

SPIDENT
Symposium
EsFlow® PLUS Series

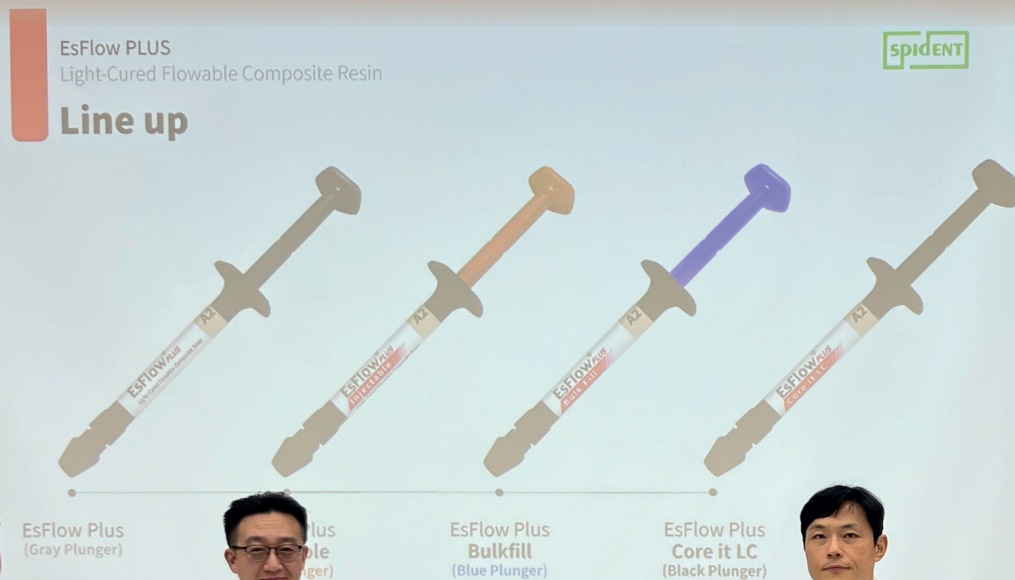


EsFlow PLUS Series Symposium

Various Clinical Applications of Flowable Composite Resin

Date & Time : January 17, 2025 (Friday) at 16:00

Place : Main Auditorium, 5th Floor,
Gangneung-Wonju National University Dental Hospital



Panelists
Prof. Kyung-Mo Cho

Department of Conservative Dentistry

Panelists
Prof. Sae-Hee Park

Department of Conservative Dentistry

Panelists
Prof. Yoon-Hyuk Heo

Department of Prosthodontics

Moderator
Prof. Kyung-Ho Go

Department of Prosthodontics

Prof. Kyung-Ho Go

Good afternoon. Today, I have invited Professors Cho, Park, and Heo to discuss Flowable Composite Resin. Although we use restorative methods involving materials such as metal, porcelain, glass-ionomer, and zirconia, we have long utilized composite resin in various applications.

Since the development of composite resin, the most widely used form has been paste-type packable composite resin. However, to improve handling, Flowable Composite Resin was developed, and its range of clinical applications has steadily expanded. Today, we will discuss the background behind its development as well as its fundamental characteristics.

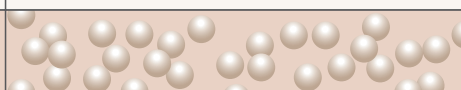


Prof. Kyung-Mo Cho

To properly discuss about Flowable Composite Resin, we must first understand the composition of composite resins. Composite resin consists of an inorganic filler dispersed within an organic resin matrix.

The resin matrix encapsulates fillers that do not bond to each other and integrates them into a unified material through the polymerization process.

Fillers impart essential properties to composite resin, such as physical and mechanical characteristics, color, translucency, and radiopacity. Generally, as the filler content increases, the mechanical properties improve, viscosity increases, and flowability decreases.

	Conventional Flowable More Organic matrix	Hybrid Less Organic matrix
		
Water sorption	↑	
Solubility	↑	
Polymerization Shrinkage	↑	
Hardness		↑
Wear resistance		↑
Modulus of Elasticity		↑
Creep	↑	
Therma expansion	↑	
Light curing ability		↑

Prof. Sae-Hee Park

That very flowability is the reason behind the development of flowable composite resin. Traditional paste-type packable composite resin has a relatively high viscosity, making it advantageous for shaping during restoration.

