FROM THE EDITOR'S DESK

# THE INSEPARABLE DUO- DENTIST AND DENTAL BIOMATERIALS

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In the days of yore, tooth extraction had been the main service of dental profession. Subsequent to extraction, replacement was done with artificial materials. Later, the non-extraction group, intending to preserve the tooth structure, resorted to partly restoring the diseased defects. These two trends can be considered as the nuclei to the evolution of dental material science. Wood, metal and ivory, under the creative skills of the dentist, transformed to dental prosthesis and restorations. Only in 1900s scientifically well-controlled experiments on the materials were started. Since then, this field has evolved as a separate science called as *Dental material science.*

Dental materials are expected to perform and sustain in the dynamic, harsh oral environment, may it be for a short span or long span of time. Therefore they are expected to possess appreciable physical, chemical and mechanical properties.Exhaustive efforts have always gone into making these attributes of the artificial materials as compatible as possible to the natural tooth structures.

Biocompatibility is yet another important attribute of the dental materials. They should not be irritating to the hard and the soft tissue structures in the oral cavity and should also resist degradation over a period time in the salivary environment. In order to emphasize the three dimensional role of the materials in satisfying the mechanical, physical and biological needs and also as they are intended to replace the natural biological tissues, they were rechristened as *Dental Biomaterials,*

Biomaterial is any material, natural or man-made, that comprises whole or part of a living structure or biomedical device which performs, augments, or replaces a natural function. As they are designed to mimic the natural tissues, they are called as *biomimetic materials*. Certain dental biomaterials possess antibacterial activity or regenerative capability, thus they are also called as *bio active materials*. These materials can also act as scaffolds for further tissue regeneration.

Dental biomaterials are used profusely in all fields of dentistry, such as, in the replacement of the lost tooth, in the correction of misaligned teeth and in the prevention and management of diseases affecting the tooth structure, the pulp and the periodontium. Metals, polymers, ceramics and semiconductors form the group of *synthetic dental biomaterials.* Adhesive Dentistry is a major breakthrough in dentistry that has resulted in materials that bond and interact very intimately with the tooth structure. With advancements in this field, it became possible to introduce more bioactive materials

Though bioactivity and biocompatibility of the synthetic biomaterials are receiving their due attention, attempts in identifying a natural biological material for replacement or restoration, a *true dental biomaterial,* is in a very infantile stage. The current thinking toward this idea, has begun with the decoding of the human genome and revelation of biological engineering of tissues. Stem cells from the dental tissues have opened up promising avenues in tissue engineering for dentistry; yet to go a long way to be translated into patient service.

However, evidence on the longevity of the new biomaterials is not robust enough. With the rapid advancements in the material technology and proliferation of the new materials, possibility for long term clinical trials is declining.

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A minimal survival rate of a restoration, for example, should be 10 years. Certain traditional restorations have shown a longevity of maximum 40 years. But the duration of clinical trial in the current literature for the newer materials is rarely for 10 years. The claims and promises of the trade that release the materials to the market with very short term trials or only laboratory studies should be recieved with caution. To critically evaluate a new introduction, it is imperative that a dental professional is equipped with the basic knowledge of the material science and also keep abreast with the latest developments.

It should be remebered that materials that can fail within a short span, will necessitate the replacement and such repeated replacments can result in progressive loss of natural tooth structure. Thus in the interest of the patient service, it is imperative that the profession does not overlook the long-term clinical performance and safety of these newer generation materials. Wisdom lies in expertly balancing the collateral damages of such revolutionary paradigm shifts.

A dentist is what the material he uses! This is one common science by which the multiple specilaities of dentistry are linked together. Therefore in this issue, attempts have been made to throw light on certain recent advances in dental biomaterials used in different fields such as periodontology, orthodontia, prosthodontia, restorative dentistry and endodontics.