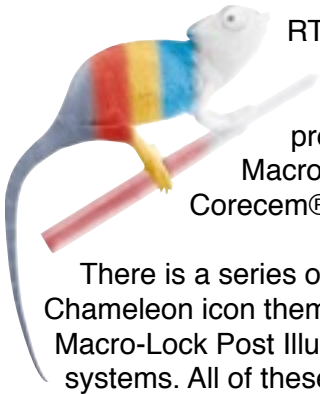
In addition, you can watch laboratory technique videos on-line:

Woven (Time- 3:12) : <https://www.youtube.com/watch?v=R1ox-ZOS4w4#t=12>

Unidirectional (Time- 2:20): <https://www.youtube.com/watch?v=mh6JLxGnylY>

Mesh (Time- 5:11): <https://www.youtube.com/watch?v=efz8zXQLEHw>

RTD ILLUSION TECHNOLOGY HAS A PERSONA



RTD has adopted the Chameleon as an icon to represent its patented Illusion Color-on-command technology, introduced in 2009. At present, the Illusion technology is offered in the Macro-Lock Post X-RO, the DT Light-Post X-RO and Corecem® Cement/Core material (see Product News).



There is a series of new product brochures available that carry that Chameleon icon theme; one for DT Light-Post Illusion X-RO, one for Macro-Lock Post Illusion X-RO, and one brochure that shows both post systems. All of these are available in English and Spanish.

MORE FREE “HOW-TO” EDUCATION ON LINE

Restoration of an Immediate Extraction Site Using a High Silica Quartz Glass Fiber Reinforced Provisional Bridge



**Ian Shuman, DDS,
MAGD, AFAAID
Pasadena, MD, USA**

The focus of this clinical study will provide the dental professional with the steps needed to fabricate a chairside fiber reinforced provisional bridge. Following the extraction of a tooth it is ideal to replace it at the same appointment. In instances where a multi-unit fixed prosthesis is the best treatment, an immediate provisional should be fabricated. Due to the length of time needed for the socket to complete healing and realize its matured contour, a long-term provisional must be created. This course will demonstrate the steps needed to fabricate a long-term provisional bridge using a Quartz fiber reinforcement material.



Read the article: <http://origin.library.constantcontact.com/download/get/file/1115638112444-92/Dr+Ian+Shuman-Restoration+of+an+immediate+extraction+site.pdf>

TECHNIQUE VIDEOS ON-LINE AT YOUTUBE

RTD has posted 3 technique videos for your easy access. These were recorded at a CE course given in Cordoba, Argentina by Dr Alejandro Bertoldi and Dr Lucas Echandia. Some captions are in Spanish, but the clinical Steps are easy for a dentist to follow.

- Anatomic Post and Core Technique (Time 8:12): <https://www.youtube.com/watch?v=pibh1BkIm58>
- Accessory Post Technique (Time 4:12): <https://www.youtube.com/watch?v=KHM4WZkk8BA>
- Fiber Augmented Post & Core Technique (Time 2:48): <https://www.youtube.com/watch?v=rh8uZPIAnT4>

RTD's YouTube Channel contains many other useful videos:
https://www.youtube.com/user/RTDDental/feed?view_as=public

PRODUCT NEWS

CORECEM™

CORECEM is a dual-cure, flowable hybrid composite for cementation of fiber posts AND core build-ups (with or without a post).

Using the same material for both technique step saves time, materials and eliminates one adhesive interface, and facilitates a durable “monobloc” restoration.



Utilizing dispersed NANO-particles of Ytterbium Trifluoride, in a bubble-free resin matrix, CORECEM has superior radiopacity to other popular cements and core materials, for better diagnostics.



Although CORECEM is flowable, it has strength that meets or exceeds other resins cements and core composites.



Despite dual cure capability, high Depth of Cure is important in post cementation, to stabilize the post, expedite the technique, and especially useful when using a chemically compatible, light-cured bonding resin, such as Sealbond Ultima.

Independent study shows that the retention of the RTD post, with CORECEM is equal to other popular systems.

CORECEM™ ILLUSION®

Corecem Illusion is exactly like regular Corecem, except that it incorporates the patented Illusion Color -On Command technology as used in DT Light-Post® Illusion and Macro-Lock Post® Illusion.

