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Nanodentistry

There is plenty of room at the bottom

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Nanodentistry ... the word nano was derived from the greek word for dwarf. The late nobel prize winning physicist Richard P Feynman in 1959 proposed using machine tools to make smaller machine tools, which in turn, would be used to make still smaller machine tools, and so on, all the way down to the molecular level. Such nanomachines, nanorobots and nanodevices ultimately could be used to develop a wide range of atomically precise microscopic instrumentation and manufacturing tools. Feynman argued that these tools could be applied to produce vast quantities of ultra-small computers and various microscale and nanoscale robots. He concluded that this is "a development which i think cannot be avoided" and hence the vision of nanotechnology was born. Attempts are going on at present to produce molecular computer components using molecular parts at the nanometer scale (10-9 meter or 1 billionth of a meter). Tiny particles enter through the microscopic structures called atoms, and do miracles. Nanodentistry will make it possible to maintain a near perfect oral health through the use of nanomaterials, biotechnology, including tissue engineering and nanorobotics. Applications in dentistry include inducing anesthesia, major tooth repair, renaturalization procedures, dentin hypersensitivity, tooth repositioning, durability and appearance. Trends in oral health and disease also may change the focus on specific diagnostic and treatment modalities. Increasingly preventive approaches will reduce the need for curative or restorative interventions, as has already happened with dental caries. Nanodentistry will lead dentistry to its new horizon with painless experience, exertion free treatments, within minimum time. Through this poster we are trying to show the future of dentistry, how this, in modern era will affect both patients and clinicians.

SCIENCE IS GOING YET ANOTHER CHANGE, IN HELPING MANKIND ENTER A NEW ERA, OF NANOTECHNOLOGY. UPWARD CONCERN IN THE OUTLOOK OF DENTAL APPLICATIONS OF NANOTECHNOLOGY IS LEADING TO EMERGENCE OF A NEW FIELD CALLED NANODENTISTRY, WHICH WILL MAKE POSSIBLE THE MAINTENANCE OF PERFECT ORAL HEALTH THROUGH THE USE OF NANOMATERIALS WITH TISSUE ENGINEERING AND NANOROBOTICS.

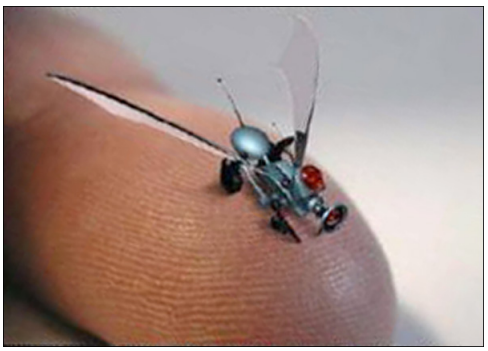

Fig. 1: nanorobot

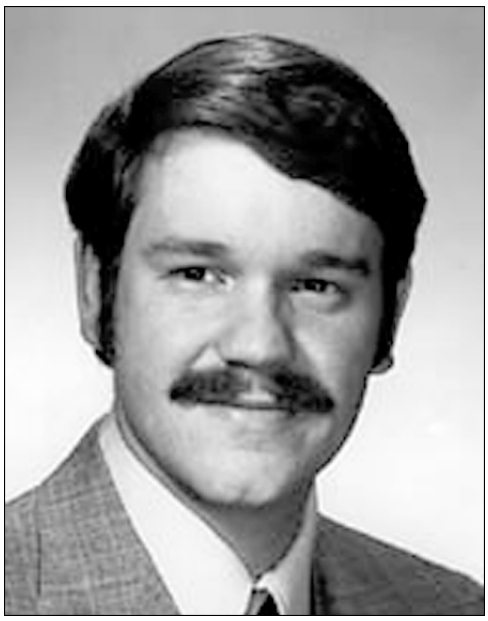

Fig. 2: Robert A. Freitas Jr

DENTAL MATERIALS AND PREVENTIVE DENTISTRY

COMMERCIALLY AVAILABLE PRODUCTS, EFFORTS ARE MADE TO IMPROVE CLINICAL PERFORMANCE OF DENTAL MATERIALS THROUGH MECHANICAL PROPERTIES OF NANO PARTICLES.

