“Bio-active” restorative materials: What are they?

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Dental restorative materials on the market nowadays demonstrate excellent clinical performance due to great advancements in materials technology. Hence, innovation of dental materials for restoration are being directed toward a new dimension, focusing on the design to exhibit “bio-active” functions. Several restorative materials claimed to be “bio-active” are commercially available recently, and most of them are advertised as “bio-active” materials based on their ability to induce remineralization caused by release of fluoride, calcium, or phosphate ions. However, “bio-active” restoratives are not simple ones to demonstrate classical remineralizing effects but more advanced to exhibit diverse functions to actively stimulate cellular/tissue responses or control interactions with microbiological species. Namely, various components such as promotion of mineralization/hard tissue formation, control of bacterial infection, prevention of inflammation, or promotion of tissue regeneration are listed as “bio-active” functions for restoratives. Those effects can be provided based not only on physical/chemical actions but also on biological actions.

It has been already 15 years since the world’s first antibacterial adhesive system which we have developed was commercialized. Apparent paradigm shift of treatment concepts from aggressive cutting restoration to preservation of human tissue as much as possible has occurred during these 15 years, and clinicians recognize the need of restorative treatments in disease-prevention mode. Because of such situation, several newly developed “bio-active” filling materials with antibacterial effects or multiple functions to prevent caries have appeared on the market. Restoratives containing ion-releasing glass filler, such as Surface Pre-Reacted Glass-ionomer (S-PRG) filler or BioUnion filler, fall into the category.

In this presentation, to help understand what “bio-active” restorative materials are, significant features of new restorative materials including the ones above mentioned will be explained.

<Curriculum Vitae>

1986	DDS, Osaka University School of Dentistry
2008 – 2009	President of Dental Materials Group, IADR
2011 –	Professor, Osaka University Graduate School of Dentistry
2019 –	Dean, Osaka University Graduate School of Dentistry/School of Dentistry
2020	IADR, Distinguished Scientist Award (Wilmer Souder Award)
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