مروری بر بایو متریال های جایگزین استخوان

در درمان های ایمپلنت

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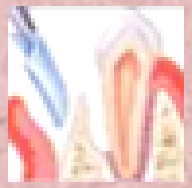
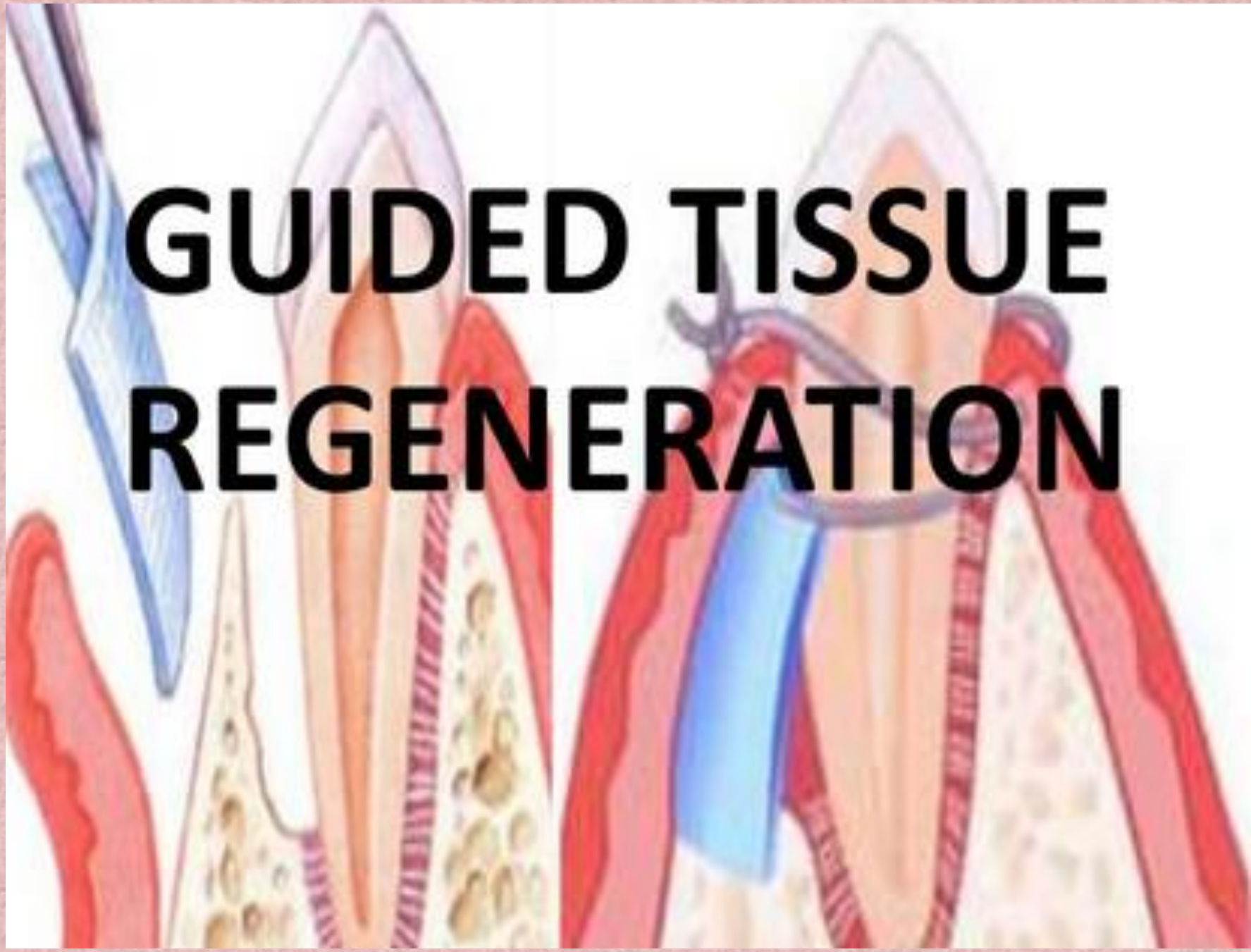
کاربردهای بالینی ممبرین ها و انواع آنها

Classification and Clinical use of membranes in implant dentistry



Outline

- GTR and GBR
- Membrane classification
- How to choose?
- Clinical and surgical considerations


GUIDED TISSUE
REGENERATION

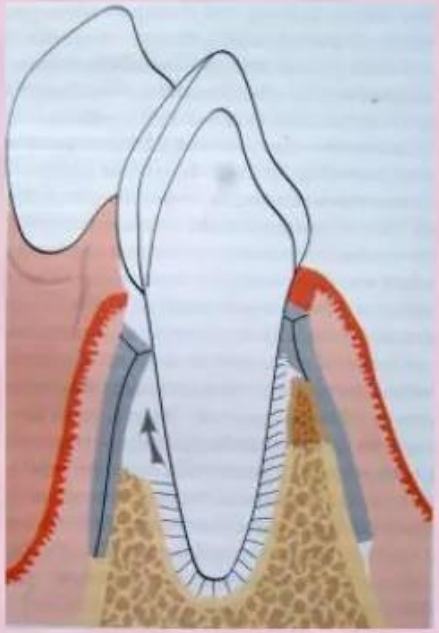
THE BIOLOGIC CONCEPT/FOUNDATION OF GTR

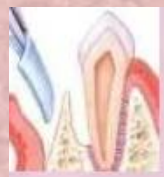
- *Principle of GTR is based on the assumption that only the periodontal ligament cells have the potential for the regeneration of the attachment apparatus of tooth.*

