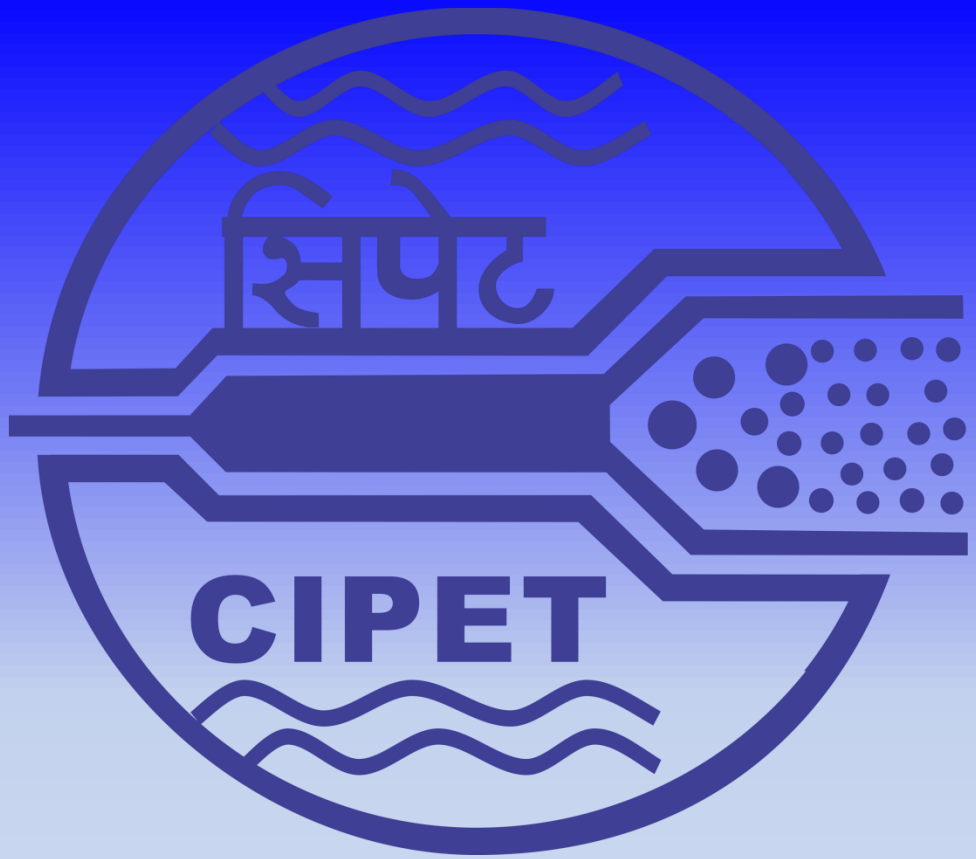


TEAM CIPET WELCOMES YOU ALL

Application of Plastics in Medical & Agriculture

S.Ilangovan
Chief Manager (Technical)
PDS – CIPET Head Office

November 13, 2014





Plasticulture Applications





Micro Irrigation System (MIS)

Micro irrigation is a generic term used for water management technologies deployed at the individual farm level.

The two most important micro-irrigation methods are:

1. Drip irrigation
2. Sprinkler irrigation

(DRIP, TRICKLE, SPRINKLE, MICRO-SPRAYJETS)

Plastic mulching and green house cultivation is also becoming popular now. Inconsistencies in rainfall, and the sinking of the water-table in most parts of the country, has made water-conservation a national priority.

Why Micro irrigation?

- As the cost of water increases, there is heavier reliance on low-volume/micro irrigation systems.
- Land characteristics such as slope of fields and very coarse soils also orient individuals towards the use of micro irrigation.
- Perennial crops prevail over annual crops in lands with micro irrigation use.

Advantages

- Increased yield
- Improved quality of yield;
- Reduction and conservation of water, energy and money
- Reduction in the costs of labor, pesticides, and fertilizers; and
- Prevention of contaminated surface water and groundwater
- Good irrigation scheduling reduces the total amount of water
- Applied during a season and almost always improves water use efficiency

Cost of Drip / Sprinkler System

(per HA area)

