Role of Collagen Impregnated with Dexamethasone and Placentrix in Patients with Oral Submucous Fibrosis

Y. Raghavendra Reddy · N. Srinath ·
H. Nandakumar · M. Rajini Kanth

Received: 19 September 2009 / Accepted: 2 August 2011 / Published online: 9 October 2011
© Association of Oral and Maxillofacial Surgeons of India 2011

Abstract

Purpose To evaluate the versatility of the collagen membrane as both drug carrier and biologic dressing material to cover the raw wounds created after the surgical excision of fibrotic bands in oral submucous fibrosis.

Materials and Methods The study comprises of ten patients. The patients of age group 20 to 50 years were selected. The collagen is reconstituted by injecting with dexamethasone and placentrix solution leaving a small overlap on to the remaining mucous membrane and the graft is sutured. Preoperative and post operative assessment was done regarding the improvement in mouth opening, decrease in burning sensation, change in colour of oral mucosa and clinically grading the extent of lesion.

Results The results were found appreciable in seven patients while in the remaining three patients it showed relapse because of inadequate physiotherapy. All the ten patients were comfortable with intra oral collagen grafting. The collagen remained moist and supple intraorally, and remained in close contact with the underlying tissues, providing a strong mechanical barrier. The material was effective in attaining haemostasis, relieving pain and preventing extensive contracture.

Conclusion In this study of short duration, the nature of collagen membrane was observed as both biological dressing material and drug carrier. It was found as a very suitable alternative to the other graft material mentioned for the repair

of defects in the mucous membrane created by surgical excision of fibrous bands in oral submucous fibrosis.

Keywords Oral submucous fibrosis · Collagen membrane · Dexamethasone · Placentrix

Introduction

Oral sub mucous fibrosis is a chronic disease of insidious onset featuring the deposition of fibrous tissue in the sub-mucosal layer of cheek, lips, palate, pharynx, fauces and oesophagus. The underlying muscles of mastication may be affected. Patients frequently present with a history of oral pain, and intolerance to spicy foods, together with a progressive reduction in oral opening. A more serious complication of this disease is the risk of development of oral squamous cell carcinoma in 3.7 to 6% of cases [1]. The criteria for diagnosis of oral sub mucous fibrosis were based on the blanched, slightly opaque and fibrous bands of the oral mucosa [2].

Various studies have suggested a multifactorial origin with a high incidence of the disease in association with consumption of the arecanut. Arecanut (the fruit of the Areca catechu palm), commonly known as betel nut or supari, plays a crucial role in the etiology of oral submucous fibrosis. Arecoline, an alkaloid component of areca nut, stimulate fibroblastic proliferation and collagen synthesis. The flavanoid (+)-catechin and tannins are also components of the areca nut and stabilize the collagen fibrils, rendering them resistant to degradation by collagenase. The attendant trismus is a result of juxtaepithelial hyalinization and secondary muscle involvement (i.e., muscular degeneration and fibrosis) [3].

Various treatment modalities have been tried and various medical and surgical options were proposed. General

Y. Raghavendra Reddy (✉) · N. Srinath · H. Nandakumar
Krishnadevaraya College of Dental Sciences, Hunsamarana
Halli, Via, Yelhanka, Bangalore, India
e-mail: rimpo2001@yahoo.co.in

M. Rajini Kanth
G Pulla Reddy Dental College, Kurnool, Andhra Pradesh, India
e-mail: coolmrk123@yahoo.co.in

management includes removal of the etiological factors and nutritional therapy. Medical line of management include topical application of triamcinolone acetide 0.1% with neomycin and injectables like hyaluronidase, dexamethasone, placental extract, ranidone (iodine and vitamin B complex). Surgical modalities includes tongue flaps, skin graft and surgical excision of fibrotic bands [4]. This study is intended to use collagen as a drug carrier (dexamethasone, placentrix) and also a biological dressing material to cover the raw wounds after surgical excision of fibrous bands.

Material and Methods

The study comprises of ten patients. The age of the patients was ranging from 20 to 50 years. All patients had less than 30 mm of mouth opening preoperatively. Preoperative assessment was done regarding the patient mouth opening (distance between upper and lower incisors edges was measured), burning sensation in mouth, colour of oral mucosa and clinically grading the extent of lesion in oral sub mucous fibrosis Tables 1, 2, 3, 4.

Material

Bovine collagen is derived from bovine skin (Lyostypt, Braun, Melsungen, Germany). Size 3 × 5 cms and thickness of 0.6 mm is selected as a graft material. Placentrix 2 ml (Fresh human placental extract containing various nucleotides, aminoacids, vitamins, steroids, fattyacids) and dexamethasone 4 mg as injecting material.

