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An Ayurvedic Approach on Oral Submucous Fibrosis and its Management – A Review

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Abstract

Introduction: Oral submucous fibrosis (OSMF) is an insidious chronic disease characterized by a juxta epithelial inflammatory reaction, fibroelastic changes in the lamina propria, epithelial atrophy, trismus, and recurrent glossitis attacks. It is one of the most prevalent premalignant diseases in India. These days, OSMF is becoming more popular. A study on OSMF and its management according to the Ayurveda values more in the scientific field because Ayurveda's main focus is on maintaining and promoting health care. **Aim and Objectives:** The aim of the study was to gain a better understanding of OSMF and its relationship to *Sarvasara Mukharoga* in *Ayurveda*. **Materials and Methods:** The contents of this article are based on modern medicine textbooks as well as Ayurvedic *Samhitas*. Clinical research published in both indexed and non-indexed journals was also consulted to obtain relevant content. **Results:** According to the *Lakshanas* described by *Bruhatrayi*, OSMF can be equated symptomatically with the *Sarvasara Mukharoga*. In the event of OSMF, the management of *Sarvasara Mukharoga* should be applied. **Conclusion**: On the basis of signs and symptoms, OSMF can be correlated with *Sarvasara Mukharoga*. Early treatment of OSMF using Ayurvedic medications and the cessation of habits helps in the easy cure of the disease.

Keywords: Ayurvedic medicines, Oral Sub Mucous Fibrosis, Premalignant condition *Sarvasara Mukharoga*

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Introduction

Oral submucous fibrosis (OSMF) is a chronic progressive scarring disease that predominantly affects people of South-east Asian origin. This condition was described first by Schwartz by a descriptive term "atrophia idiopathica (tropica) mucosae oris." Later in 1953, Joshi redesignated the condition as OSMF, implying predominantly its histological nature.[1]

The disease occurs mainly in Indians. It affects between 0.2% and 1.2% of urban population attending dental clinics in India. The disease should be a course of concern in countries with large migrant populations from South-east Asia. Worldwide estimates in 1996 indicate that 2.5 million people are affected by the disease. Among Indian villagers based on baseline data, recorded a prevalence of 0.2% (n5 10,071) in Gujarat, 0.4% (n5 10,287) in Kerala, 0.04% (n5 10,169) in Andhra Pradesh, and 0.07% (n5 20,338) in Bihar. Prevalence by gender varies widely in different published studies. The general female preponderance may be related to the factors such as oral habits, deficiency states of iron, and Vitamin B complex among many other conditions prevalent in Indian women.[2]

In *Ayurveda*, OSMF is related to *Acharya Sushruta's Sarvasara Mukha Roga* (Oral Cavity Diseases). Mouth pain, blanching of the oral mucosa, burning sensation in the mouth, inability to open the mouth, and other symptoms can be detected in *Mukha Roga* (diseases of the oral cavity).[3] Some *Mukha Roga* treatments include *Swedana* (sudation), *Gandusha* (oil pulling), *Kavala* (gargling), and *Nasya* (nasal medicine), which can be applicable for OSMF. In this conceptual paper, OSMF will be highlighted, evaluated, elaborated, and discussed.

Aim and Objectives

The objectives of the study are as follows:

1. To evaluate, elaborate, and discuss the OSMF as per modern.
2. To evaluate, elaborate and discussed the correlation of OSMF and its management as per *Ayurveda*.

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Materials and Methods

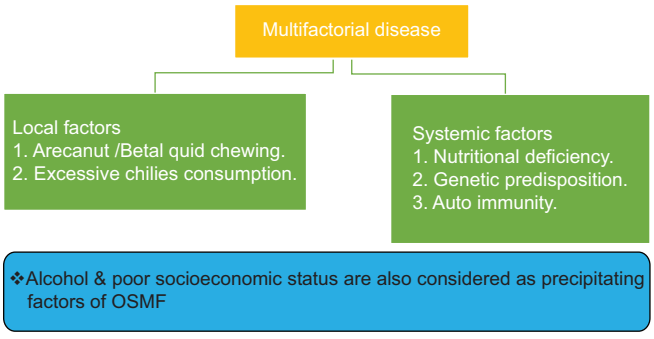
The information in this article is based on personal clinical experiences as well as a variety of clinical studies on OSMF and its management that have been published in index and non-index publications. The Ayurvedic Samhitas have been studied, as well as their comments. An Ayurvedic and modern medicine textbook was utilized to acquire literature on the subject.

Etiology of OSMF[3]

The exact etiology of this condition is unknown. It is believed to be multifactorial. Use of tobacco and areca nut (Areca catechu) has been recognized as one of the most important etiological factors for the causation of OSMF, which contains tannins, arecoline, arecaidine, guvacine, and guvacoline. The previous studies on the pathogenesis of OSMF have suggested that the occurrence may be due to

i. Clonal selection of fibroblasts with a high amount of collagen production during the long-term exposure to areca quid ingredients (Meghji *et al*., 1987).