A. DRIP IRRIGATION

Wide Spaced Rs. 20,000
Medium Spaced Rs. 35,000
Closed Spaced Rs. 70,000

B. SPRINKLER IRRIGATION

All crops Rs. 15,000

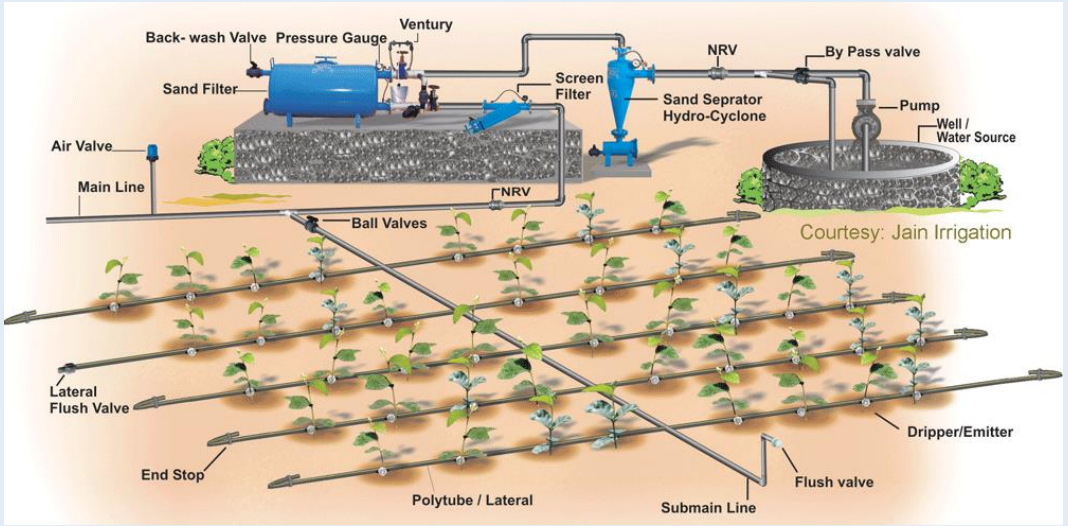
Socio-economic Impact of MI

By converting 1 lakh land area under micro irrigation

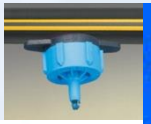
- Total water saving is 347 million Cu. meters/annum.
- Fertilizer saving of Rs. 105 cores
- Saving of 271 lakh KWH of energy per year worth Rs. 7crores by pumping less water.
- Employment generation of 1.25 lakh person
- Saving on infra-structural investment on major irrigation projects (for saved) – 265 crores.

DRIP IRRIGATION FOR HIGHER WATER USE EFFICIENCY

Drip irrigation is a method which optimizes the use of irrigation water by providing it uniformly and directly to the roots of the plants, through a close network of plastic pipes and emitters. Nutrients can also be supplied to the plant through the drip system, which is called Fertigation.



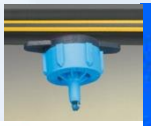
DRIP IRRIGATION TECHNOLOGY

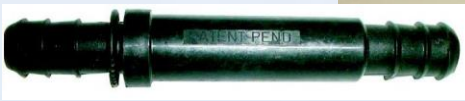


Water saving and increase in yield

Crop	increase in yields (%)	water saving (%)
Tomato	25-50	40-60
Sugarcane	50-60	30-50
Okra	25-40	20-30
Potato	20-30	40-50
Cabbage	30-40	50-60
Brinjal	20-30	40-60
Chilli	10-40	60-70
Bottle Gourd	20-40	40-50
Cauliflower	60-80	30-40

DRIP IRRIGATION TECHNOLOGY





Vegetables: Drip Fertigation Versus Conventional Irrigation

CROP	YIELD (kg/acre)			WATER USE (m^3/acre)		
	Surface	Drip	% more	Surface	Drip	% saving
Tomato	9808	25050	155.4	1901	1007	47.0
Capsicum	5340	8900	66.6	2041	1161	43.1
Bhendi	3144	7187	128.5	1683	1043	38.0
Brinjal	5044	8569	69.9	2483	1488	40.0
Beans	2255	4100	81.8	1776	1120	36.9
Babycorn	2292	3952	72.4	1462	820	43.9
Gherkins	9720	19500	100.6	1343	856	36.2
Carrots	5460	10500	92.3	1965	1301	33.8
Cauliflower	6840	10960	60.2	1562	1040	33.4
Cabbage	8550	18750	119.2	1504	1016	32.4

Large Sprinklers and Rain Guns

Cheapest available system for sprinkler irrigation

Substantial power saving and cost effective

Suitable for all open field close spaced crops

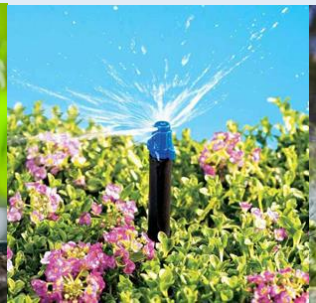
Suitable for a variety of crops such as coffee, tea, arecanut etc.

MICRO SPRINKLERS

These are the best tools for under-foliage irrigation for many crops like citrus, apple, banana etc.