Table 1 Color of oral mucosa was observed in natural light and following values are assigned

Scores	Mucosal colour
0	Normal
1	Oral mucosa membrane appears in elastic, opaque with white blanching almost of papery white
2	Areas of redness with spider like tissue in sub mucosal layer
3	Areas of redness followed by appearance of vesicles and superficial ulcerations

Table 2 Degree of burning sensation

Scores	Degree of burning sensation
0	No burning sensation
1	Mild burning sensation
2	Moderate burning sensation
3	Severe burning sensation

The patients were questioned the degree of burning sensation they observed upon ingestion of spicy food, tobacco, hot beverages etc. and following scores were assigned

Methodology

The procedure was conducted under general anesthesia. The fibrous bands were palpated to assess the extent and to plan the incision. The incision started entirely from the inner aspect of buccal mucosa behind the commissure of lip and extended posteriorly preferably up to pterygomandibular raphe region depending on the location of fibrotic bands. The incision was carried out to the depth of the submucosal layer. The fibrous bands were incised with the dissecting scissors. A mean opening of 30 to 35 mm was obtained as acceptable on the operation table. A technique of covering the raw wound by utilizing collagen membrane as both drug carrier and biologic dressing material was performed. The graft was dipped in dexamethasone and placentrix. After 5 min, the graft was placed leaving a small overlap on the remaining mucous membrane. The grafts were sutured all along the periphery and quilting sutures were done to attain close apposition to underlying tissues. Intensive jaw physiotherapy was advised. The patients were asked for postoperative checkups during first, second and third week, followed by first, second, third and sixth months postoperatively.

Table 3 Clinically grading the extent of lesion

Grading	Extent of lesion
0	Normal
1	When clinically palpable fibrotic bands are not detected, diagnosis being given on a histological basis (areas of early oral submucous fibrosis)
2	When perioral i.e. lip, buccal, hard and soft palate mucosa is involved only
3	When perioral i.e. lip, buccal, hard and soft palate mucosa with retromolar area, pterygomandibular area involved
4	Lip, buccal, hard and soft palate mucosa along with retromolar area, pterygomandibular area, tongue and anterior tonsillar pillar area involved
5	Lip, buccal, hard and soft palate mucosa along with retromolar area, pterygomandibular area, tongue and lateral pharyngeal structures, oesophagus, involved precancerous changes may be seen

Table 4 Degree of mouth opening

Scores	Mouth opening measured in mm
0	>35 is normal
1	25–30
2	20–25
3	15–20
4	<10

The mouth opening was measured in mm. The distance between incisal edges of upper and lower incisors is taken and values are assigned

Results

The results were found appreciable in seven patients. All the ten patients were comfortable with intra oral collagen grafting. None complained about the sensation of foreign body or any odour. The collagen remained moist and supple intraorally, and remained in close contact with the underlying tissues, providing a strong mechanical barrier. The material was effective in attaining haemostasis, relieving pain and preventing extensive contracture. Allergic reaction (systemic or local) to graft material was not seen. When placed directly on the raw wound the graft underwent lysis within 7 days. After 7 days most of the collagen peeled off, and the remnants were removed by cutting it and irrigated with normal saline. The tissue was clinically healthy and at 2 weeks was covered by a thin epithelial layer. Normal appearance of the area of operation was restored after 7 to 10 days. The granulation tissue was

normal and there was little evidence of scar contracture at the end of fourth week.

Post operative mouth opening was found to range from 30 to 40 mm, in seven patients. In the remaining three patients a 10–15 mm improvement was noted because postoperative physiotherapy was not performed by the patient Tables 5, 6.

Burning sensation:

30% reduced to normal
50% showed mild burning sensation,
20% reverted back to same range postoperatively after 6 months.

Color of oral mucous membrane:

60% patients had good results with normal mucosa color.
20% patients showed inelastic opaque blanching
20% showed spider like tissue

Table 5 Pre and post operative mouth opening measurements

Case	Age	Sex	Mouth opening in (mm) Preoperative	First week Post operative	Second week	Third week	First month	6th month	1 year	2 year
1	30	M	20	29	29	30	33	36	36	38
2	28	M	16	22	23	23	24	20	16	15
3	38	F	4	25	26	25	22	12	10	8
4	30	F	7	27	26	24	24	20	17	12
5	30	F	12	30	30	29	29	28	29	30
6	26	F	10	28	29	28	32	32	33	33
7	22	M	20	32	33	36	36	36	36	36
8	20	M	22	32	34	36	38	38	39	39
9	20	M	22	33	34	34	35	35	35	35
10	35	M	18	23	28	29	27	28	29	29

Table 6 Pre and post op measurements for burning sensation, color of oral mucosa and clinically grading the extent of lesion