This presents as a BLUE posterior core composite while being manipulated, for easy contrast against natural tooth structure.

After finishing, the BLUE color disappears, leaving a popular A1 shade.



WARM



COLD

INDEPENDENT PUBLISHED RESEARCH



RTD keeps an eye on the in vitro and clinical research that is being published on nearly every continent. There is plenty, and we use this newsletter to share some of what we consider to be the most significant studies, many of which distinguish RTD products and technology from the plain and ordinary.

Daniel Torassa, DDS , PhD, Editor

Read and download an impressive scientific bibliography of over 500 studies about Fiber Posts;

www.rtdental.com/images/pdfs/FiberPostBibliographybyStudyType.pdf

Degree of conversion of resin composite cured by light through a translucent fiber posts. Urapepon, S. , J Adv Prosthodont 2014;6:194-9

Purpose: This study evaluated the depth of cure of resin composite cured by light through a translucent fiber post. **Methods:** The opaque plastic tubes in various lengths of 2, 4, 6, 8, 10, 12, 14 mm. were filled with resin composite in which two different translucent fiber posts (DT Light-Post, RTD, St Egreve, France & FRC Postec Plus, Ivoclar Vivadent AG, Schaan, FL) were inserted into the center and photo-polymerized for 40 seconds. The degree of conversion of the cured composite at bottom surface were examined using Fourier transform infrared attenuated total reflection spectrometer (FTIR/ATR) at 0.1, 0.5 and 1.0 mm apart from the post surface. **Results:** The degree of conversion of the 0.1 mm, 0.5 mm, 1.0 mm apart from the post surface was highest at the 2 mm level and continuously decreased when the distance from the light source was increased and drastically decreased when the depth from the top of the post was greater than 4-6 mm. For each level, the highest degree of conversion was at 0.1 mm from the post surface and decreased continuously when the distance apart from the post surface was increased. **Conclusion:** The quantity of light transmission depends on the type of post and the light transmission capability of the post, especially after 4-6 mm depth and the area further apart from the post surface, are insufficient for clinical light activation of resin composite.

Editor comments:

Several researchers have reported on the light cure mode to dual cements giving higher micro-tensile bond strength to dentin, rather than the self cure mode. The bond strength of fiber posts with a dual cement depends on the ability to transmit light along the post.

The degree of conversion of a photoactivated resin composite to evaluate the effect of light transmission was used. Type of post, depth and distance apart from its surface are conditions that influence the quantity of light transmission.

The results show that the light transmitted through the posts was drastically reduced when the depth from the top of the post more than 4-6 mm, and showed insufficient transmission of light to polymerize the resin cement or composite. Moreover, the expectation of light-cured mode of resin cement cannot be expected especially in the deeper part; more than 4-6 mm. Also, the space apart from both posts DT Light-Post and FRC Postec Plus which had a similar behavior.

Evaluation of light transmission through different aesthetic posts and its influence on the degree of polymerization of a dual cure resin cement. Taneja, S., Kumari, M., Gupta, A. Jnl Conservative Dent ,Jan-Feb, 2013, Vol 16, Issue 1

Aim: To measure the light transmission through different aesthetic posts and to evaluate the degree of polymerization of dual-cure resin cement cured through these posts. **Materials and methods:** The posts were divided into two experimental groups i.e. Group A (DT Light-Post RTD, St Egreve , France); Group B (DT White Post RTD, St Egreve , France) and control i.e. Group C (metal post), each group having 10 samples. Posts of each group were illuminated with curing light, and photographs were taken keeping the parameters standardized to evaluate the intensity of light transmission at different levels.

Continued

INDEPENDENT PUBLISHED RESEARCH

The degree of polymerization of dual-cure resin cement was evaluated using FTIR spectroscopy. The data obtained was suggested subjected to a statistical analysis. Results: DT Light-Post showed highest light transmission and degree of polymerization. The light intensity decreased from cervical apical for both aesthetic posts, but the decrease from middle to apical third was insignificant for DT White -Post group. No light transmission was detected in metal post, but the degree of polymerization decreased significantly from cervical to middle third. Conclusion: Cementation of fiber post with superior light transmitting ability, using dual cure resin cement, resulted in increased degree of polymerization.