Good for irrigating close growing vegetable crops

Creates micro-climate for best results



Drip Irrigation

- Uniform & precise application of water at low pressure
- Saves water , fertiliser & labour
- Use of saline water is possible

Sprinkler Irrigation

- Protects crop against frost
- Saves crop from insects & pests
- Irrigation is possible on undulating terrains

Greenhouse

- Moderates temperature and humidity
- Cultivation of off-season crops possible
- Incidence of disease and pests is reduced

Type of Greenhouse

- Naturally Ventilated
- Fan & Pad Arrangement
- Wooden based

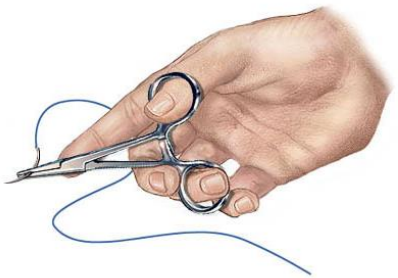
Plastic Mulch

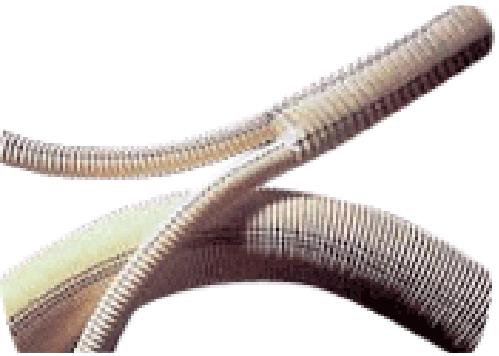
- Conserves moisture
- Prevents weed growth and improves soil micro climate
- Provides cleaner crop

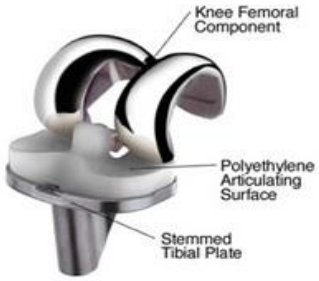
S.No.	Plasticulture Application	Area Covered (ha)	Potential (ha)
1	Drip Irrigation	2,91,000	270,00,000
2	Sprinkler Irrigation	2,25,000	425,00,000
3	Greenhouse & Plastic tunnel	20,000	7,00,000
4	Shade net house	30,000	10,00,000
5	Plastic Mulching	30,000	10,00,000
6	Plant Protection Nets	20,000	12,03,000

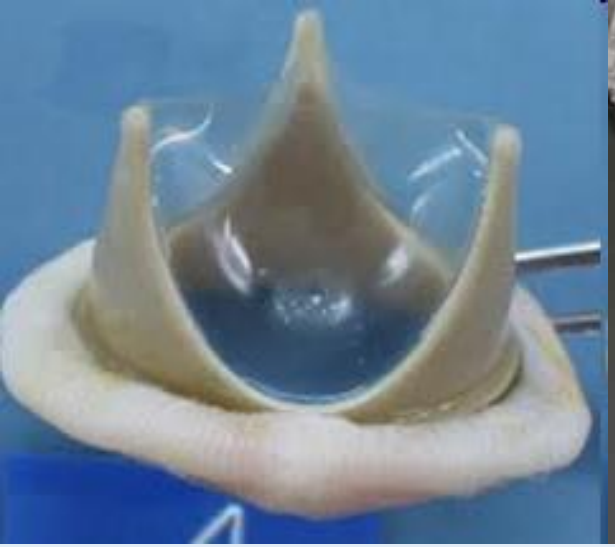
		(Nos.)	
1	Farm Pond/ Reservoir lined with plastic film	1,50,000	5,00,000