However, its handling can be challenging, and it has limitations in filling very narrow gaps. Which is why a composite resin with lower viscosity was developed to improve flowability. The simplest way to achieve this was by reducing the filler content.

Prof. **Yoon-Hyuk Heo**

Reducing the filler content was effective in lowering viscosity; however, it also weakened the mechanical properties of the composite resin, making it less suitable for high-load areas.

Additionally, polymerization of composite resin results in shrinkage, which can lead to weakened bond strength, increased microleakage, and postoperative sensitivity. Polymerization shrinkage primarily occurs in the resin matrix.

Therefore, when the filler content is reduced, the relative proportion of resin increases, leading to greater shrinkage.

Prof. **Kyung-Mo Cho**

Reducing the filler content also has the drawback of making the material appear more transparent.

Prof. **Kyung-Ho Go**

Nevertheless, flowable composite resin continues to be used and has undergone continuous advancements.

Prof. **Kyung-Mo Cho**

Indeed, its superior flowability makes it particularly advantageous for use in confined spaces. Thanks to the syringe-based delivery system, it can be easily applied, making it a preferred choice over the more cumbersome handling of traditional composite resin.

However, excessive flowability can sometimes hinder the ability to maintain the desired shape.

Prof. **Sae-Hee Park**

Therefore, manufacturers attempted to slightly reduce flowability by adding fillers or modifying the viscosity modifiers in the resin matrix. However, this sometimes resulted in difficulties with syringe extrusion or improper filling of the intended area.

Prof. **Yoon-Hyuk Heo**

While efforts were made to maximize the advantages of flowable composite resin, its various shortcomings led manufacturers to integrate their unique composite resin technologies to develop the next generation of flowable composite resin.

Prof. **Kyung-Ho Go**

With recent advancements in polymer technology, manufacturers have discovered ways to maintain a high filler content while ensuring excellent flowability. So, what properties should an ideal flowable composite resin possess?

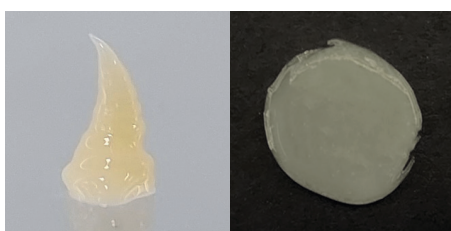
Requirements for Flowable composite resin

- ▣ Comparable physical strength to conventional packable composite
- ▣ Easy build-up and make flow when it need
- ▣ Enough light curing depth
- ▣ Easy to inject
- ▣ High polishability and gloss retention
- ▣ Similar fluorescence to natural teeth
- ▣ Enough radiopacity
- ▣ No bubble during using
- ▣ Not stick to syringe tip
- ▣ Not overflow from syringe tip
- ▣ Pliable tip

Prof. Yoon-Hyuk Heo

Let's outline a few key factors. First, it should have mechanical properties similar to conventional composite resin to allow for effective layering while also exhibiting flowability when needed. It should be easily extruded from the syringe and ensure efficient light polymerization even in deep cavities.

✓ Easy build-up and make flow when it need



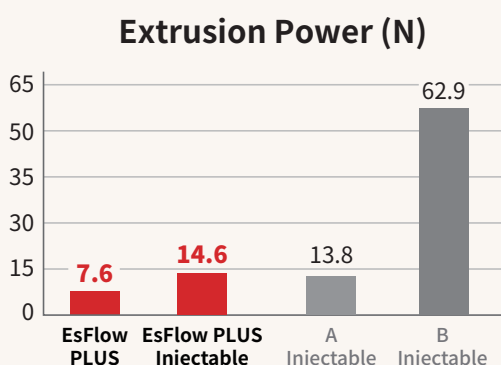
Stack as you like, Flow as you need.

Exceptional thixotropic viscosity makes it optimal for free-hand cusps build-up.

With a 'explorer-ing', it will flow as you need.

✓ Easy to inject

Specially designed syringe gives comfort during extrusion.
Pentagonal plate and plunger make it easier to hold and inject.