Editor comments:

In this research light conductivity of two fiber posts with differences on their constitution (DT Light Post, DT White post; RTD, France) and a metal post were evaluated. A dual cured, self adhesive cement (Relyx Unicem;3M Espe, Germany) was used as the resin cement. It was clear that the metallic post had no ability for light transmission, and comparing the fiber posts, the DT Light post show better results than the DT White post, which is not translucent. This results are in agreement with other similar researchs were the importance of the constitution of the matrix resin and fillers have on light conductivity. Taking into consideration the results of this research, the conductivity decreases through the length of the post and the conversion of the resin is weak in the apical area, which reduces physical properties of the cement in the apical third. Although there is relationship between the extent of resin cement, degree of polymerization of resin cement, and physical property improvement, care must be taken not to attribute clinical success to conversion values. Further clinical studies are required to substantiate this findings.

Determining the influence of fibre post light transmission on polymerization depth and viscoelastic behaviour of dual-cured resin cement. Dogar, A., Altintas, S.C., Kavlak, S., Guner, A. Int Endod J. 2012 May 24. doi: 10.1111/j.1365-2591.2012.02085.x. [Epub ahead of print]

Aim: To evaluate the effect of quartz-fiber posts on the depth of polymerization of a dual-cure resin cement using Raman spectroscopy and to determine the physical properties of the polymerized cement using a dynamic mechanical analyzer (DMA). Methodology: Twenty-five fibre (DT Light-Post, RTD St Egreve, France) and 25 CrNi posts were used to evaluate depth of polymerization. Posts were cemented with dual-cure resin into root canals formed from silicone moulds, without using bonding or etching agents. After polymerization, resin layers on each sample were removed using a curette and cut into three equal parts (apical, middle and coronal). All resin specimens for every third were gathered and crushed. Resin powder samples were analysed using Dynamic Mechanical Analysis and Raman spectroscopy for each third. Results: The numerical data revealed that the thermal transitions of the materials took place at higher temperatures from the apical to the coronal sections in both groups. C=C double bond intensity was lower in fibre post-resin cement samples when compared to their intensity in metal post-resin cement samples. Conclusion: Dual-cured resin cements had more rigid properties and better polymerization for fibre posts when compared with metal posts. Polymerization quantity was affected by position in the canal.

Editor comments:

The dynamic mechanical behaviors of polymers after being polymerized through a fiber post or a metallic one were assessed.

The conclusion supports the fact that fiber post with light conductivity achieves a stable resin cement with better cross-linking of the resin with more broken C = C double bonds which means a better viscoelastic behavior. The coronal third registered a more rigid result than middle or apical regions. Fiber posts are able to establish a "unit" post-cement more stable and predictable and thus contribute to the durability of this restorations.

continued

INDEPENDENT PUBLISHED RESEARCH

Light transmission through fiber post: The effect on adhesion, elastic modulus and hardness of dual-cure resin cement Radovic, I., et al.

Dent Mater, Vol. 25 Issue 7. Pages 837-844, July, 2009

Objectives: The aim of this study was to investigate the effect of fiber post light transmitting ability to the continuity of resin cement-root dentin (C-RD) and resin cement-fiber post (C-FP) interface, elastic modulus and hardness of a dual-cure resin cement. **Methods:** Spectrophotometric measurements were applied for the determination of light transmission at coronal, middle and apical level as well as at the apical tip through Tech 21 X-OP (TECH) and DT Light-Post (DT). Posts were cemented using dual-cured resin cement (Calibra). Roots were sectioned longitudinally through the post. Epoxy resin replicas were made and used to evaluate C-RD and C-FP interface under SEM. Modulus of elasticity (E) and Vicker's hardness (VH) of the cement layer were assessed. **Results:** No light transmission was detected through TECH. Light transmission through DT decreased from coronal to apical and rose at the apical tip. TECH presented a significantly lower percentage of continuous C-RD and C-FP interface in comparison to DT. Coronal third of C-RD interface in TECH specimens had a significantly higher percentage of continuity than apical third. No regional differences in continuity of C-RD interface were found in DT specimens. E and VH were significantly lower when TECH was used, and decreased from coronal to apical for both posts. **Significance: Cementation of fiber post with no light transmitting ability using a dual-cured resin cement resulted in lower E and VH of the cement layer and lower percentage of continuous C-RD and C-FP interface in comparison to cementation of light transmitting fiber post.**

Editor comments:

The effect of two Fiber posts (DT Light-Post, RTD y Tech 21 X-OP, TECH), but with differing light conductivity properties, were used to know their influence on the continuity of the interface between Resin cement-Dentin and Resin Cement-Post. Elastic modulus and Vickers hardness was also evaluated on the resin cement after being polymerized trough both fiber posts.

