Synthetic Gingiva as Good as Real!!!

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Abstract

Thinning of gingival and recession can often be an embarrassing esthetic problem to the patient. We have heard of umpteen restorative techniques using biocompatible grafts. Silicone is tested for its esthetic and functional durability in the human body. Silicone elastomers are used in periodontal esthetic management with great success.

Keywords: Gingival recession, biocompatible grafts, Silicones, Periodontal esthetic management

Introduction

In 21st century we are abide with latest in technologies and research, the field of periodontal surgery also grown with usage of novel materials both natural and artificial. One among the artificial material is the silicone[1] which has excellent usages in periodontal esthetic management. Silicone rubber is an elastomer[2] (rubber-like material) composed of silicone—itself a polymer containing silicon together with carbon, hydrogen, and oxygen. Silicone rubber is generally non-reactive, stable, and resistant to extreme environments and temperatures from -55°C to +300°C while still maintaining its useful properties.

Medical Grade Silicone

Medical Grade Silicones[3] are silicones tested for biocompatibility and are appropriate to be used for medical applications.

Food and Drug Administration (FDA) Center for Devices and Radiological Health (CDRH) regulates devices implanted into the body Medical grade silicones are generally grouped into three categories[4]: non implantable, short term implantable, and long-term implantable. Materials approved as Class V and VI can be considered medical grade.

Role of Silicone in Prosthesis[5]

Silicone elastomers used for prosthetic rehabilitation are soft and resilient material providing comfort (relieving pressure from sensitive areas), aesthetic (restoring the foot length) and provide a psychological sense of wholeness compared to the other materials. The emphasis was always towards rigidity and prosthetic failure which occurred mainly due to skin breakdown.

Role of Silicone in Periodontics

Silicone elastomers are used in periodontal esthetic[6] management with great success.

They are used in various methods like:

1. Gingival veneers
2. Soft tissue ridge expansion.
3. Gingival augmentation.
4. Non resorbable membrane for guided tissue regeneration

Gingival Veneer[7]

A gingival veneer (Fig 1) is a prosthesis worn in the labial aspect of the dental arch, which aims to restore the muco-gingival contour and esthetics in areas where periodontal tissues are deficient. Different materials usually used to fabricate include an acrylic resin (heat polymerized/auto-polymerized porcelain or even resin composites matching the color of the gingiva.

Fig. 1: Gingival Veneer

Gingival Veneer using Silicone Elastomers[8]

Flexible gingival veneers (Fig. 2) are veneers made up of silicone are made to overcome the disadvantage of acrylic veneers of being hard, rigid and difficulty in fitting accurately around multiple teeth. Patients with poor oral hygiene or dexterity are not candidates for acrylic prosthesis. Flexible gingival veneer made of silicone is both comfortable and accurately fitting.

Fig. 2: Gingival Veneer using Silicone Elastomers

Soft Tissue Ridge Expansion using Silicone[9]

Soft tissue expansion is a technique used by plastic and restorative surgeons to cause the body to grow additional skin, bone or the other tissues. Extensive bone augmentation procedures are frequently carried out prior to implant surgery. Tissue expanders[10] (Fig.

3) are used for the reconstruction of soft-tissue, this device consists of silicone elastomer inflatable expander with a remote silicone elastomer injection dome.

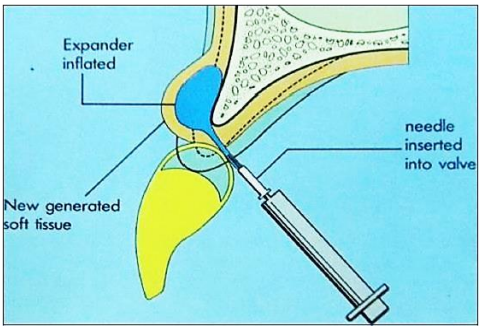

Fig. 3: Soft Tissue Ridge Expansion using Silicone

Gingival Augmentation using Silicone Elastomers [11]

Autogenous soft tissue grafts like free gingival graft and connective tissue grafts are gold standard for gingival augmentation[12]. Due to some limitations such as second site injury, limited availability of donor tissue volume, inadequate or excessive rigidity, donor site morbidity. Autologous grafts (Fig. 4) are now considered for augmentation which include alloplastic[13] dermal matrix made up of collagen and silicone.

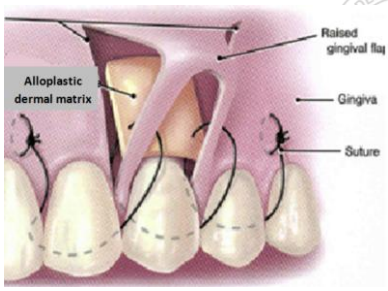

Fig. 4: Gingival Augmentation using Silicone Elastomers

Silicone as Membrane for Guided Tissue Regeneration[14]

Silicone elastomers can also be used as non resorbable membrane (Fig. 5) for guided tissue regeneration due to its many advantages.

1. Cost effective
2. Superior adaptation in the defect areas.
3. Minimal tissue rejection

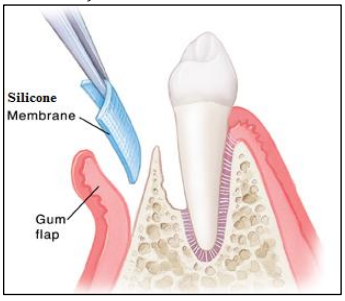

Fig. 5: Silicone as Membrane for Guided Tissue Regeneration

Future Trends

Future studies are made in this field like tissue engineering with nanospheres[15] of silicone injected for gingival augmentation leading to silicone reinforced gingiva.

Conclusion

Thus silicone elastomers occupy the periodontics for its esthetics and functional support. Further researches are required to overcome its drawbacks and make it as a permanent treatment option in periodontal diseases.

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