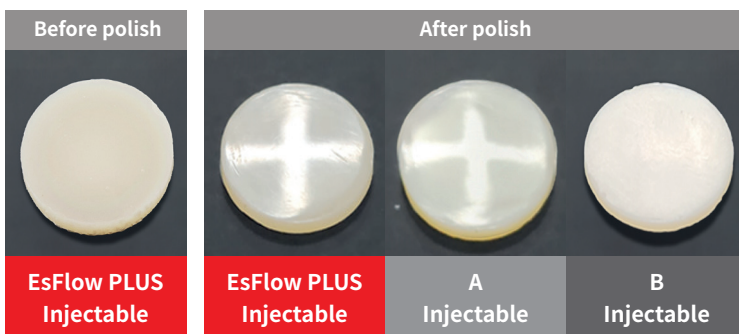
*Spident R&D center internal data

Prof. Yoon-Hyuk Heo

For aesthetic purposes, it should provide excellent polishability and long-term appearance retention after finishing, exhibit fluorescence similar to natural teeth, and have an appropriate level of radiopacity. Additionally, it should prevent air bubble formation during use, leave no residual material in the syringe tip, and immediately stop flowing once pressure is released. An optimally flexible syringe tip would be an added advantage

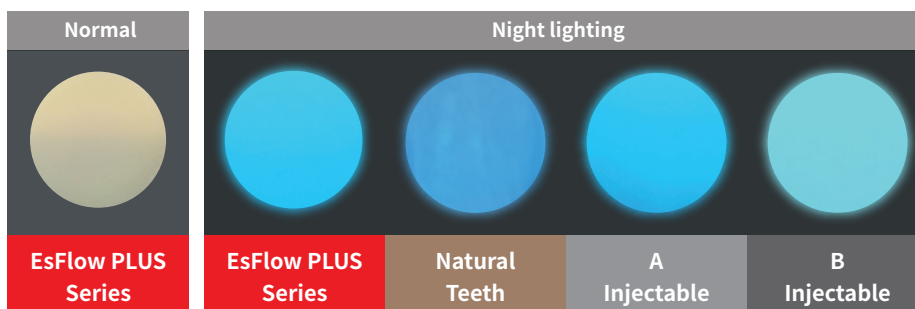
✓ High polishability and gloss retention

Excellent polishability and gloss retention.



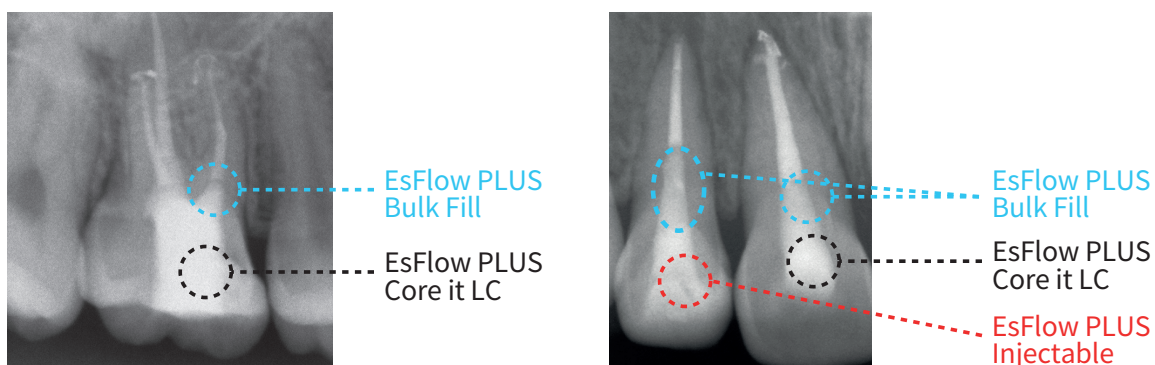
✓ Similar fluorescence to natural teeth

Natural teeth has fluorescence property and as we launch next generation of flowable composite, we added fluorence to it to become more similar to natural teeth.