The Tech 21X-OP post had no light conductivity. DT Light-Post had light conductivity and this property was reduced from the coronal third to the apical. These differing properties on both Fiber posts showed different results in terms of resin cement-dentin and resin cement post interfaces continuity, having a significantly higher percentage of continuity for the DT light post.

The results for elastic modulus and vickers hardness were also different and better for DT light post, this improved micromechanical properties of the resin cement were founded because of the light conductivity showed with DT Light-Post.

We are happy to occasionally publish new and relative in vitro research that may not get published in the mainstream literature. The following projects were conducted by supervised post-doctorate student in Turkey.

Effect of ferrule preparation and aesthetic post systems on the fracture resistance of teeth with oval root canals. Atalay, A.S.. Istanbul University, Institute of Health Science, Department of Prosthodontics. PhD Project. İstanbul, Turkey.



The purpose of this in-vitro study was to evaluate the effect of different fiber reinforced aesthetic post systems and ferrule preparation on the fracture resistance of endodontically treated teeth with oval root canals.

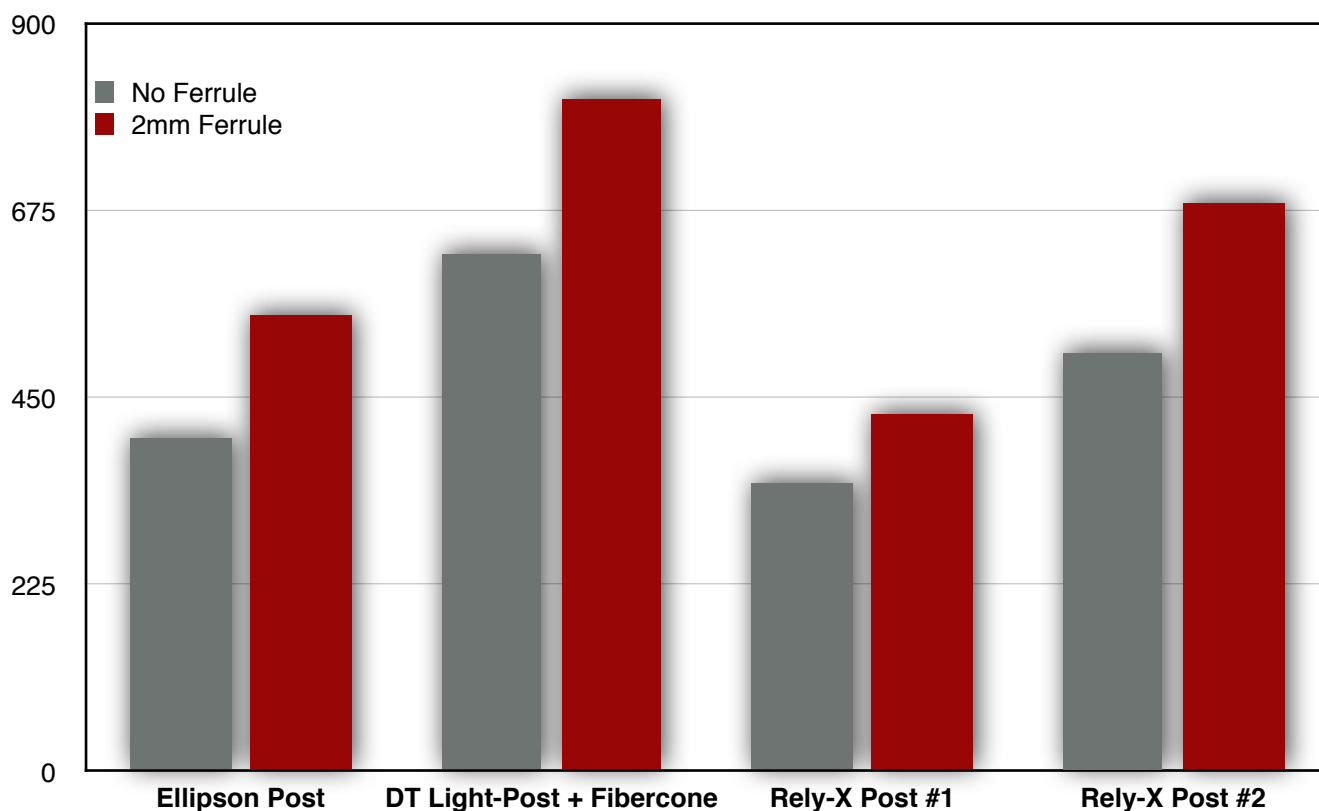
80 human canines with oval root canals were divided into 2 main groups (n=40). For the non-ferrule group (G1), teeth were de-coronated at the cemento-enamel junction (CEJ) perpendicular to the long axis. For the ferrule group (G2), teeth were sectioned 2mm coronal to the CEJ. Following endodontic treatment both groups were further divided into 4 subgroups consisting of 10 specimens in order to receive different fiber-reinforced esthetic posts.

