Collagen membrane for reconstruction of soft tissue defects after surgery of oral cancer and precancer: a brief review

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ABSTRACT

There are some surgeries after which a temporary cover for raw wounds is required to ensure healing. Some of those circumstances are loss of tissue due to burns, trauma, amputation, chronic ulcer, leprosy, and skin graft sites. Although the body initiates regeneration mechanisms, however the time taken for complete healing of wounds is unpredictable. Also, there is a tendency for long standing wounds to undergo infection and scarring. Oral mucosa is no exception to scarring and infection of wounds and there has always been a search for new materials that can be used for coverage of oral defects. Xenogenous collagen is one such grafting material. Over the years collagen implant solutions for a number of clinical applications include general surgery, burn surgery, neurosurgery, plastic and reconstructive surgery, oral surgery, and peripheral nerve and tendon surgery. This paper aims to focus on collagen as an effective option of wound closure in plastic and reconstructive surgery of the head and neck, especially after loss of soft tissue following resection of oral malignancies.

Keywords: Collagen; oral mucosa; grafting; oral submucous fibrosis; oral cancer

Access this article online

Quick Response Code:

Website: http://parjournal.net

DOI: 10.20517/2347-9264.2015.119

How to cite this article: Vastani A, Chourasia N, Pahlajani V, Choubey S. Collagen membrane for reconstruction of soft tissue defects after surgery of oral cancer and precancer: a brief review. Plast Aesthet Res 2016;3:100-5.

Received: *05-11-2015*; **Accepted:** *16-02-2016*

as seen with a 6-month follow up. Pradhan *et al*.[33] also in a similar study found a significant difference in the postoperative mouth opening, an insignificant difference for post surgical morbidity and higher grades of surgical convenience in using collagen sheet as a wound dressing material as compared to buccal pad of fat. Reddy *et al*.[39] found good results in cases of OSMF when they impregnated dexamethasone in the collagen graft after excision of fibrous bands.

MANIPULATION OF COLLAGEN

Though it has not been mentioned in literature, we have observed that most surgeons find it difficult to handle the wet collagen sheet in the oral cavity once it is taken out from its sterile packing. Even after washing away the preservative medium by immersing the material in sterile solution for 5-10 min, the tendency of the collagen to coil in itself does not go away. In our opinion, it can be attributed to its minimal thickness, elasticity and cohesiveness. So, the technique of using a "tie-over" bolster dressing (as used with skin grafts)[40] can be tried to secure collagen membrane to the recipient site. However, if the surgeon does not desire to keep the gauze or sponge dressing tied to the collagen graft, we suggest an easy technique that not only reduces the difficulty in manipulating collagen, but also provides perfect adaptation of the graft to the recipient site in oral cavity.

The method involves spreading the wet collagen sheet over a thick moistened gauze ball [Figure 1] after removing the preservative from collagen by immersing in in saline for 10 min. The size of graft and gauze depends on the size of the surgical defect. This gauze along with the graft is then taken to the surgical site and placed there with collagen facing the recipient site. With the gauze still in place, the accessible portion of collagen sheet underneath the gauze can be sutured to the wound margin [Figure 2]; choice of the suture depends on the surgeon. Next, the gauze can be slightly lifted over the portion of graft situated adjacent to the sutured collagen and another couple of stay sutures can be placed as required [Figure 3]. For example, if a buccal mucosa defect has to be grafted, the first suture can be placed anteriorly and lifting the gauze pad can proceed from anterior to posterior region. Thereafter, using this same technique, the whole circumference of the wound can be

Figure 1: Picture demonstrating the placement of wet collagen sheet over a thick, moistened gauze

Figure 2: Placing the first suture through the accessible portion of graft to the surgical site, while the gauze is stabilized over the graft with a finger rest or an instrument