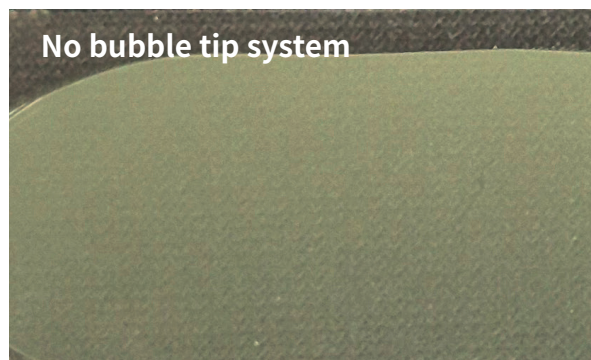
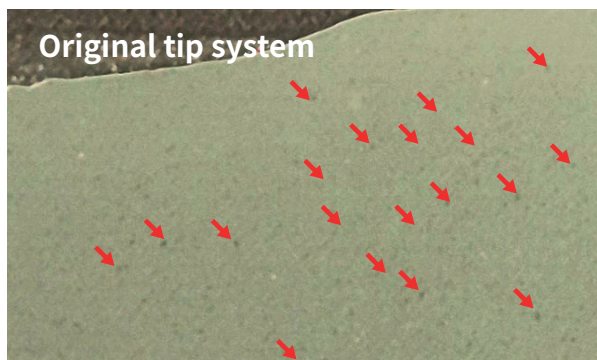
✓ Enough radiopacity

Excellent radiopacity.



No bubble during using

'Zero Bubble System' - an enhanced tip design minimizes the formation of bubbles inside the tip.



Prof. **Sae-Hee Park**

Although a single flowable composite resin may not perfectly meet all the ideal conditions, it is desirable to have a range of products with similar properties but slightly different characteristics to suit various clinical situations.

EsFlow[®] PLUS Series Light-Cured Flowable Composite Resin

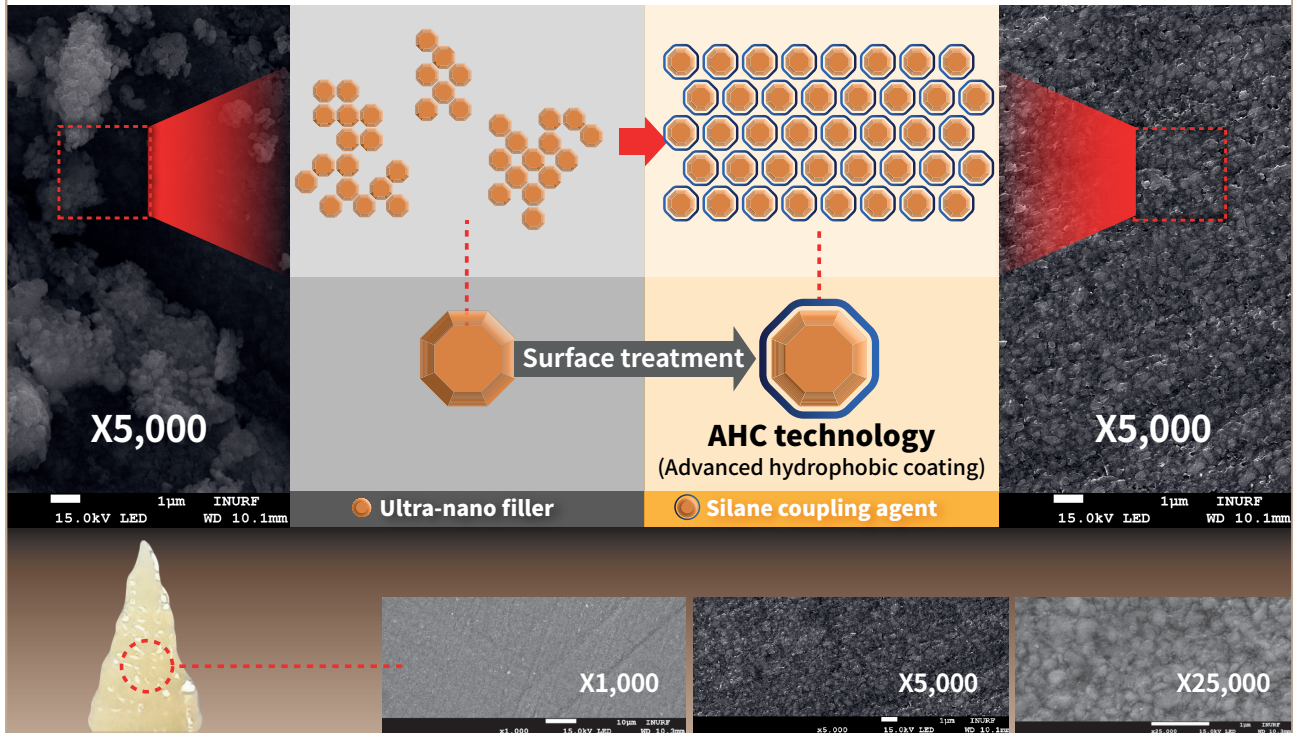


Prof. **Kyung-Ho Go**

Spident has been marketing Flowable Composite Resins for a long period and recently launched the EsFlow PLUS product line with several improvements. Compared to the previous EsFlow products, EsFlow PLUS offers significantly enhanced physical properties, flowability, and handling characteristics.