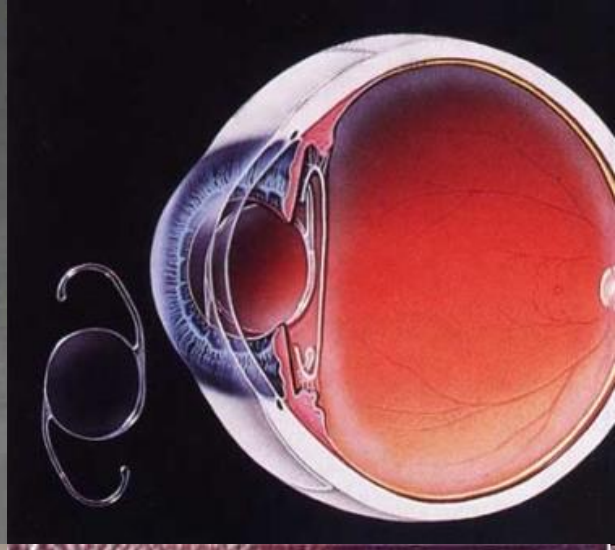
MEDICAL APPLICATIONS

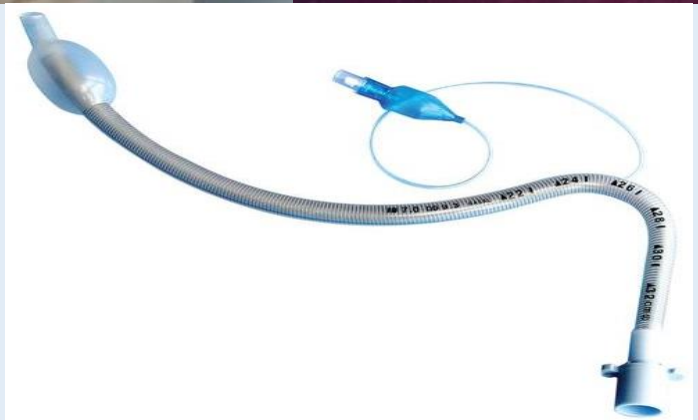






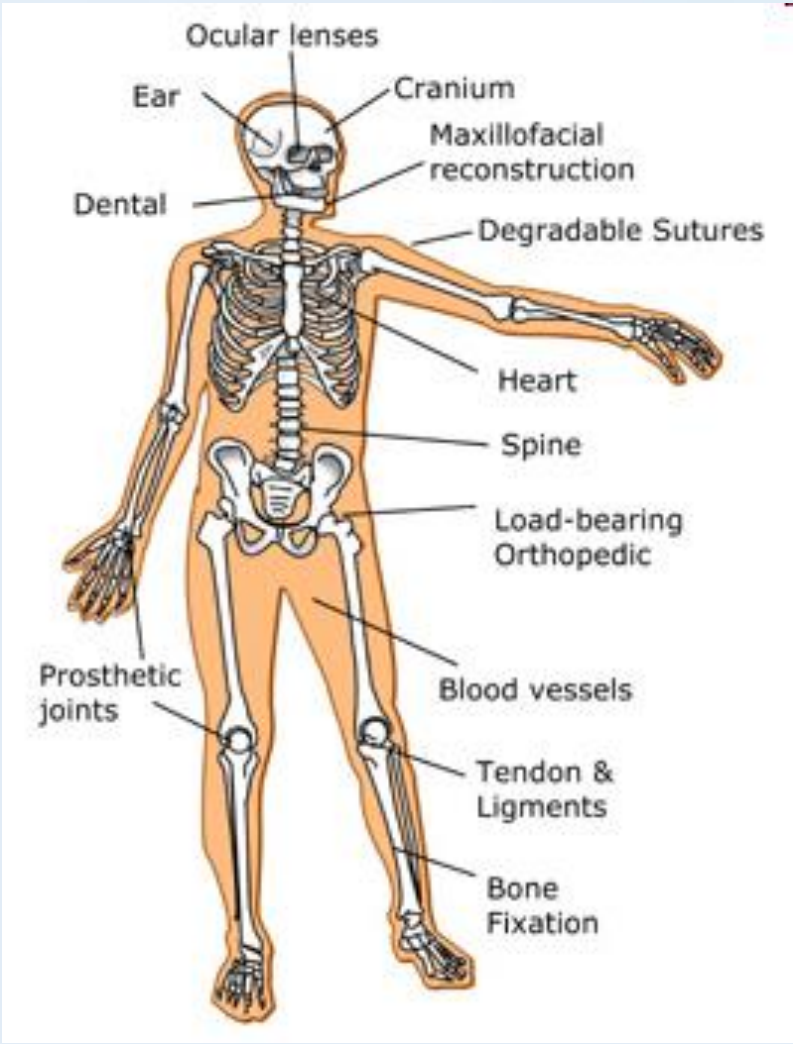






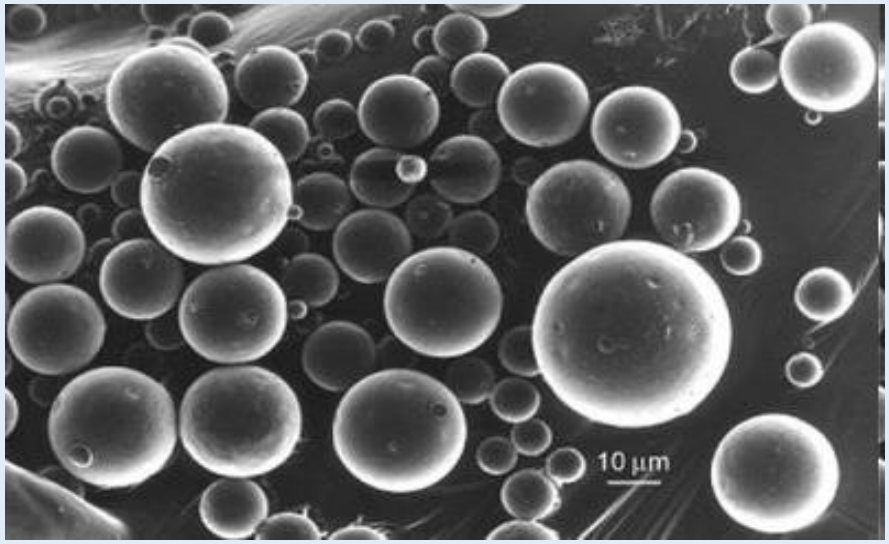
Where can you find uses for PLASTICS ?