INDEPENDENT PUBLISHED RESEARCH

Different post systems were used to form the experimental groups as follows: 1. Ellipson Post; RTD, St. Egreve, France, 2. DT Light-Post + Fibercone; RTD, St. Egreve, France, 3. Rely-X Fiber Post #1; 3M ESPE, Seefeld, Germany, 4. Rely-X Fiber Post #2; 3M ESPE, Seefeld, Germany. Teeth were embedded into acrylic resin molds 2 mm below the CEJ following cementation of the posts into the root canals. Cores were fabricated for the coronal portions of the posts using a dual polymerizing composite core material. All ceramic crowns were also constructed and cemented..

All specimens were compressively loaded at 135° angle to the long axis of teeth in a universal testing machine at a crosshead speed of 1mm/min until fracture. Data obtained were analyzed statistically using Student's t test and ANOVA followed by Tukey HSD multiple comparison tests. The experimental group (DT Light-Post + Fibercone) in which the teeth were restored with a standard circular post combined with an accessory post revealed the highest fracture strength values in both ferrule and non-ferrule groups ($p < 0,001$). Regardless of the post type, ferrule preparation had a significant influence on the fracture resistance and increased the loads to failure in all groups ($p < 0,001$). Conclusion: Within the limitations of this in-vitro study, it can be concluded that the use of Fibercone Accessory Posts with the main post allows a reduction in cement thickness, forms a rigid post-canal adaptation and avoids the poor post-canal adaptation caused by the empty spaces around the circular posts when restoring teeth with oval root canals. The results of this study could serve as effective measures for clinical applications. The present work was supported by the Research Fund of Istanbul University. Project No. 8142

Fracture Resistance (N)



Editor comments:

In this In Vitro research clinical conditions similar to the one we face in everyday oral rehabilitation were tried to reach and could demonstrate the better results obtained with accessory posts to reduce cement volume and improve the physical properties of the whole system, principal post-accessory posts and resin cement.

Within the limitations of In vitro research, is important to notice once again that conservative dentistry is necessary in Prosthodontics. The 2mm at least of sound dentin to be surrounded by the final restoration is of utmost importance for the clinical results.

INTERVIEW



Dr. Pensak, of Calgary, Alberta, Canada, maintains a full-time private general dental practice for over 3 decades, with an emphasis on cosmetic occlusal reconstructive procedures. He lectures internationally on the subjects of aesthetic dental rehabilitation, practice management and occlusion theory.

He was an early adopter of the low-modulus, fiber post approach, having clinical experience with all 5 generations of RTD fiber posts, including Fibercone® Accessory Posts.

We asked Dr. Pensak to share his preferences for cementation of fiber posts in this stage of evolution.

Q. Of the several genres of cements being offered today for post cementation, which approach do you prefer; self-etching? self-adhesive?, total-etch with resin cement?

A. Post cementation is a procedure of last resort. We only have to resort to this technique when a tooth is so structurally compromised that it requires the most predictable, scientifically valid technique available today. Any alternative puts the viability of the tooth at risk. The most predictable, scientifically valid technique is to employ the total etch technique to bond a Quartz fiber post with a resin cement.