- *It consists of placing barriers of different types to cover the bone and periodontal ligament thus temporarily separating them from gingival epithelium.*

- *Excluding the epithelium and the gingival connective tissue from the root surface during the post surgical healing phase -*
  - ✓ *Prevents epithelial migration into the wound.*
  - ✓ *Favours repopulation of the area by cells from the periodontal ligament and bone cells.*

- *Guided tissue regeneration with the use of barrier membranes works on the principle of cell exclusion.*





MELCHER'S CONCEPT/TISSUE COMPARTMENT HYPOTHESIS

Melcher's hypothesis

*In **1976, Melcher** suggested in a review paper that the type of cell which repopulates the root surface after periodontal surgery determines the nature of the attachment that will form.*

Root surfaces may be repopulated by four different types of cells:

1. *Epithelial cells.*
2. *Cells derived from the gingival connective tissue*
3. *Cells derived from the bone*
4. *Cells derived from the periodontal ligament*

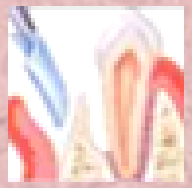
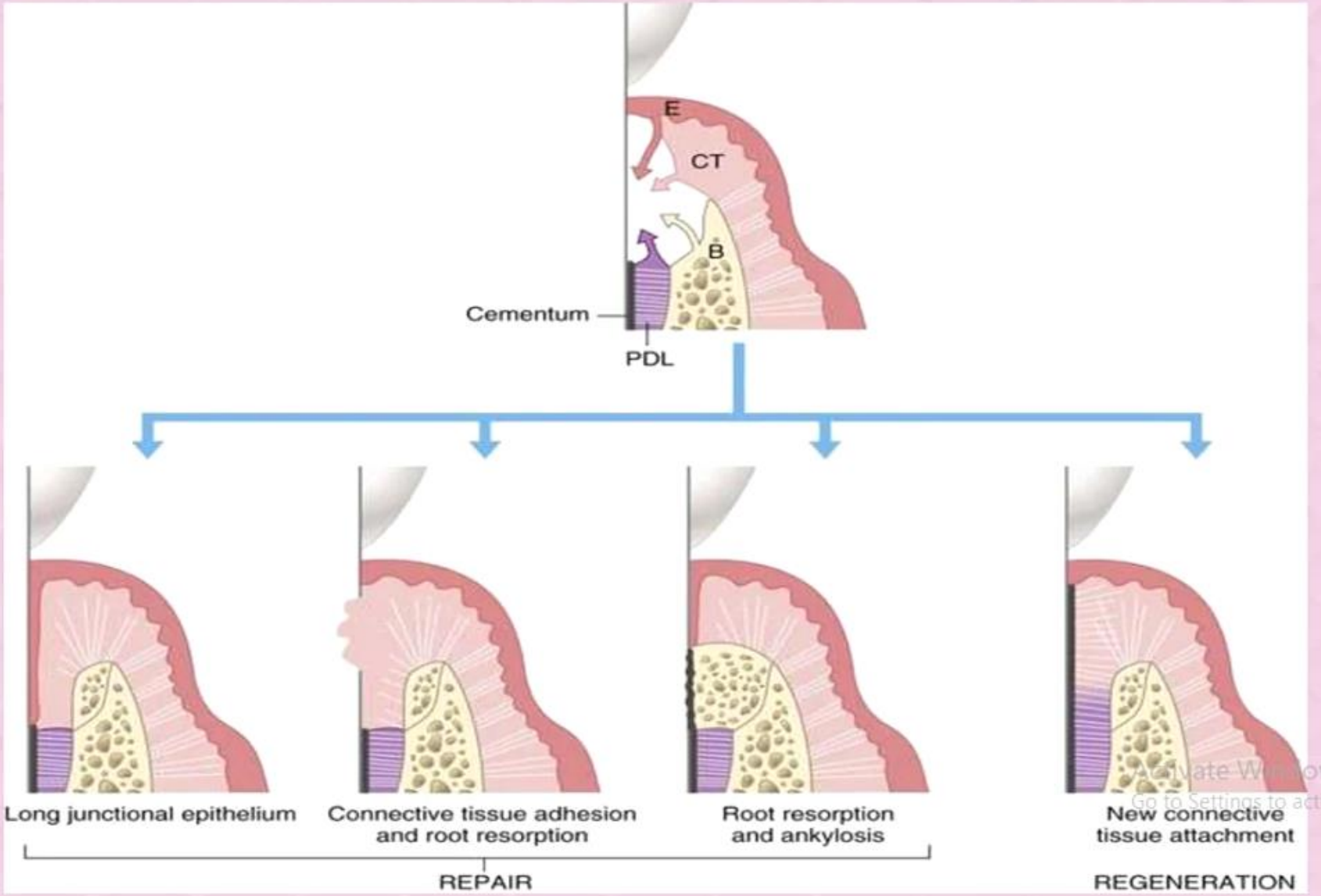
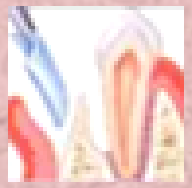
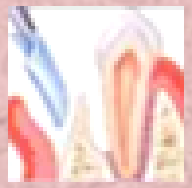