✓ Comparable physical strength to conventional packable composite

Our unique silane coating technology AHC(Advanced Hydrophobic Coating) facilitates the uniform and dense dispersion of nano fillers(180nm), culminating in exceptional strength and optimal handling characteristics.

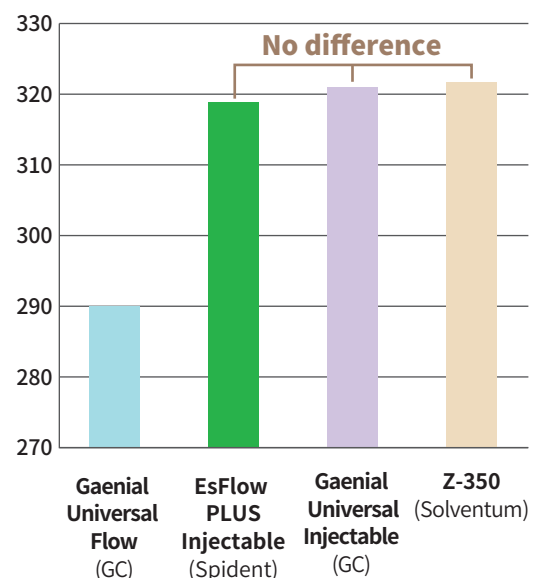


Prof. Kyung-Mo Cho

The most significantly improved product is EsFlow PLUS Injectable. The term 'Injectable' signifies its ability to maintain its shape without slumping, while still exhibiting optimal flow under slight pressure or vibration. Despite its high viscosity, it can be easily extruded from the syringe.

My experiment confirmed that its compressive strength is comparable to that of conventional paste-type composite resin, demonstrating excellent mechanical properties.

Compressive Strength			
Material	N	Mean	St.D
Gaenial Universal Flow (GC)	15	290.8	51.9
EsFlow PLUS Injectable (Spident)	15	318.6	43.4
Gaenial Universal Injectable (GC)	15	321.7	32.5
Z-350 (Solventum)	15	323.4	17.1



*College of Dentistry, Gangneung-Wonju National University data

Prof. Kyung-Ho Go

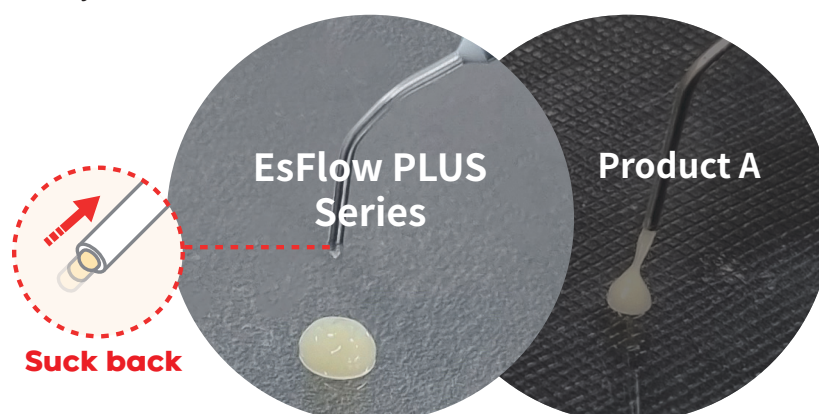
Although I did not conduct the experiment myself, clinical experience suggests that restorations made with this product exhibit less wear during adjustments compared to other composite resins, indicating superior wear resistance.

Prof. Yoon-Hyuk Heo

Using the product, I can clearly feel the significant improvements. In terms of convenience, the long, flexible tip allows easy bending in the desired direction, making it ideal for application in deep or narrow areas. Additionally, it requires minimal force for extrusion, and once pressure is released, the flow stops immediately, leaving no residue in the tip.