Fig. 3: nano composite

Fig. 4: bonding agent with nano particles

Fig. 5: nano technology impression materials

Fig. 6: nano GIC

FUTURE / APPLICATIONS

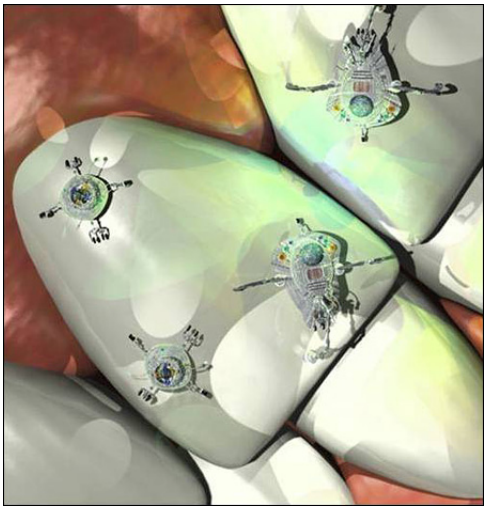

Fig. 7: dentrifrobots – cleaning the teeth

Fig. 8: nanorobot increasing dentinal durability

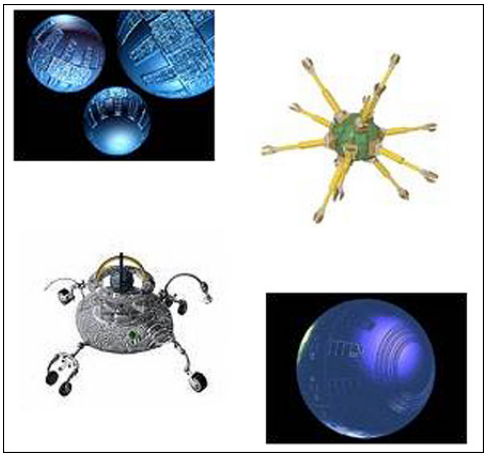

Fig. 9: nanorobots

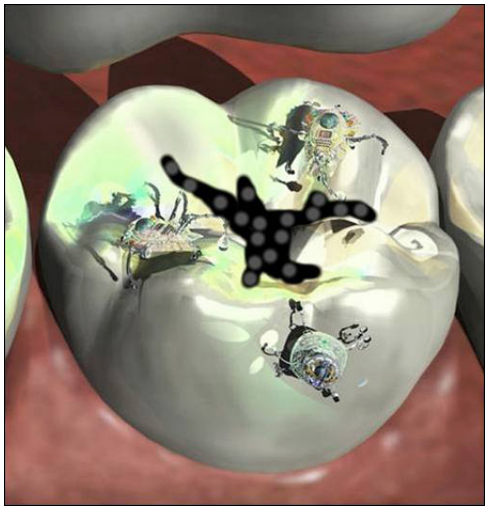

Fig. 10: tooth repair by nanorobots

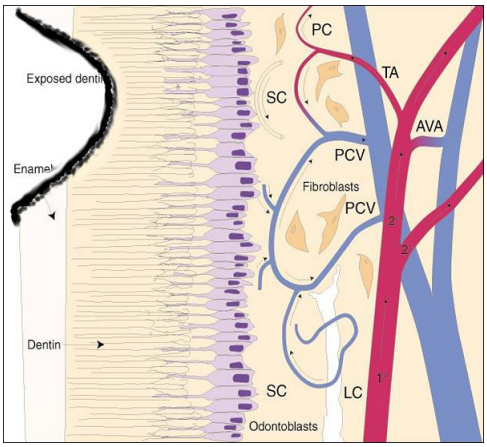

Fig. 11: cure for hypersensitivity

SURGICAL INTERVENTION AND DIAGNOSTIC SCIENCE

Fig. 12: RAPID DETECTOR OF SALIVARY PROTEIN AND NUCLEIC ACID. HELPS IN SCREENING AND DETECTION OF DISEASE

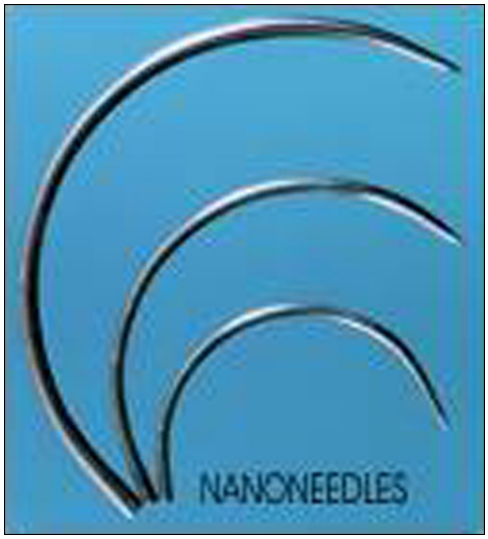

Fig. 13: SUTURE NEEDLES WITH NANO SIZED STAINLESS STEEL CRYSTALS