Figure: Schematic diagram depicting the concept of Melchers hypothesis

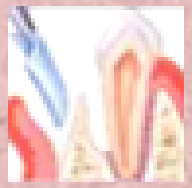




- Biocompatibility
- Cell Occlusion
- Tissue Integration
- Space Making
- Good Handling Properties



Biocompatibility



Cell Occlusion

OBJECTIVES OF AN IDEAL BARRIER MEMBRANE

- *It should fulfill occlusive requirements of GTR concept.*
- *It should be biocompatible and/or allow tissue integration.*
- *Non-toxic and non-carcinogenic.*
- *Chemically inert and non-antigenic.*
- *Easily sterilizable.*
- *Easy to handle during surgery.*
- *Sufficiently rigid so as to maintain space between it and root surface.*
- *Supplied in different designs to suit the specific clinical situations*
- *Easily storable and long shelf life.*
- *Easily retrievable in case of complication.*
- *Should not be too expensive.*
- *able in case of complication.*

CLASSIFICATION

Classification by Minabe in 1991:

Nonabsorbable

- *Polytetrafluoroethylene (e-PTFE) type*
- *Titanium reinforced polytetrafluoroethylene type*
- *Rubberdam*

Bioabsorbable

Natural

- *Collagen type*
- *Synthetic polymer type(lactate-glycol compound)*
- *Connective tissue graft*
- *Durameter*
- *Oxidized cellulose*

Synthetic

- *Alloderm*
- *Polyurethanes*
- *Polylactic acid*
- *Polyglycolic acid*

Classification by Gottlow in 1993:

First generation membranes: Non-resorbable membranes

- ✓ *Millipore Filter*
- ✓ *Expanded polytetrafluoroethylene membrane (e-PTFE) GORE-TEX*
- ✓ *Nucleopore membrane.*
- ✓ *Rubber Dam.*
- ✓ *Ethyl cellulose.*
- ✓ *Semi-permeable silicon barrier.*

Second generation membrane: Resorbable membranes

- ✓ Collagen – Biomend, Periogen, Paroguide, Biostite, Tissue guide.
- ✓ Polylactic acid Membrane – Guidor, Vicryl, Atrisorb, Resolut, Epiguide, Biofix.
- ✓ Vicryl Mesh.
- ✓ Cargile Membrane.
- ✓ Oxidised Cellulose Membrane.

Third generation membrane:

They are the resorbable membrane with added growth factor incorporated with an aim of improving early bone healing.

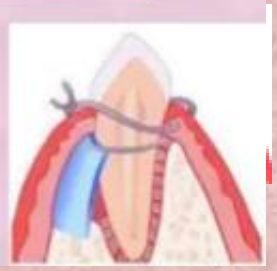
Advantages and disadvantages of non-resorbable membranes

Advantages:

- Excision of epithelial and gingival CT from PD defect
- Maintains space between defect and barrier allowing entry of cells from PDL and alv bone.
- Helps to stabilize clot which may enhance regeneration
- Space maintainence over an extended time and can remain in place for longer period.

Disadvantages:

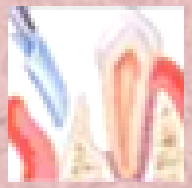
- Membrane exposure
- Contamination
- Infection
- Bone loss



Advantages and disadvantages of resorbable membranes

Advantages
Reduce operatory time
More tissue compatibility
Increase patient acceptance
Elimination of second surgery for barrier removal
Reduces risk of loss of regenerated attachment owing to reentry surgery.

Disadvantages
Resorbable
High Cost
Instability of barrier
Biodegradation rate cannot be controlled
Lack of stiffness-collapse of membrane



شاخه	دسته	گروه	طبقه	مجموعه
e-PTFE d-PTFE	غیرقابل جذب	پلیمرهای صناعی	از منابع غیربیولوژیک	فاقد فعالیت بیولوژیک
پلی استرها هیدروژلهای پلی اتیلن گلیکول	قابل جذب			
		تیتانیوم		
Native Cross-linked	کلاژن	پلیمرهای طبیعی	از منابع بیولوژیک	
	Chitosan			
پوست کیسه آمنیوتیک	ماتریکس های بدون سلول بافت های نرم	بافت‌های غنی از کلاژن		غشاءهای سدکننده در جراحی های GBR و GTR
	ماتریکس بدون مواد معدنی بافت های سخت			
		پپتیدهای CYS-RGD	پلیمرهای حاوی بیوماکرومولکولهای سطحی	دارای فعالیت بیولوژیک
		پپتیدهای CYS-PTH (1-34)