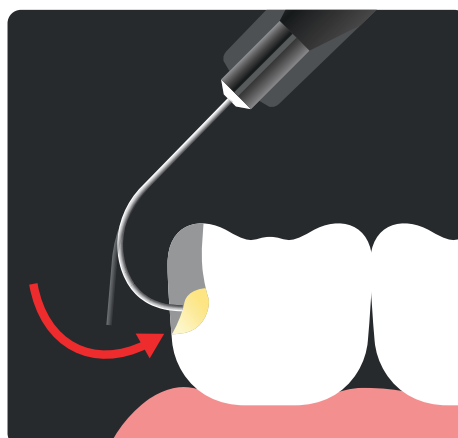
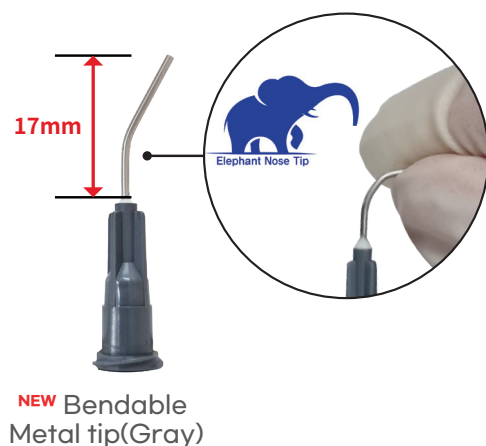
Not stick to syringe tip & Not overflow from syringe tip

Ideal viscosity makes it easier to separate the material from the tip. It leads to shorter finishing steps without the need to polish extra composite and virtually eliminates any material overflow.



Pliable tip

With new bendable tip, you can reach the distal surface of the posterior.



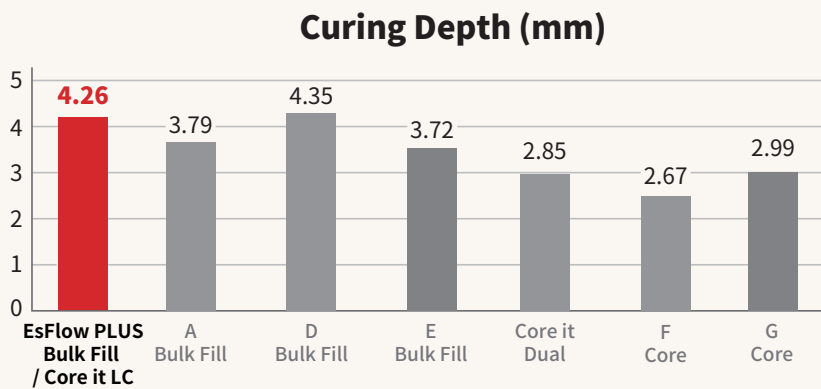
Prof. Sae-Hee Park

The newly developed PLUS product line offers significantly improved physical properties compared to the previous EsFlow products, exhibiting characteristics closer to paste-type composite resins.

A key advantage is the variety of product options tailored to different clinical situations. For example, the lineup includes a bulk-fill variant with enhanced light-curing capabilities and a light-cured core material designed for clinicians familiar with flowable composite resins.

Enough light curing depth

Reliable depth of cure allows fast volume restorations.



*Spident R&D center internal data

*Following each manufacturer's instructions



Prof. Kyung-Ho Go

If there are various flowable composite resin products available, their range of applications would also expand. I would love to hear in what cases you are using EsFlow PLUS products, professors.

EsFlow PLUS Series Indication

Category	Product	Small Cavity	Class I, II	Class III	Class IV Diastema	Class V	Core build up
Universal (≤ 2mm)	EsFlow PLUS 						
	EsFlow PLUS Injectable 						
BulkFill (≤ 4mm)	EsFlow PLUS Bulk Fill 		 Liner/Base				
	EsFlow PLUS Core it LC 						

Most ideal

Recommended

Available

Not recommended

Prof. Kyung-Mo Cho

I believe that both EsFlow PLUS and EsFlow PLUS Injectable can be applied in nearly all cases where conventional composite resin is used for restorations. Unlike conventional flowable composite resins, which had lower strength and were limited to small restorations, these products provide sufficient strength for larger restorations, making them applicable from Class I to Class V procedures.

However, since the bulk-fill variant focuses on enhanced light curing and has a slightly more transparent characteristic, it is more suitable for use in deeper areas rather than the outermost layer of esthetic restorations.