Age	Sex	Burning sensation		Colour of oral mucosa		Clinically extent of lesion		Duration (year)
		Pre op	Post op	Pre op	Post op	Pre op	Post op	
30	M	1	2	0	1	0	3	2
28	M	2	3	0	1	3	3	2
38	F	2	3	2	2	3	4	2
30	F	1	2	2	2	3	3	2
30	F	0	2	0	1	1	3	2
26	F	1	3	1	2	1	4	2
22	M	0	2	0	1	0	3	2
20	M	0	2	0	1	0	3	2
20	M	1	2	1	1	0	3	2
35	M	1	3	0	1	1	3	2

Grading of extent of lesion:

- 40% patients showed good results with normal condition
- 30% patients showed grade 1 extension.
- 30% showed with grade 3 extensions

Discussion

The present article deals with role of collagen impregnated with dexamethasone and placentrix in treatment of oral submucous fibrosis. The suggested protocol includes release of fibrous bands, grafting collagen membrane on the denuded area acting as both drug carrier and biologic dressing material, rigorous jaw exercise for 6 months with regular follow up.

The highlights of this technique are: Collagen triggered the adhesiveness of platelets and stimulated the release

phenomenon, producing aggregation of nearby platelets [5]. It protects against chemical, thermal and bacterial contamination. It has the ability to obtain epithelization. There is excellent patient comfort and tolerance to the dressing. When used over the raw exposed wounds, provides the coverage for sensitive nerve endings, thereby diminishing degree of pain. None of them complained of severe pain post operatively. Those patients with pain can be attributed to the post surgical traumatic inflammation. Allergic reactions: none of the patients showed any signs of either local or systemic allergic manifestations. Hence the antigenicity of the collagen sheet was regarded as not significant. It prevents contracture of the wound Figs. 1, 2, 3, 4, 5, 6, 7.

Placentrix [6]

It acts as a biogenic stimulator, stimulates metabolic and regenerative process, increases blood circulation, tissue metabolism, and induces colour changes.

Fig. 1 Preoperative inadequate mouth opening 22 mm

Fig. 3 Excision of fibrous bands

Fig. 2 Collagen bovine type (lyostypt) impregnated with dexamethasone and placentrix

Fig. 4 Collagen is adapted and sutured

Fig. 5 Active epithelialization noted after 1 week

Fig. 6 Post operative mouth opening noted 39 mm after 1 year

Fig. 7 Post operative mouth opening 39 mm after 2 years

Dexamethasone [4]

It opposes the action of soluble factors released by sensitized lymphocytes following activation by specific antigens. It prevents inflammatory reaction and fibrosis by decreasing fibroblastic proliferation and depositing of collagen.

Conclusion

In this study of short duration, the nature of collagen membrane was observed as both biological dressing material and drug carrier. It was found as a very suitable alternative to the other graft material mentioned for the repair of defects in the mucous membrane created by surgical excision of fibrous bands in oral submucous fibrosis. Similar results were obtained in studies conducted by Sanjay Rastogi et al. [7].

A collagen graft used as a biological dressing material is therefore advocated for use in the mouth to cover large areas devoid of mucous membrane.

The postoperative mouth opening was found to range from 30 to 40 mm during 6 months post operatively in seven patients. In the remaining three patients there was only few millimeters improvement (10 to 15 mm) because of inadequate physiotherapy.

References

1. Cox SC, Walker DM (1996) Oral submucous fibrosis. A review. *Aust Dent J* 41(5):294–299
2. Lai DR, Chen HR (1995) Clinical evaluation of different treatment methods for oral submucous fibrosis. A 10-year experience with 150 cases. *J Oral Pathol Med* 24:402–406
3. Khanna JN, Andrade NN (1995) Oral submucous fibrosis: a new concept in surgical management. *Int J Oral Maxillofac Surg* 24:433–439
4. Gupta Dinesh Chandra S, Dolas Rameeshwar S, Iqbal Ali (1992) Treatment modalities in oral submucous fibrosis: how they stand today? study of 600 cases. *Ind J Oral Maxillofac Surg* 7:43–47
5. Alexander John M, Richmond JL (1978) Microfibrillar collagen (Avitene) a haemostatic agent in experimental oral wounds. *Journal of oral surgery* 36:202–205
6. Rananjaneyulu P, Prabhakara Rao BS (1980) Sub mucous fibrosis—new treatment. *J Indian Dent Assoc* 52:379–380
7. Sanjay Rastogi, Mancy Modi, Brijesh Sathian (2009) The efficacy of collagen membrane as biodegradable wound dressing material for surgical defects of oral mucosa: a prospective study. *J Oral Maxillofac Surg* 67:1600–1606