- Everywhere!
  - There seems to be endless uses for polymers
- Why?
  - Easier to produce
  - Biocompatibility
  - Often cheaper
  - Designed to mimic
  - Replacement to old practices
  - Designed to prevent additional surgery/trauma to patient



Plastics in Drug Delivery

- Pill coatings
- Rapid dissolving capsules
  - Fluid driven
  - pH driven
- Degradable delivery vesicles in composite systems

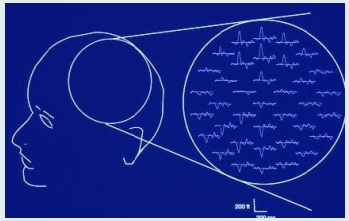


Plastics in Medical Application

DESIGN AND DEVELOPMENT OF SENSOR ARRAY HELMET FOR MAGNETOCARDIGRAPHY

Government of India
Department of Atomic Energy
Indira Gandhi Centre for Atomic Research

MAGNETOENCEPHALOGRAPHY



Magnetic field recorded at each sensor as a time series

SENSOR ARRAY HELMET

MEG Cryostat

Left Top: The schematic picture shows the positioning of several cylindrical type sensors over a subject's head to record the magnetic signals emanating from the brain.

Left Bottom: Flat type sensors positioned in the shape of a helmet over the head.

M/s Indira Gandhi Centre for Atomic Research(IGCAR), Kalpakkam

Second National Award Winner in Public Health Care Category

Plastics in Medical Application

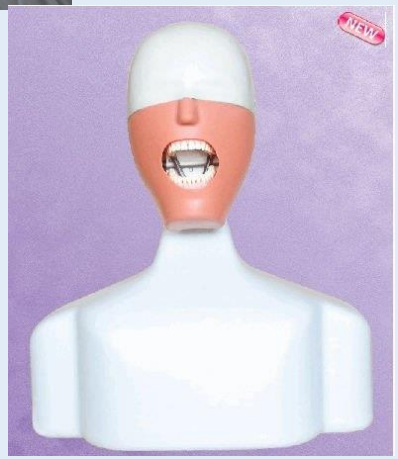
DESIGN, MATERIAL SELECTION AND DEVELOPMENT OF CONCAVE BOTTOM FRP CRYOSTAT FOR MAGNETOCARDIGRAPHY

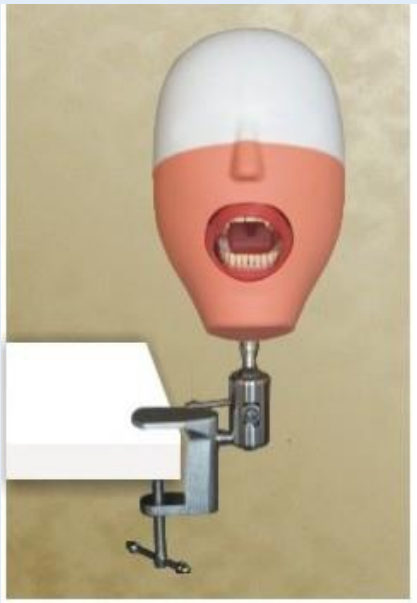
4 channel system presently at IGCAR with flat bottom Dewar

Multichannel whole cortex system with a concave bottom dewar (Illustration)

Plastics in Medical Application

Navadha
Simplifying Dentistry





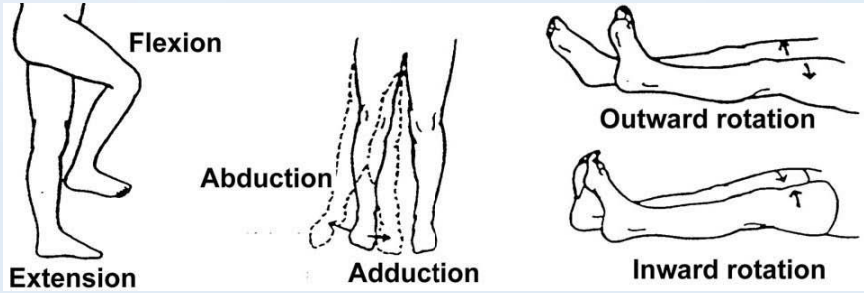
Skull and Body
Application: **Dental replacement Training Kit**

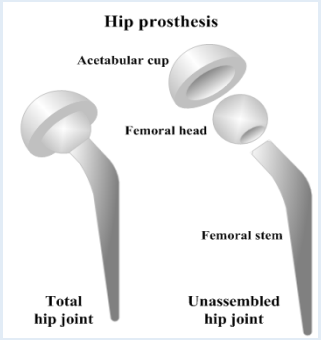
Plastics in Medical Application

Design, Development & Analysis of Acetabular Cup using HDPE/PA6 Blends in Hip Implants

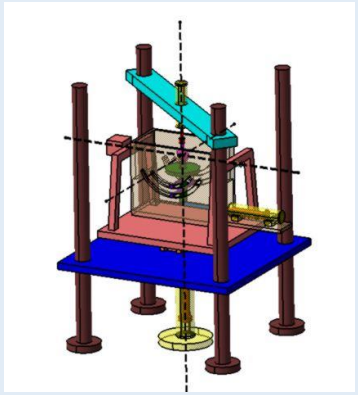
The main problem in hip implant is wear of acetabular cup that occur in its inner profile.