Q. Why do you reach for that first?

A. To most predictably ensure the long-term viability of the tooth, I believe it is wise to embrace the long-term track record of the total etch with resin cement technique. It generally demonstrates better bond strength in in-vitro studies and compensates for the variability in the nature of internal dentin and for problems in getting a really clean surface inside a post space. Some published work with RMGI and self-adhesive systems indicate very encouraging bond strength data in-vitro, but long-term clinical trials are linked to the “total - etch” protocol.

Q. But doesn't that technique take more time? more steps?

A. A few more steps, but I can use the same resin for cementation and the core buildup. I prefer those types of resins. That approach actually saves me time and materials and, therefore, money. It is one less chemical interface between materials that I have to worry about, and makes for a more homogenous restoration, less clean-up, and so on.

Q. You can't use the self-etching or self-adhesive / Glass Ionomer cements in that “dual-purpose” approach?

A. None that I know of. The handling and mechanical properties are all wrong. They were developed to be used for “universal” cementation of crowns, bridges, inlays, posts, etc., with a low film thickness and an adhesive mechanism. But the type of products I'm using, which includes Corecem, have a film thickness under 30 μ , but have handling characteristics that allow me to inject and “stack” a core buildup without slumping. It takes on the mechanical properties of other single-purpose core materials, including high-strength, good radiopacity and it trims very much like dentin.

Q. RTD Corecem was not the first product of this type in that category. Dentsply, Bisco, Ivoclar, Coltene and DMG all make products in this “dual purpose resin” category. Why do you prefer RTD Corecem?

A. First, the consistency, radiopacity and trimming characteristics are quite competitive with the big companies' products. But what I like the best is Corecem **Illusion**, with the unique color-on-command technology also found in most of the current RTD fiber posts.

Q. Aren't you worried about some degree of "show-through" in all-ceramic crowns, especially in the anterior region?

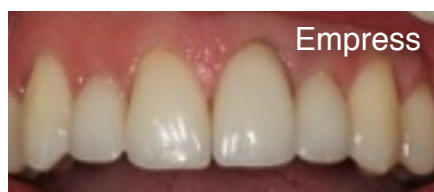


A. Of course I was curious when I first received Corecem Illusion several years ago. I loved the material itself and the color change, but I also provide a lot of all-ceramic crowns. So I did my own test, for my own peace-of-mind.

I had a clinical case (Fig 1 & 2) and had crowns made in Emax®, Empress® and Zirconia. I had

prepared to allow for 1mm thickness on the labial for all 3 versions.

I tried-in the crowns with try-in cement and took each of these pictures (Figs. 3, 4 & 5) after chilling them with cold water from my syringe for 1 minute. I saw no color showing in any of the 3.



With the many other cases I have done, I do not see show-through with Emax or Zirconia, regardless of crown thickness, but I would expect to see color - very slightly - through Empress; at .75mm thickness or less.

I am not intending to re-write RTD's directions, but with my experience over these years, I am confident using and recommending Illusion posts and Illusion Corecem to my colleagues and audiences with any of the 3 types of crowns, **with appropriate thickness**.

More about Dr. Tony Pensak

Dr. Pensak graduated in 1981 with his dental degree from the University of Western Ontario in London and spent the first 10 years of his career developing his new practice in Calgary, while continuing to take advanced courses as often as was possible.

In 1995, Dr. Pensak launched his lecturing career, and has since traveled to such far-flung destinations as Australia and Greece to instruct graduate dentists and dental specialists in advanced techniques in both lecture and clinical formats.

He lectures internationally on the subjects of aesthetic dental rehabilitation, practice management and occlusion theory. He has experience with a wide range of approaches to occlusal rehabilitation including Pankey, O.B.I., F.A.C.E., PAC-Live and is one of only several hundred dentists to have completed the Full Mouth Rehabilitation program at the prestigious Las Vegas Institute (L.V.I.)

He is a Fellow of the Academy of General Dentistry, a published author, and is Category II laser certified.

In 1997, Dr. Pensak co-founded the Millennium Institute for Advanced Dental Studies in Calgary, which was Canada's first hands-on teaching institution for dentists.

Dr. Pensak is currently engaged in original clinical research in the area of pulpal response to dental materials, and is one of the few Canadian dentists to be considered a clinical evaluator and key opinion leader working with manufacturers including 3M ESPE, Dentsply, RTD and Bisco.