

Restorative Dentistry Evolution in Oral Healthcare

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DESCRIPTION

In the field of dentistry, the quest for innovative solutions to address oral health issues is a constant endeavor. Emerging biomaterials have ushered in a new era in restorative dentistry, offering promising alternatives to traditional materials and techniques. These advanced biomaterials not only aim to restore the structural integrity of teeth but also strive to mimic the natural properties of dental tissues, resulting in improved aesthetics, longevity, and patient satisfaction.

One of the biomaterials making waves in restorative dentistry is bioactive glass. Composed of silica-based compounds, bioactive glass exhibits remarkable bioactivity and has the ability to interact with the surrounding biological environment. When used in dental restorations, it can stimulate the growth of hydroxyapatite, the main component of teeth, facilitating the remineralization process and enhancing the bond between the restoration and the tooth. This fosters a more harmonious integration, reducing the risk of secondary caries and enhancing the longevity of restorations.

In recent years, researchers have also turned their attention to smart biomaterials with the ability to respond to external stimuli. Smart materials, such as shape-memory polymers and hydrogels, for restorative dentistry applications. These materials can exhibit changes in shape, stiffness, or other properties in response to factors like temperature, pH, or mechanical stress. This adaptability is particularly advantageous in dental applications where materials need to withstand the dynamic oral environment while providing optimal functionality and comfort to the patient.

The emergence of bio ceramics has further expanded the horizons of restorative dentistry. Bio ceramics, such as zirconia and alumina, are known for their exceptional mechanical properties and biocompatibility. Zirconia, in particular, has gained traction as a material of choice for dental crowns and bridges due to its durability and tooth-like translucency. Moreover, the biocompatibility of bio ceramics reduces the risk of adverse reactions, making them a suitable option for patients

with sensitivities or allergies. Hybrid biomaterials, combining the advantages of different materials, have also revolutionized restorative dentistry. These materials often integrate the strength of ceramics and the flexibility of polymers, resulting in versatile materials that can be tailored to specific clinical situations. For instance, resin-modified glass ionomers offer a blend of glass ionomer cements and resin composites, providing enhanced aesthetics, improved bond strength, and the release of fluoride for caries prevention.

The development of biomimetic materials represents a pinnacle of achievement in restorative dentistry. These materials aim to replicate not only the mechanical properties of natural teeth but also their intricate hierarchical structure. Biomimetic materials, such as tooth-mimicking composites, seek to provide restorations that seamlessly blend with the surrounding dentition, making them virtually indistinguishable from natural teeth. This approach not only restores the function of teeth but also reestablishes the aesthetics and self-confidence of the patient. As the field of restorative dentistry advances, the integration of digital technologies with emerging biomaterials is becoming increasingly prevalent. Computer-Aided Design and Manufacturing (CAD) systems enable the precise fabrication of dental restorations from these biomaterials, ensuring optimal fit, function, and aesthetics. This marriage of technology and biomaterials streamlines the restorative process, reducing chair time for patients and enhancing the overall treatment outcome.

The advent of emerging biomaterials has ushered in a new era of possibilities in restorative dentistry. From bioactive glass to smart materials and biomimetic composites, these innovations are reshaping the landscape of oral health care. The pursuit of materials that not only restore but also mimic the natural properties of teeth reflects a patient-centered approach, aiming to provide durable, aesthetically pleasing, and biocompatible solutions. As these biomaterials continue to evolve and gain clinical acceptance, they transform the way dental restorations are approached and executed, ultimately improving the oral health and well-being of countless individuals.

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