The Project aims at providing a clinically accurate model of the hip joint to better quantify hip kinematics in function of hip morphology for diagnosis purpose

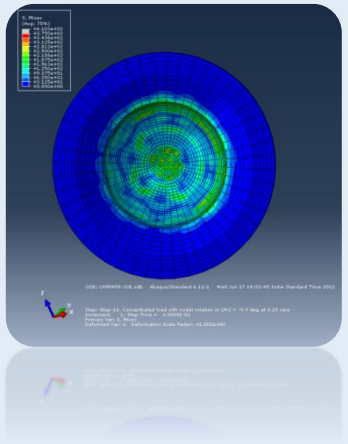




Acetabular Cup



Hip Joint Simulator



DST funded CoE in Orthopedic Bio Material @ IISC, Bangalore

Collaborators:

IISC, Bangalore

M S Ramaiah Advanced Learning Centre, Bangalore

Plastics in Medical Application

DESIGN AND DEVELOPMENT OF MEDICAL DEVICES

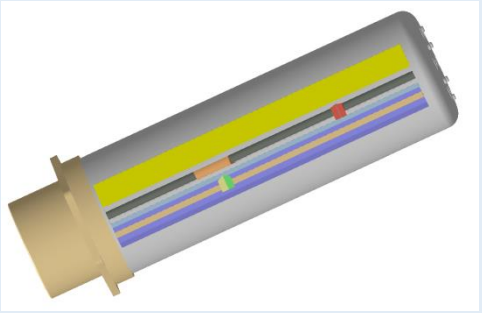
Mouth Piece with filter

Bugs Bunny Mask

Metered Dose Inhaler
(MDI) Chamber

Nebulizer

Peak flow Meter



Funding Agency:
M/s J K Medical Systems, Chennai

NON WOVEN IN HOSPITALS

Broad usage of Non-woven in Hospitals

- Patient Preoperative measures - Ward
- During operation - Theatre
- Post operative measures - Ward

Many more to explore

Existing Applications of Non-Wovens

Surgical Face Mask

- Bacteria Filtration Capability
- Barrier Properties
- Splash Resistance
- Breath ability
- Cost Efficiency
- Skin Friendly

Effective Cost: Non Woven cost 2/3rd of that of Cotton Masks.

Non-Wovens – Wide spread usage just began in India

Existing Applications of Non-Wovens

Head Wear

- Prevent falling of Hairs
- Prevent Bacterial Attack
- Breath able

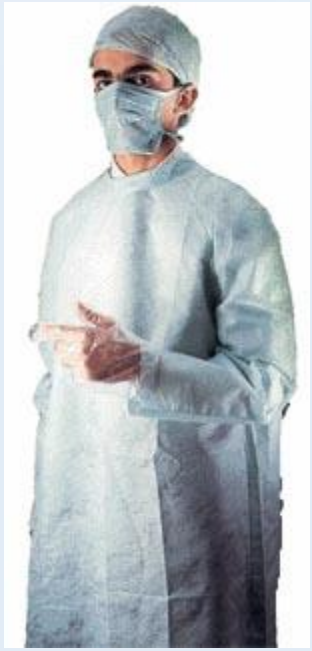
Highly comfortable

Existing Applications of Non-Wovens

AIDS KIT

- Prevent infection

Gown Isolation
Face mask
Bed Sheet



Safeguard against infection

Existing Applications of Non-Wovens

Gowns in Operating Rooms

- Breathable Viral Barrier
- Avoids Pathogenic Transmission
- Low Lint
- Softness, Breath ability and Drape

Tested for suitability to check Avian Influenza, Healthcare Associated Infections, Hepatitis, AIDS, MRSA, SARS etc.

Safety - the prime consideration

Existing Applications of Non-Wovens

- Bandages
  - Bacteria Resistant
  - Breathable
  - Easy to Remove
  - Washable
- Wipes
  - Ease in Cleaning
- Shoe Covers
  - Prevent Contamination

Quick Healing of Wounds

Emerging Applications of Non-Wovens

- Adult Incontinence Kit
- Bed Sheet and Pillow Case
- Examination Table Sheet
- Disposable Innerwear
- Surgical Gowns / Lab Coats / Aprons
- Patient Gowns / Isolation Gown
- Angiography Drapes
- Laparatomy Pack
- Maternity Kit
- Ready Made Packs for various Procedures

Need of time – Better materials for better safety,

Emerging Applications of Non-Wovens

Adult Incontinence Diapers

- Useful for Bed ridden Patients
- Managing leakages associated with Urine and Bowel Incontinence.

Advantages

- Ease of use
- Comfort
- Odor control

Increasing Demand for Senior Citizen Healthcare

Emerging Applications of Non-Wovens

Bed Sheet and Pillow Cover

- Replacement of Uncomfortable Oil Cloth
- Gives a Fresh New look vis-à-vis a washed linen
- Better Hygiene as compared to a washed linen

Anti Bacterial Treated Bed Drape

- In built pouches to enable fluid management.
- Conformable to body contours
- Useful for Patients having Bed Sores.

