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# PROCEEDINGS OF "CONFERENCE ON RECENT ADVANCES IN BIOMATERIALS DEC 17-18 '10"

HELD AT SAVEETHA SCHOOL OF ENGINEERING, SAVEETHA UNIVERSITY, THANDALAM, CHENNAI-602 105,  
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**SAVEETHA UNIVERSITY**

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Proceedings of  
**"Conference on Recent Advances in Biomaterials Dec 17-18 '10"**  
Held at Saveetha School of Engineering, Saveetha University, Thandalam, Chennai-602 105, Tamilnadu, India

## SCOPE OF THE CONFERENCE

*"The conference will provide a platform for discussing current advancements and future trends in biomaterials for medical and pharmaceutical applications. Through the synergistic approach of applied chemistry and physics, material science, electronics, mechanical engineering, biochemistry and medicine, this Conference on biomaterials includes how the deeper insight into biological events and its interplay with nanotechnology may support the development of a generation of novel materials, micro-nano-devices and molecular level approaches suited to solve relevant biomedical problems both for therapy and diagnostics. The conference will provide an excellent opportunity to meet and forge collaboration with large number of experts with diverse specializations including engineering, basic sciences, medical and dental professionals, etc. For the research scholars and students, CRAB 2010 will be an eye opener and an excellent opportunity to meet experts from various institutions in India and abroad."*

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## THEME 2

# COATINGS AND SURFACE MODIFICATION OF BIOIMPLANTS

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Abstract ID:22

### CONVERSION OF CONVENTIONAL TWO STROKE PETROL ENGINE INTO STRATIFIED CHARGE ENGINE

Kumaran Palani

*Saveetha School of Engineering, Saveetha University, Chennai-602 105*

The concept of the stratified charge engine has been studied and documented for a number of years. Yet it is still considered a novel technology and very few production vehicles are available with these engines.

This project aims at proving that a few simple modifications can convert a regular production SI engine into a stratified charge engine. The stratified charge engine design is developed with simple modifications on a 100 cc two-stroke single cylinder SI engine.

A mechanical diesel injection system is used for fuel delivery. The timing is adjusted to provide injection just at the time of combustion. The carburetor is eliminated and only pure air is allowed into the combustion chamber during intake. A two-hole nozzle is incorporated in the cylinder head and the location of the spark plug is suitably adjusted for better combustion. The modified engine is easy to build and it is able to burn very lean mixtures with air/fuel ratios as high as 37:1.

**Keywords:** stratified, A two-hole nozzle

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Abstract ID:23

### A REVIEW ON CRUISE CONTROL FOR INTELLIGENT VEHICLES

Mr. S. Paul Sathiyar, and Ms. Wisemin Lins,

*Karunya University, Coimbatore, Tamilnadu, India*

Automatic vehicle speed control is presently one of the most popular research topics throughout the automotive industry and particularly in the Intelligent Transportation Systems field (ITS). In fact, headway control is very important to the safe driving of Intelligent Vehicle (IV), since for every minute, on average; at least one person dies in a crash. Researches related to the vehicle safety are particularly drawing more and more attention, which aims to compensate for human limitations in sensing the environment and reacting to the unexpected events. Cruise Control (CC) system employs the concept of running at set speed under no obstacle / vehicle in front (velocity control mode). CC fails to work when a vehicle / obstacle is detected in the front of the host vehicle. To overcome this drawback, Adaptive Cruise Control (ACC) system was developed. ACC can also work in velocity control mode along with distance control mode. In distance control mode ACC can automatically adjust the velocity of the vehicle in order to maintain a proper distance between leading vehicle and the host vehicle. This paper discusses about the various evolutions that have been evolved in the field of cruise control, its recent developments and research trend in the automation of the vehicles in longitudinal/lateral control. The control algorithms like fuzzy logic, sliding mode, genetic algorithm, sensor fusion





techniques etc., are used to implement the various level of evolution of cruise control. The techniques with their merits and short comings have been reviewed, keeping safety first and then fuel economy and comfort. The paper concludes with suggestions for future improvement.

**Keywords:** Cruises Control, Distance Control, Intelligent Vehicle, Lateral Control, Longitudinal Control, Velocity Control

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Abstract id:75

## EVALUATION OF TITANIUM IMPLANT USING ANIMAL EXPERIMENTAL PROTOCOL

Dr. E. Muruganandan, Dr. K.K. Shantha Sundari M.D.S.

*Saveetha Dental College And Hospitals, Saveetha University*

Orthodontic anchorage control is a fundamental part of orthodontic treatment planning and subsequent treatment delivery. Mini implants are used for Orthodontic anchorage, mini implants are made up of Titanium and Stainless Steel Alloys.

Mostly Titanium alloy is used for the Mini-Implants, which has a composition of Ti-6AL-4V. The distinguishing feature common to all of these devices is that they provide anchorage through either a mechanical interlock or biochemical integration with bone.

