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Biosmart materials: A silent revolution in dentistry

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Smart materials are defined as those that change in a controlled way when an external stimulus such as light, stress or temperature is applied. Their response can be reversed when the external effect is removed. Scientists at NASA are investigating the use of smart materials to create aircraft that fly like birds and insects. The recent advances in the design of smart materials have created novel opportunities for their applications in bio-medical fields. One of the applications is the dental field.

Smart behavior in dentistry was reported for the 1st time in GICs; these materials do not undergo great dimensional changes in a moist environment in response to heat or cold and it appears heating results only in water movement within the structure of the material. These materials exhibit noticeable shrinkage in a dry environment at temperatures higher than 50°C, which is similar to the behavior of dentin. The other aspect of the smart behavior of these materials is the fluoride release and recharge capacity. Another example is the shape memory alloys (SMAs) which can be deformed, but then return to their original shape when heated. The most common SMA is Nickel-Titanium.

The numerous applications they have been put to, no wonder tells us that these smart materials hold a real good promise for the future of dentistry. The aim of the presentation is to show how dentists and dentistry made use of these smart materials for benefits of their patients.

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