Prof. Sae-Hee Park

The bulk-fill variant is well-suited for the final restoration of root canal cavities, including root canal filling and coronal sealing.

Additionally, EsFlow Plus Core-it LC offers a light-curing depth similar to bulk-fill composites while having lower translucency, making it suitable for use throughout the entire root canal cavity.

Prof. **Yoon-Hyuk Heo**

From a prosthodontic perspective, I believe that EsFlow PLUS Injectable is an effective material for sealing the occlusal hole of implant restorations. (**Fig 01**)

Since implant restorations are typically made of hard materials such as metal or zirconia, there is a risk that composite resin may wear down quickly due to differences in wear resistance.

Therefore, it is advisable to seal the occlusal surface with a material that has excellent wear resistance, and EsFlow PLUS Injectable meets these requirements.

It can also be used for ceramic repair. (**Fig 02**)

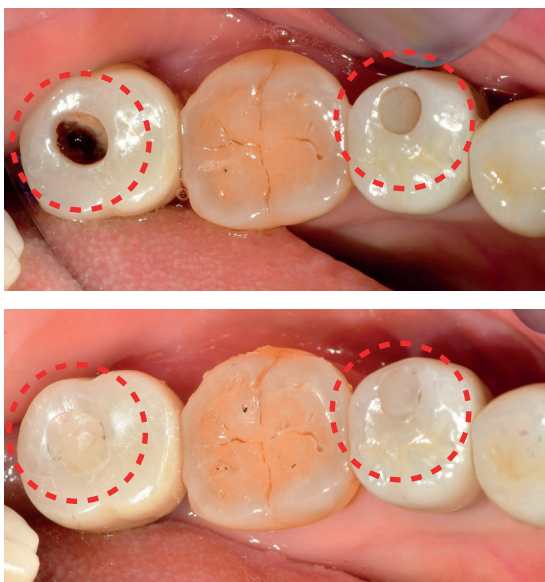
Prof. **Kyung-Ho Go**

It seems that the EsFlow Plus product line can be used in almost all cases where composite resin is applied. Are there any additional fields where it could be used?

Prof. **Kyung-Mo Cho**

Further use and research will be needed, but it is expected that EsFlow PLUS could also be applied in orthodontic bracket bonding, luting of indirect restorations, and stabilization of mobile teeth due to trauma or periodontal disease.

Implant hole filling (Fig 01)



Porcelain repair (Fig 02)



Prof. Kyung-Ho Go

Are there any precautions when using the EsFlow PLUS family?

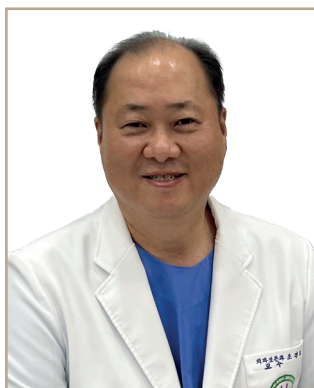
Prof. Kyung-Mo Cho

There are no special precautions when using the EsFlow PLUS product line. However, dentists who are accustomed to highly flowable composite resins may need some time to adjust to the injectable product, as it requires filling from the bottom of the cavity.

Prof. Kyung-Ho Go

Today, we had an in-depth discussion on flowable composite resin and Spident's latest EsFlow PLUS product line with three professors. Dental materials are continuously evolving, and dentists must swiftly adapt to these changes to achieve better treatment outcomes.

I sincerely appreciate Spident, a leader in dental material development, for their contributions. With that, we conclude today's forum. Thank you.