Mini implants are manufactured in various designs, sizes and shapes. Mini-implants have long, narrow conical shapes and are available in 6–15 mm intraosseous lengths and in 1.2–2.3 mm diameters. Orthodontic implants and most mini-implants are commonly described as being self-tapping. Self-tapping body designs often have a special groove in their tip, which cuts or taps the bone during insertion.

An orthodontic mini implant can be tested for biocompatibility using various biocompatibility tests. Biochemical and immunohistochemical methods can also be used to study an implant. Healing reaction to an implant can be studied using histomorphometrics. A histological study is necessary to evaluate the progressive, time dependent healing occurring in the bony margin of the bone-implant interface.

This paper presentation focuses on the use of histomorphometry to test an mini implant in an animal model.

**Keywords:** histomorphometry, intraosseous, immunohistochemical

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Abstract id:62

## EFFECT OF SURFACE MECHANICAL ATTRITION OF TITANIUM ON THEIR OXIDE LAYER MORPHOLOGY AND ITS INFLUENCE ON BIOACTIVITY & CORROSION

Kannan M,\*, Manivannan P, Prithiviraj P, Vignesh S, Siddharthan A & Rajendran N

*College of Engineering, Guindy, Anna University Chennai, India-600025.*

The effect of surface mechanical attrition(SMA) on bioactivity and corrosion of Commercially pure Titanium (c.pTi) is reported in this work. The oxide layer morphology shows difference in pore size and distribution compared to untreated c.pTi. The corrosion behavior and bioactivity indicates dependence of oxide layer morphology as in case of the SMA c.pTi sample is compared to untreated c.pTi. Electrochemical impedance test and Simulated body fluids assessments were carried out to find the corrosion rate and bioactivity respectively. Chemical oxidation is done by using 20% H<sub>2</sub>O<sub>2</sub> for 1 hour. The microstructure of SMA c.pTi surface shows submicron grain size. Bioactivity test is carried out by



immersing SMA c.pTi and untreated c.pTi samples in Simulated Body Fluid(SBF) for 7 days whose temperature and PH are maintained at 37°C and 7.4 respectively. Electrochemical impedance(AC and DC impedance) is carried out to determine the rate of corrosion. Thus, SMA process parameters may be optimized for desired oxide layer morphology to enhance oxidation and bioactivity.

**Keywords:** surface mechanical attrition, corrosion

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Abstract id:55

## BIOMATERIALS AS A BOON & BOND FOR IMPLANTS TO ENHANCE OSSEointegration

Dr. K.Karpagam BDS, Dr. P. Saraswathi

*Saveetha Medical College&Hospital, HOD-Dept of Anatomy, Saveetha Medical College&Hospital*

Dental Implants are very important especially for the people who are prone to jaw bone loss. It replaces missing tooth roots through several restorative options which can help a person regain his teeth and jaws durability and strength in chewing. Osseointegration - a process where a direct anchorage occurs between the dental implant root and the jaw bone

(which normally takes 6 months for complete healing). Peri-implant bone formation is a very important factor for a better osseointegration. The paper talks about various modifications of implants which can quicken the process of osseointegration with better healing and prognosis in a short duration. The modifications being, change in the chemical composition of the implant materials using an additional biomaterial say bioactive glasses with air abrasion, cold spray effect of titanium alloy, coating of the same over implant surface, modifying the shape of implants etc; thus trying to prove that surface roughness, hydrophilicity, and surface chemistry does enhance bone formation and osseointegration.

**Keywords:** osseointegration, hydrophilicity

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Abstract id:46

## MATERIALS AND MECHANISMS OF BIONIC IMPLANTS

J . Anita Christaline

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Bionics is an interdisciplinary branch that applies the concepts of electronics to biological activities. The main challenge in bionics is to mimic the intricacy of natural human activities into artificial movements by a seamless transition between the hard world of electronics and the soft world of biology. This has necessitated the need to implant devices in humans that can communicate to the body cells. Recent years has witnessed the bionic implants in several people to overcome disabilities. These implants powered by electronic motors make the man machine interaction more closer. This paper presents a review of the materials and mechanisms behind bionic implants. The variants of Bionic implants include Implantable defibrillator, Neural arm implant, Heart-assist pump, Brain implant, Mind control, Tremor control implant, Cochlear ear implant, Retinal implant, Artificial leg with feedback, Epilepsy implant, bionic limbs and bionic arms. Mechanism and materials of bionic implants like Artificial Silicon Retina(ASR), AbioCor artificial heart, Myoelectric prosthetic arms and limbs, Cochlear implants, artificial muscles, nanotechnology based skin are explained in detail. The concepts related to nano bionics like nano-bio processors, nano implant devices and nano robots have





also been presented in this paper. Special emphasis has been given to the bionic prosthetics like Bionic arms and limbs controlled by neuro signals or muscle power. Also concepts related to myoelectrodes, force sensors, potentiometers, touch pads and others surgical aspects like Targeted reinnervation of muscles that could accommodate myelectric arms are explained. Finally this paper gives an insight into the delicate conducting polymers that could assist in the interpretation of biological signals.

**Keywords:** AbioCo, Myoelectric prosthetic, myoelectrodes,





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