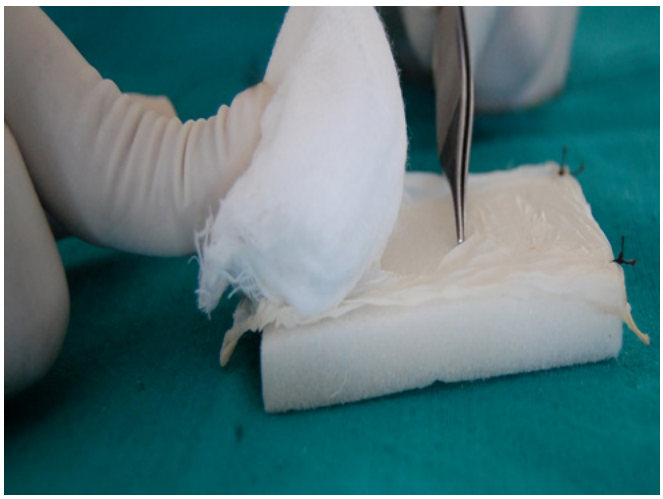

Figure 3: The gauze is slowly mobilized/ rolled, but not removed completely from the graft surface so that more area of the graft is accessible for suturing without much warping of the graft. Simultaneously, an instrument tip can be used to stabilize the graft

Figure 4: The collagen graft in place after suturing; the gauze is removed just before placing the last suture

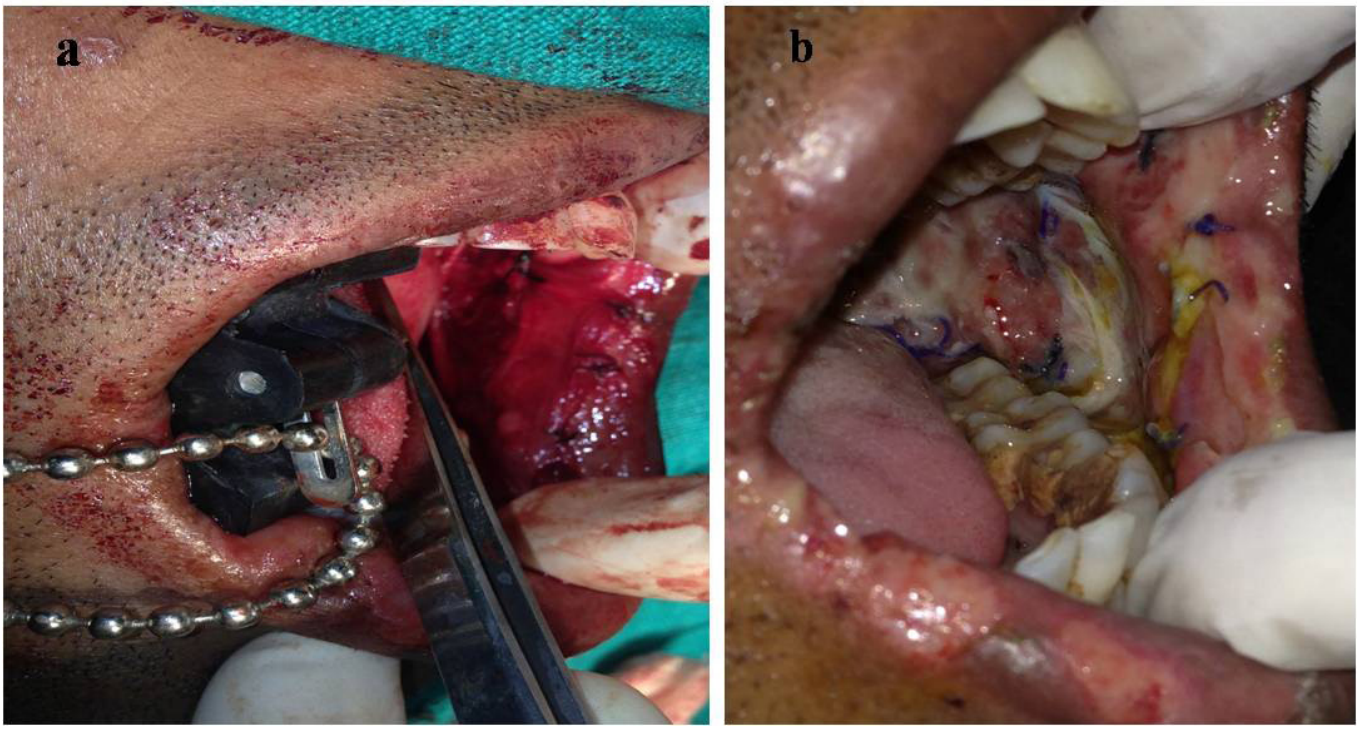

Figure 5: (a) Collagen membrane secured on buccal mucosa in a case of oral submucous fibrosis following excision of buccal fibrous bands; (b) photograph of the 7th postoperative day showing partial healing of buccal mucosa and partial sloughing of collagen