Fig. 14: BONE DEFECTS CAN NOW BE TREATED WITH HYDROXYAPETITE NANOPARTICLES

INDUCING LOCAL ANESTHESIA:

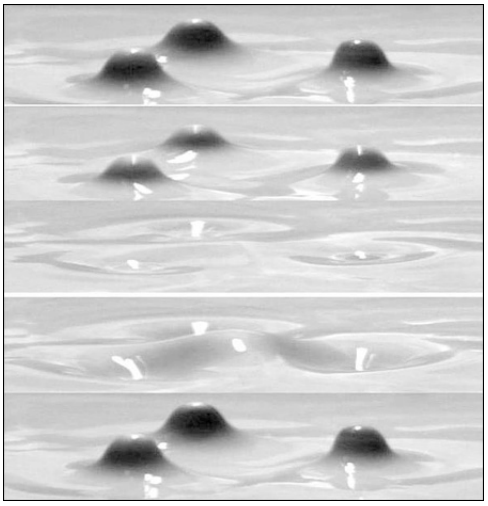

Fig. 15: colloidal suspension containing nanorobots

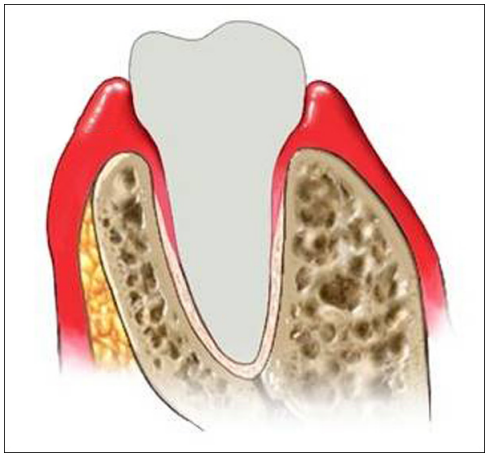

Fig. 16: nanorobots enter through gingiva to pulp

Fig. 17: nanorobot

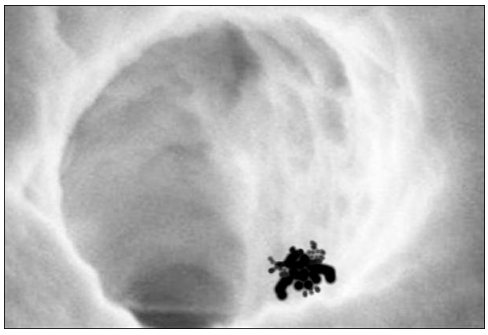

Fig. 18: nanorobot through dentinal tubules

THERE ARE WIDE RANGE OF CONCERN WITH NANOTECHNOLOGY, NOT LEAST OF WHICH IS THE ISSUE OF NANOTOXICITY. THE DEFENSE SYSTEMS OF THE HUMAN BODY IS NOT DESIGNED TO DEAL WITH SUCH SMALL PARTICLES BUT THEY WILL UNDERGO A FULL SAFETY ASSESSMENT BEFORE THEY ARE PERMITTED FOR USE.

"THE GENIE IS OUT OF THE BOTTLE, THE WORLD WILL NEVER BE THE SAME"

This Poster was submitted by Dr. Abhinav Sharma.

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