A relief to patients suffering from bed sores

Emerging Applications of Non-Wovens

Disposable Innerwear

- Light Weight
- The low cost alternative for all patients
- Better Hygiene
- No hassles of washing

The all season solution, can also be used during traveling

Emerging Applications of Non-Wovens

- Personalized Care -
  - Cubicles
  - Isolation Curtain Chambers.

Many more to explore

Value Proposition

- Many products are cost effective as compared to Linen
- Non-woven offer better safety
- No capital investment for laundry
- Energy / Space saving
- Manpower Saving

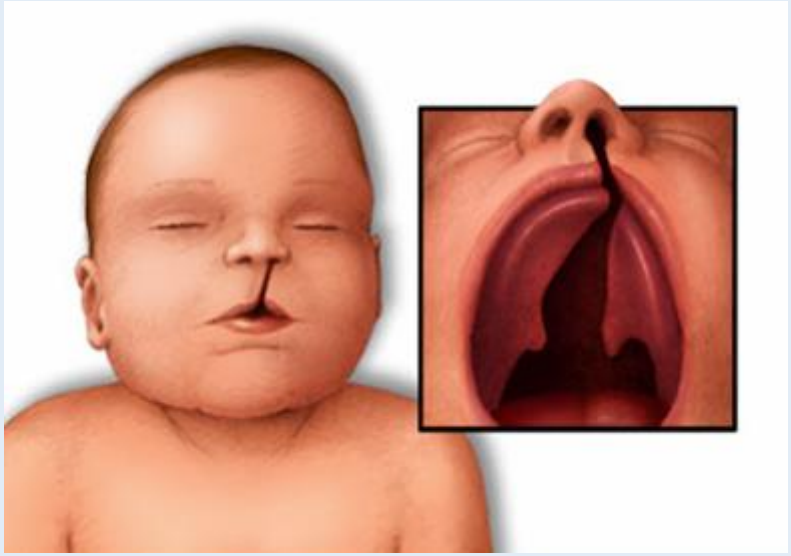
Value Proposition

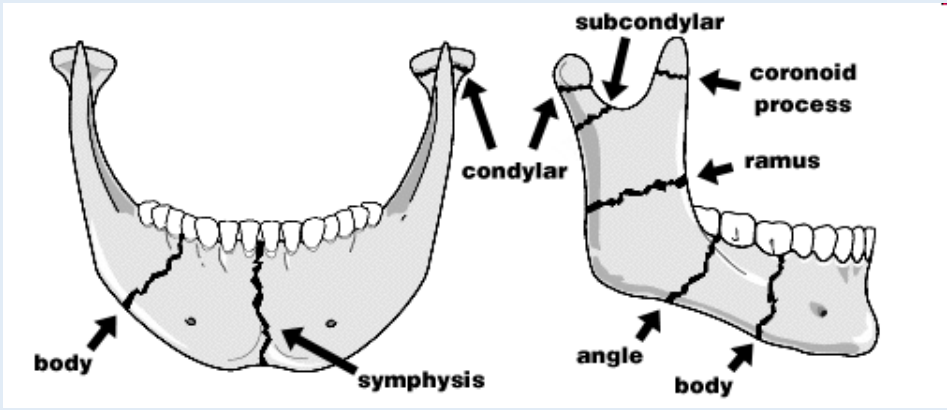
Disposal Method

- The ideal method recommended is Incineration.
- Presently practiced in many hospitals for other disposables like blood bags, syringes, etc.

The Problem:
Oral Deficiencies

- Oral bone deficiencies are a major Issue!
  - High prevalence of periodontitis
  - Injury/trauma to jaw bone or teeth
  - Other deficiencies from birth defects (i.e. clef palate/lip)

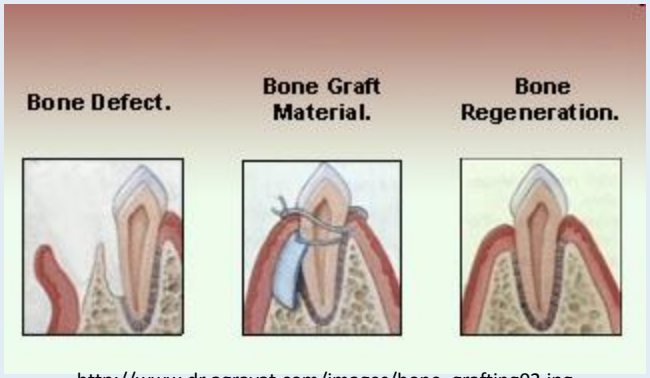




The Solution:
Bone Augmentation

- Performed to increase the amount of bone to allow for secure implant placement

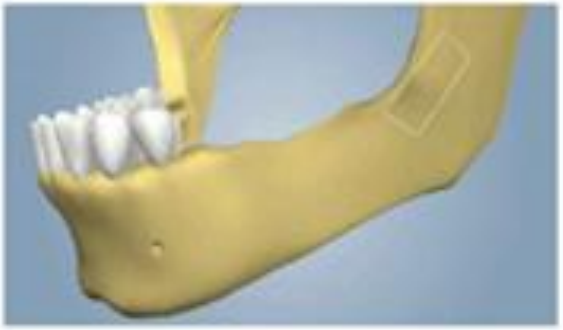
- Common procedures:
  1) Alveolar process augmentation of mandible and/or maxilla
  2) Maxillary sinus augmentation