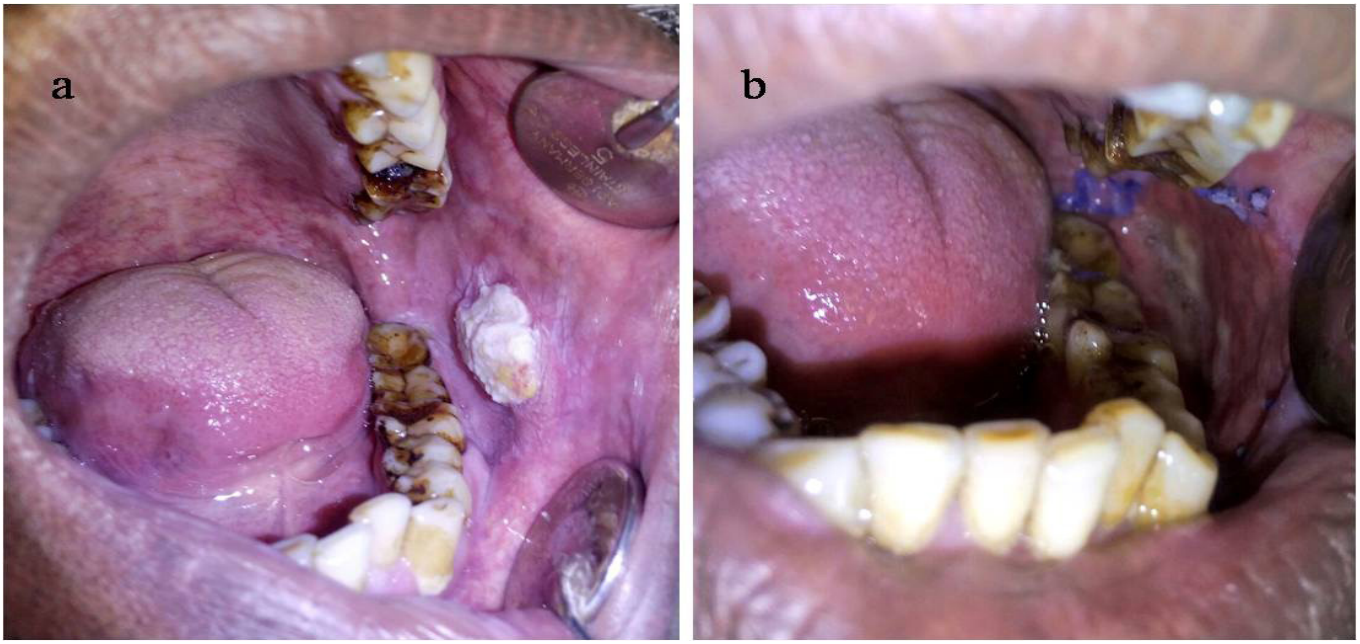

Figure 6: (a) Preoperative photograph showing verrucous carcinoma of left buccal mucosa; (b) photograph of the 7th postoperative day showing almost complete take up of collagen graft by the defect made by wide excision of lesion

covered with the graft by sutures [Figure 4]. It is important to note that the gauze should be removed only before the last suture remains to be given to secure the graft in proper adaptation. After the gauze is removed, a well-adapted collagen can be seen which is not amenable to the problem of mobility and rolling of the material during suturing; making the placement of additional sutures (if required) very easy. A dressing may or may not be placed over the graft, depending on the choice of surgeon. We prefer to snugly fit a thick, removable, moistened gauze dressing over the graft at least for two days, to avoid graft contamination and to prevent the collection of fluid between graft and recipient site that could predispose the site to infection, thus jeopardizing the successful take-up of graft. If the surgical defects are multiple or bilateral, we advocate placement of a Ryle's tube for 3-4 days so that immediate oral intake after the surgery can be avoided, yet nutrition is maintained. Clinical appearance of collagen grafted in OSMF and oral squamous cell carcinoma can be seen in Figures 5 and 6 respectively.

CONCLUSION

Oral and maxillofacial surgeons treat various pathologies in and around the oral cavity. The commonest protocol of treatment for all pathologies is the surgical excision, rendering postoperative