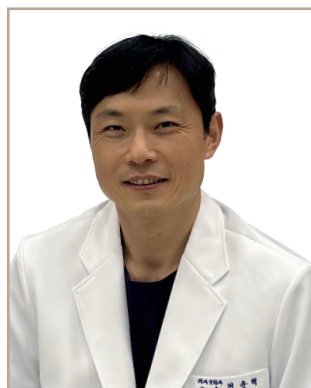
Prof. Kyung-Mo Cho

Department of Conservative Dentistry



Prof. Sae-Hee Park

Department of Conservative Dentistry



Prof. Yoon-Hyuk Heo

Department of Prosthodontics



Prof. Kyung-Ho Go

Department of Prosthodontics

Clinical Case

#12, 11 Anterior restoration

*Source by Prof. Kyung-Mo Cho



1. Root canal filled



2. Deep cavity



3. Filled EsFlow PLUS Bulk fill



4. Stack up EsFlow PLUS Core it LC



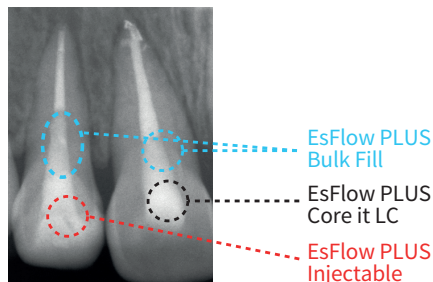
5. Final core build up



6. Crown prep



7. Filled EsFlow PLUS Injectable



#21 Anterior restoration

*Source by Prof. Kyung-Mo Cho



1. Root canal filled



2. Filling EsFlow PLUS Bulk fill



3. Filled EsFlow PLUS Bulk fill



4-1. Filling EsFlow PLUS Injectable



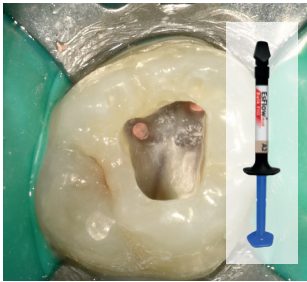
4-2. Filling EsFlow PLUS Injectable



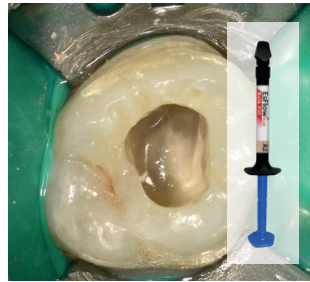
5. Filled EsFlow PLUS Injectable

Posterior restoration

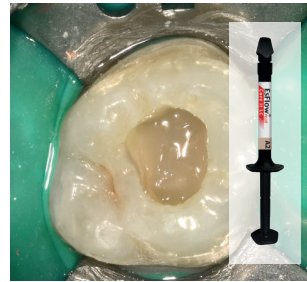
*Source by Prof. Kyung-Mo Cho



1. Filling EsFlow PLUS Bulk fill



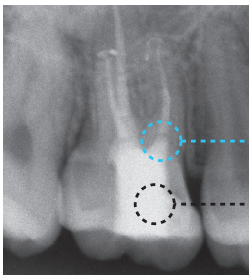
2. Filled EsFlow PLUS Bulk fill



3. Filling EsFlow PLUS Core it LC



4. Filled EsFlow PLUS Core it LC



EsFlow PLUS Bulk Fill
EsFlow PLUS Core it LC

Lingual pit

*Source by Prof. Kyung-Mo Cho



1. Root canal filled



2. Filling EsFlow PLUS Core it LC



3. Filled EsFlow PLUS Core it LC

Premolar proximal

*Source by Prof. Kyung-Mo Cho



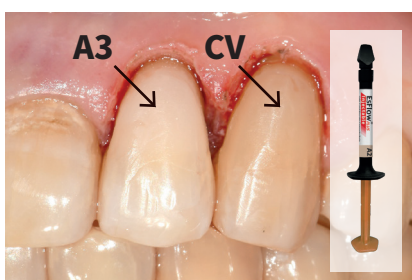
1. Prepare the tooth



2. Filling EsFlow PLUS Injectable

Cervical caries

*Source by Prof. Kyung-Mo Cho



1. Filling EsFlow PLUS Injectable



2. Filled EsFlow PLUS Injectable

A large circular graphic at the top of the page, divided into three concentric rings. The outermost ring is blue and contains several dental-related icons: a pair of pliers, a person's head, a tooth, a person in a lab coat, a dental chair, and another person's head. The middle ring is green and contains icons for a tooth, a dental X-ray, a magnifying glass over a tooth, a dental bottle, a tooth, and a dental X-ray. The innermost ring is blue and contains icons for a tooth, a dental X-ray, a magnifying glass over a tooth, a tooth, a dental X-ray, and a tooth. The background of the entire page is a dark blue gradient with a subtle pattern of white dots and lines.

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SPIDENT CO., LTD. www.spident.co.kr
203 & 312, Korea Industrial Complex, 722, Gojan-Dong,
Namdong-Gu, Incheon, Korea 405-821
TEL. +82-32-821-0071 FAX. +82-32-821-0074