



Review Article

Smart materials in pediatric dentistry- A review

Shaik Ali Hassan^{1,*}, Sumit Bhateja¹

¹Dept. of Dental, Manav Rachna Dental College, Faridabad, Haryana, India



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ABSTRACT

By general understanding, smart materials can't avoid being materials that have properties which may be balanced in a controlled way by refreshes, for instance, stress, temperature, tenacity, pH, and electric or drawing in fields. There are different sorts of capable materials, some of which are starting at now ordinary. Models merge piezoelectric materials, which produce a voltage when stress is applied or the a substitute way, blends or shape memory polymers which are thermoresponsive, and pH sensitive polymers which swell or guide as a response to change in pH. In this review there is information about the use of various materials for the pediatric patient.

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1. Introduction

McCabe¹ depicted Smart materials as materials whose properties may be changed in a controlled way by updates, for example, stress, temperature, moisture, pH and electric or engaging fields. A key fragment of able direct breakers a capacity to return to the main state after the overhaul has been cleared. These materials react to ordinary changes or outside effects, and are in any case called responsive materials. The reaction may show itself as a change fit as a fiddle, stiffness, viscosity or damping. When implanted in have materials and begun, they can compensate for inadequacies or breaks made, a marvel called the called self-fixing effect and keeps the material in a superior than normal condition. There was an explanation that as careful materials that react to trademark changes at the best conditions and reveal their own outstanding cutoff points according to the earth.^{2,3} This has provoked a snappy augmentation in the headway of sharp materials and structures, at the degrees of littler scale and nano-scale. Cleverness of materials portrays self-adaptability, self-identifying, memory, and various functionalities. Word

reference meaning of "shrewdis gifted or filling in as if by human perception and this is the thing that stunning materials are However, as a matter of confirmation, materials or structures can never achieve certified information or thinking without the expansion of phony data through PCs, microchip, control reason, and control estimations.

2. Smart materials in pedodontic dentistry

2.1. Glass ionomer cements

The glass-ionomers and related materials is firmly connected with their water content and the manner in which this can react to changes in the earth.^{4,5} On warming, extended fluid stream to the surface and quick loss of water is the segment behind the watched pressure. This lead resembles that of human dentine where similar changes are seen on account of stream of fluids in the dentinal tubules. Consequently, the glass-ionomer materials can be said to copy the direct of human dentine through an is shrewd or filling in just as by human perception and this is somewhat splendid lead. On account of this sharp lead of GIC, it gives mind blowing minor change as per the adjusting attempts. The other piece of the splendid behavior of GIC

* Corresponding author.

E-mail address: alishaikhassan@gmail.com (S. A. Hassan).

is the fluoride release and restore limit. Commonly the fluoride release in things is seen as a high initial fluoride release followed by a moderate lessening over a period. The canny lead of materials containing GIC stages is credited to their property of getting animated.

2.2. Calcium phosphate

Fluoride take-up is impacted by the social occasion of calcium and phosphate particles in the salivation or biofilm. For each two fluoride particles, ten calcium particles, and six phosphate particles are required to layout one unit cell of fluorapatite. Calcium and phosphate have their own unique goals when utilized as remineralizing executives, by and by, certain particular structures are open (casein being the unprecedented phosphoprotein in bull like milk) have been appeared to balance out calcium and phosphate as nanoclusters together with. In hydroxyapatite development, displays a high dissolvability, is promptly changed.^{6,7}

2.3. Smart composite

It is a light-started alkaline, nanofilled glass obliging material.⁸ It releases calcium, fluoride and hydroxyl particles when intraoral pH regards plunge under the fundamental pH of 5.5, checking the demineralization technique of the tooth surface and making conditions uncommon for remineralization.⁹ The material relies on mechanical upkeep, requiring no drawing and holding official and can be sufficiently diminished in store up. The application is fast and fundamental. It finds its utilization in reproducing of class I and class II wounds in both principal and interminable teeth. Monetarily available as Ariston pH control appeared by Ivoclar-Vivadent Company. It is open just in a singular broad white shade, and isn't tooth-tinted in this way, it is sensible only for back recoveries.

2.4. Shape memory

NiTi mixes exist as various gem structures at low and high temperature (martensitic and austenitic, autonomously). In the martensitic the material is delicate and adaptable and can without a lot of a stretch be contorted requiring just a light force. In the austenitic or parent mastermind (hexagonal framework), the material is solid and hard. The cross portion connection can also be adjusted by pressure, and on the discharge of the weight, the structure comes back to an austenitic stage and its stand-out shape; a marvel called as weight initiated thermoelastic change. They are utilized for gathering of territories and orthodontic wires. Too adaptable wires are supported inferable from their adaptability and deterrent. The unequaled adaptability, quality, torque limit, when showed up contrastingly according to cemented steel, is the dire supported circumstance of these materials, along these lines passing on progressively basic ease of use and extended patient comfort. The NiTi underpins

are dynamically pleasing for patients during foundation and besides during treatment. Use of especially hot or solidifying sustenance doesn't instant disarrays in these backings if the austenite and martensite stages are all around picked. The upside of using turning NiTi records are improved access to bended root channels during cleaning and embellishment with less sidelong power applied. This reduces chief shortcoming and gives a continuously associated with channel openness with less channel transportation, a lessened event obviously deviation, and unessential postoperative devastation to the patient.

2.5. Smart ceramics

The procedure included machining a pre-assembled clay clear made of zirconia earthenware creation with a nanocrystalline permeable structure in the presintered state, trailed by sintering. The sintered material clinicians homogeneously in every single spatial bearing to its last estimations. The material gets its high hardness, high bore, and quality during the last sintering. The veneering of the choice creative structure by then joins the crucial tasteful and wear characteristics. The methodology has central purposes of high precision in an essential, quick, and absolutely electronic way. This development was presented in the market as CERCON Smart Ceramics System by the dental provider Degudent. It at that point opened up another period of pottery in dentistry. It indicated better attributes with deference than feel requests, magnificent biocompatibility, and nonattendance of extreme touchiness reactions.^{10,11} In pediatric dentistry, they discover use in making porcelain facade altering and full cast or porcelain converged to metal crown recuperation. They in like way discover use as sharp territory supports containing microchip fit for assessing the powers applied to the portion tooth line.

2.6. Burs for pediatric patient

These are polymer made with scoop like straight bleeding edges.¹² The polymer material has been expected to be more truly than carious, placated dentin yet milder than strong dentin. It is purported to clear carious dentin explicitly; while, strong dentin isn't affected the front lines wear out in contact with harder materials. Briers are open in three sizes 010, 014, and 018 and are proposed for single-use just. They should be used with light weight and expulsion should be done from within to the edges to keep up an essential better than average ways from contact with the harder dentin.

3. Conclusion

This is phase of advancement and there is many modification everyday. By goig time there is need for to reduce the pressure on child and get his confidence in treatment which altogether instills a positive attitude

towards the dental treatment. Every pedodontist should know about the new materials and use in the treatment.

4. Source of Funding

None.

5. Conflict of Interest

None.

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Author biography

Shaik Ali Hassan Dental Surgeon

Sumit Bhateja HOD

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