Commentary:

Most conventional dental materials have a neutral & passive existence in the oral environment. The majority of them were thought to be designed in a way that they could last for the more extended period in the oral cavity, permitting them to be utilized for a longer period\(^1\). There is no single material in dentistry that is ideal and satisfies all the necessities of an ideal material\(^2\). Science and innovation in the 21st century depends vigorously on the advancement of new materials that are relied upon to react to the changes in the environment and show their capacities as indicated by the ideal conditions\(^3\). As the mission for an ideal remedial material proceeds, a more current age of materials was presented\(^4\). Smart materials are a response to the necessity of environment amicable and responsive materials which modify their properties to perform explicit functions.

These materials are named as ‘Smart’ as these materials uphold the rest of the tooth structure to the degree that more conservative cavity preparation can be completed\(^5\). Depending on alterations in some external conditions, “smart” materials change their structure, composition, or their functions. Though, several stimuli can alter these materials including temperature, pH, moisture, electrical agents, chemical or biomedical stimuli, stress and magnetic fields, a key element of smart material incorporates a capacity to re-visititation of the original state after the stimulus has been removed\(^6\).

The various sorts of smart materials utilized in the field of dentistry are piezoelectric materials, shape memory alloys or polymers, pH delicate polymers, polymer gels, restorative materials such as smart ceramics (Cercon Zirconium), composites, impression materials, GIC, componers, hybrid GIC, amorphous calcium phosphate releasing pit & fissure sealants, fluoride-releasing pit & fissure sealants etc. and others that have shown their own smart behavior such as smart suture, smart burs, etc\(^6\).

These are ‘Biomimetic’ in nature due to the properties of imitating normal tooth substance, for example, enamel or dentin\(^7\). Their level of smartness is estimated as far as their "responsiveness" to natural upgrades and their "dexterity". These smart materials can undoubtedly detect the alterations in the oral cavity and react emphatically to these changes (are profoundly responsive and have an incredible ability to detect and react to any ecological change). Hence these materials are otherwise called “Responsive Materials”\(^7\).

It is the planning of biomaterials that animates the physical and mechanical properties of the lost tissues, consequently giving a chance to present and change treatment modalities for the infection. These advancements in material science have denoted the start of a period of bio-brilliant dentistry, a stage into what's to come\(^8\).

Today, it is one of the provoking assignments to produce new multifunctional materials that have insight at the material level. Material insight being arranged into three capacities: detecting changes in ecological conditions, handling the detected data lastly making judgment (impelling) by moving ceaselessly from or to the stimulus. This gathering of multi-practical materials can have the ability to choose and execute explicit capacities smartly to react to changes in the neighbourhood condition\(^9\). Biosmart dentistry is an interdisciplinary methodology and has the potential for changing ordinary dental practice by bringing up the intensity of modern science to take care of genuine clinical issues.

These dynamic dental materials could potentially spearhead new groundbreaking dental therapies with a significantly enhanced clinical outcome of treatments\(^10\). Furthermore, almost certainly the brilliant behavior of these biosmart materials holds a decent guarantee to the eventual fate of dentistry.
References


Keywords: Biocompatible Materials; Bioesthetics; Dental Materials; Smart Materials.
Source of Support: Nil.
DOI:10.15713/ins.dpj.095
Conflict of interest: None Declared.

Corresponding Author:
Kishan Agarwal,
Department of Conservative Dentistry and Endodontics,
Saraswati Dental College and Hospital,
Lucknow, Uttar Pradesh, India.
Email id: kishan25021991@gmail.com