http://www.dr.agravat.com/images/bone_grafting02.jpg

Problem with bone graft augmentation

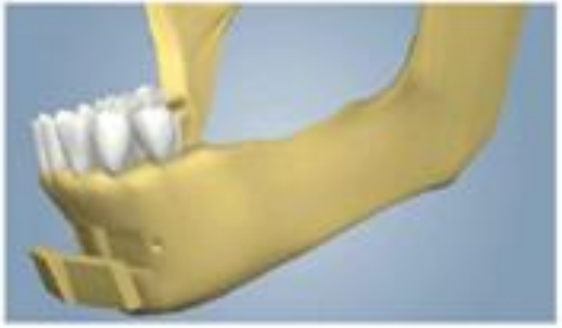
Donor site morbidity



Another technique involves extracting bone from the chin in small blocks.

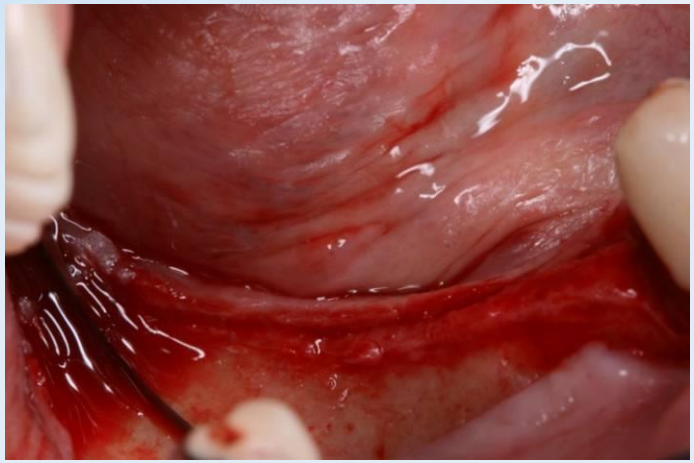
The bone is secured to the jaw with specialized screws, and substitute bone is used to fill the surrounding areas. Healing membranes cover the grafts and once the bone has matured, implants can be placed.

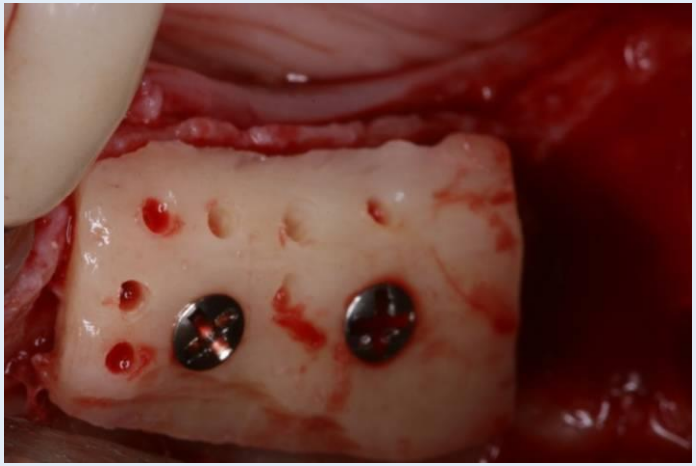
Bone grafting can make dental implant treatment possible even with severe cases of bone loss.



Bone Augmentation

Example

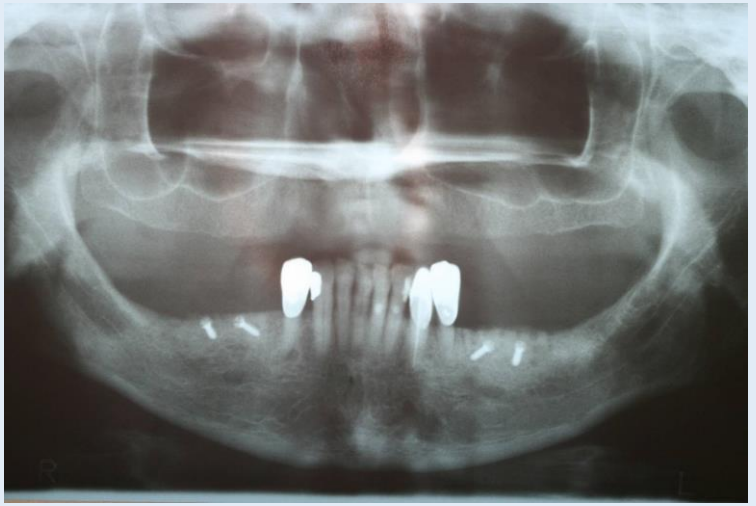




Courtesy of Scott Price, D.M.D.

Two weeks post-op

7 months post-op



Courtesy of Scott Price, D.M.D.

Thank You