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- **Fellow, Indian Public Health Association**
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- **Published/ presented more than 130 scientific papers in National/ International Conferences/ Journals/Books**
- **Awarded Fellowships/Scholarships by World Health Organization (WHO), National Institutes of Health(NIH), USA; Canadian Society for International Health(CSIH), International Clinical Epidemiology Network(INCLEN), and International Society for Priorities in Health Care**
- **Editor, Journal of Academy of Hospital Administration**
- **Vice President, Indian Association of Occupational Health (IAOH), Delhi State Branch and Member, Central Council, IAOH .**
- **Was the First Secretary and Registrar of the Delhi Medical Council (DMC).**
- **Member, Scientific Committee on Epidemiology in Occupational Health, Scientific Committee on Occupational Health and Development and Scientific Committee on Accident Prevention of International Commission on Occupational Health (ICOH)**
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Current Scenario & Future Requirements Of Medical Textiles



MEDICAL TEXTILES

- Textile has always been a part of healthcare.
- Combination of Textile Technology and Medical Sciences has resulted into **MEDICAL TEXTILES**.
- Medical Textiles are one of the faster growing sectors of the global Technical Textile industry.



MEDICAL TEXTILES

- Recently only, application of textiles has started going beyond the usual wound care, incontinence pads, plasters etc.,
- Latest innovation ie., wide variety of woven, non woven, knitted forms of textile increasingly finding their way into a variety of surgical procedures.
- As healthcare industry is growing enormously in India, the demand for the Medical Textile is also on the rise.



Medical Textiles - Current Scenario

Reusable / Durable to Disposable :

- Concept of **reusing linen** of yester year is slowly getting eliminated and shift to **single use disposable products** is the norm of the day in many of the Hospitals.
- Great transformation in the mode of treatment offered by hospitals, encouraging usage of disposables.
- Shift from conventional cutting & preparing of gauze pieces to precut gauze pieces, since 2000.



Shift to disposables – Why ?

- Hospital acquired infection – to prevent.
- Reusable linen - a carrier and source of infection.
- Increased awareness – among medical professionals/ healthcare workers and patients.
- To reduce overall healthcare costs to the nation by using disposables in order to reduce cross infections.
- Surgerywise / procedurewise custom disposable pack /kit.
- Usage of wrappers instead of pink/green cloth covers for trays in CSSD, to retain sterilization and increase the number of days storage.



Shift to disposables – Why ?

- Resistant to liquid penetration (Blood / Water), come into contact from cuts or spattering , results in exposure to pathogens.
- Non linting (Burrs / loose particles will not come out).
- Saving of time and man power in cutting and preparing the gauze pieces.
- Resistant to flame & Infection free nature(barrier against bacteria).



Shift to disposables – Why ?

- Allows air and moisture to pass through (better breathing / better circulation, resulting in surgeon's comfort).
- Economic aspect (linen comes to 10 to 15 cycles, whereas disposable single use and throw. Cost comes to either equal or higher by 15% to 20% that of linen, in case of disposables).
- Ease of use, hygiene and cost effective, by eliminating laundering (washing of 1 ton of linen, 7 ton of water – approx. required).



Players dealing in innovative/advance Medical Textile products

1. Bandages & Wound Care:

- ❖ Kimberly clark
 - ❖ Beiersdorf
 - ❖ Battelle Memorial Institute, US
 - ❖ Perlei Medical, US
 - ❖ Comvita, NewZeland.
 - ❖ Imedex Biomateriaux, France.
 - ❖ 3M
- Smith & Nephew
 - Area Labs, US
 - J & J, Ethicon, US
 - Quick- Med Technologies, US
 - Conva Tec,UK.
 - Nycomed Pharma, Norway



Players dealing in innovative /advance Medical Textile products

2. Sutures

- ❖ Johnson & Johnson, Ethicon, US & UK
- ❖ Honeywell International, US
- ❖ Poly-Med, US
- ❖ Tyco Healthcare, US
- ❖ Biotronik, Switzerland

3. Vascular prostheses (grafts)

- ❖ W.L.Gore, US
- ❖ Edward Life Science, US
- ❖ Boston Scientific, US



Players dealing in innovative /advance Medical Textile products

4. Casts / Plasters

- ❖ BSN Medical, Germany
- ❖ Ossur, Iceland.
- ❖ Alcare, Japan

5. Stents

- ❖ J & J, Ethicon, US
- ❖ Scimed Life Systems, US
- ❖ Vascutek, UK

6. Cell growth technology

- ❖ Tufts University, US

7. Cartilage and bone regeneration

- ❖ Bioretec, Finland



Players dealing in innovative /advance Medical Textile products

8. Nerve reconnection and regeneration

- ❖ Asrtra Tec, Sweden.
- ❖ Oxford Biomaterials, UK

9. Anti microbial fabrics

- ❖ CC Technology Investment, Hong Kong
- ❖ Foss Manufacturing Company, US
- ❖ Rhodanyl, France

10. Ortho joints

- ❖ J & J (Depuy)
- ❖ Inor



Role played by fibre - based materials has advanced dramatically in recent years....

- Bioglass fibres used in *tissue engineering* to create new bone structures.
- Textile *scaffolds* to promote cell growth and build the cell structures
- Textile based *stents* (Biocompatible / Biodegradable).
- *Bandages* - advanced dressings for wounds and burns, delivering antibiotic and other drugs directly to the parts of the body.
- *Casts* – moisture curing resins and glass fibres offering light weight and more comfortable alternative to plaster of Paris.
- Textile fibres and conduits are developed to guide *nerve reconnection and regeneration*.



Some Innovative products in Medical Textiles

- **Bio functional materials** - active substances are incorporated into fibre by chemical modification or applied onto fibre during spinning process
- These additives get transferred to skin by body moisture or by body heat.
- eg., anti-allergen finishing agents used to relieve patients from asthma.



Photonic Textiles

- ✓ Philips demonstrates **photonic textiles** that turn fabric into intelligent displays.
- ✓ eg., a baby jaundice sleeping bag, embedded with blue LEDs to break bilirubin is developed.

Mesh sack

- ✓ Manufactured from warp knitted polyester to prevent heart enlargement for patients with degenerative heart failure.

Medical Textiles production in India yet to gear up, because

- High investment involvement.
- High import duty on machinery.
- Yet to have adequate technology for high value medical - textiles manufacturing.
- More awareness of hygiene required(maintaining high hygiene standards from raw materials to finished products).
- Lack of customized production.
- Absence of converters in India to transform the roll goods into a consumer products.
- Indigenous developments of products to take place in order to bring down the treatment cost.
- R & D to be undertaken on a large scale to make shift from low value to high value products.



Government to finance **CENTER OF EXCELLENCE** for Medical Textiles

- Union Ministry of Textiles identified **SITRA**, Coimbatore as center of excellence for Medical Textile productions.
- Govt. is granting Rs.100 million over 3 years to center for setting up necessary facilities.
- Lab with international recognition, IT supported information base, training programmes and video conferencing.



Improvement needed in Medical Textile products

- A. Scientific study is required with regard to appropriate application of various Medical Textile products.
- B. Purpose should be solved.
- C. What strength and what construction needed to be standardized, depending upon place of use, i.e., operation room and beds at wards.
- D. Total stain free material needed to avoid blood/ Fluid coming in contact with human body.
- E. Durability, good-looking and aesthetic, lightweight, adequate strength needed in medical apparels.



Future Requirements of Medical Textiles

- Future Requirements of Medical Textile directly related to growth of Indian Healthcare Sector i.e., increasing in number of Hospitals.
- In India healthcare sector is about **US\$ 17 billion** industry, with annual growth rate at **13% to 17%**.
- By **2012 US\$ 36 billion** is Indian healthcare sector's growth estimated.
- Rise in number of **65+** year olds, the segment of population that uses most healthcare products and spends the greatest number of days in the hospitals, leading to Medical Textiles consumptions.



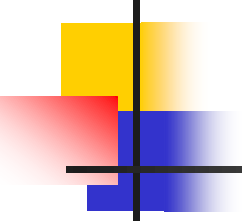
Non Woven Textiles – Market size

- Disposable non woven textiles will dominate Medical Textiles market. Demand for hygiene products will go huge.
- In next **10** years, 1 million ton of non woven textiles is the production level expected.
- Current Indian non woven textiles is 70 thousand tons (which was the same level in china 15 years ago).
- China producing today 1 million ton of non woven textiles.



Conclusion

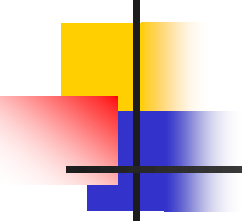
- We have thus so far seen what is the current scenario and what are the future requirements of Medical Textiles.
- Medical Textiles are one of the dynamically expanding sectors and development of same is to convert pain full days of patients into comfortable days.
- As medical procedures continue and transform, the demand for textile materials is bound to grow and grow.



*You see things as they are and ask why
But I dream of things that never
were and ask why not....*

G. B. Shaw wrote

Kennedy quoted this often



Health is the greatest possession.
Contentment is the greatest treasure.
Confidence is the greatest friend.
Non-being is the greatest joy.
- Lao Tzu

THANKS TO ALL....