Figure 1: Clinical Features of OSMF. Oral submucous fibrosis involving various areas of the oral cavity. (a and b) Significant blanching and presence of palpable, thick fibrous bands on the left and right buccal mucosa. Brownish-black pigmentation in the posterior vestibular region in b. (c and d) Blanching of the soft palate and faucial pillars. Note the shrunken uvula and its altered shape. (e) Blanching of the floor of mouth and loss of surface texture. (f-i) Blanching and palpable fibrous bands of the upper and lower labial mucosa. Stiff labial mucosa and presence of blanching of attached gingiva in f and g. (j) Depapilated tongue, (k) Bud shaped or shrunken uvula, (l) Restriction in mouth opening. OSMF: Oral submucous fibrosis



Flowchart 1: Etiology of OSMF.[4] OSMF: Oral submucous fibrosis

ii. Stimulation of fibroblast proliferation and collagen synthesis by areca nut alkaloids (Harvey *et al*. 1986).
iii. By fibrogenic cytokines secreted by activated macrophages and T lymphocytes (Haque *et al*., 2000).
iv. By decreased secretion of collagenase (Shieh *et al*. 1992).
v. Deficiency in collagen phagocytosis by OSMF fibroblasts (Tsai *et al*.).
vi. By production of collagen with a more stable structure (Collagen type I trimer) by OSMF fibroblasts (Kuo *et al*. 1995).
vii. By stabilization of collagen structure by catechin and tannins from the areca nut (Scutt *et al*., 1987).
viii. By an increase in collagen cross-linkage as caused by upregulation of lysyl oxidase by OSMF fibroblasts (Ma *et al*., 1995) (Flowchart 1).

Clinical Features

This condition is usually seen in the age group of 30–50 years. Males are affected more than female (3.2:1 ratio). First and foremost feature of OSMF is burning sensation and pallor or blanching of oral mucosa. Intraoral sites of involvement include the buccal mucosa, retromolar area, followed by soft palate, palatal fauces, uvula, tongue, and labial mucosa. There may be stiff and small tongue, blanched and leathery floor of the mouth, fibrotic and depigmented gingiva, rubbery soft palate with decreased mobility and blanched and atrophic tonsils, and shrunken bud like uvula. Mouth opening may become progressively reduced. Other symptoms include increased salivation, change of gustatory sensation, hearing loss due to stenosis of the Eustachian tubes, dryness of mouth, nasal tonality to the voice, dysphagia to the solids (If the oesophagus involved), and impaired mouth movements (Eating, whistling, blowing, and sucking) (Figure 1).[4]

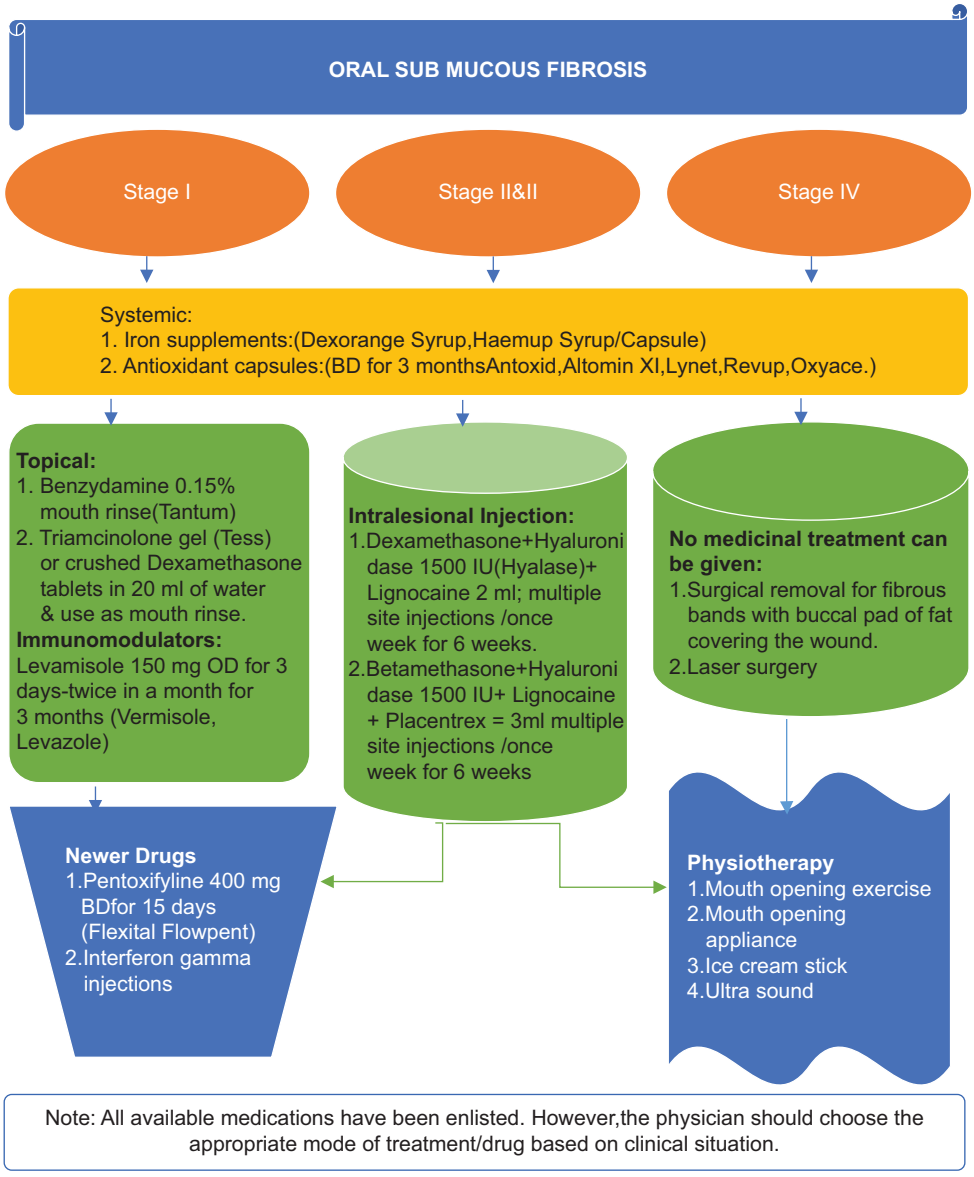
Classification system based on clinical features:

1. J.V Desa in 1957 – (Classification based on clinical features).
2. Pindborg J.J in 1989 – (Classification system based early stages and clinical features).
3. Katharia S. K *et al*. in 1992 – (Classification system based on clinical features of mouth opening distance).
4. Lai D. R *et al*. in 1995 – (Classification system based on interincisal distance of Teeth).
5. R Maher *et al*. in 1996 – (Classification system based on types of OSMF and its clinical features).
6. Rajendra R *et al*. in 2003 – (Classification system based on OSMF stages and its clinical features).
7. Nagesh and Bailoor in 2005 – (Classification system based on clinical cases of OSMF and its features).
8. Bose T and Balan A in 2007 – (Classification system based on clinical stage, functional stage and its feature).
9. Kumar K *et al*. in 2007 – (Classification based on grades and histopathological elements).
10. Chandramani More *et al*. in 2011.

Among them, some important classifications are listed in [Tables 1–7].

Malignant Potential and OSMF

According to Pindborg J.J, atrophy of the epithelium increases the vulnerability of the action of carcinogens. Due to irritation by exogenous factors, the atrophic epithelium undergoes hyperkeratinization, there is intercellular edema in the pickle cell layers and the basal cells undergo hyperplasia. After this carcinoma can develop at any stage. Congestion of the blood vessels due to excessive fibrosis in the connective tissue compromises the blood supply. Some have demonstrated abnormal expression of P-53 tumor suppressor gene as detected by immunohistochemistry in the epithelium of OSMF.



Flowchart 2: Management of OSMF.[10] OSMF: Oral submucous fibrosis

Table 1: Classification of oral mucosal lesions (Based on different habits, the lesion can be grouped broadly as shown)[5]

S. No.	*Different Habits*	*Lesions*
1.	Smoking	Leukoedema Leukokeratosis nicotina palati Palatal erythema Central papillary atrophy of tongue
2.	Chewing	Paan Chewers lesion Oral lichen planus-like lesion Oral Submucous Fibrosis
3.	Smoking and chewing (Mixed)	Leukoplakia and pre-leukoplakia Oral lichen planus-like lesion Oral squamous carcinoma

Table 2: In 1957, Desa divided OSMF into three categories as:[6]

Grade 1 – Stage of stomatitis and vesiculation.
Grade 2 – Stage of fibrosis.
Grade 3 – Stage of sequelae.

OSMF: Oral submucous fibrosis

Management

Nutritional support, Immunomodulatory drugs, Physiotherapy, Local drug delivery, Combined therapy and Surgical management. (Flowchart 2).

Stem cell therapy[11]

Recently scientists have proven that intralesional injection of autologous bone marrow stem cells is a safe and effective treatment modality in oral sub mucosal fibrosis. Autologous bone marrow stem cell injections induce angiogenesis in the area of lesion which, in turn, decreases the extent of fibrosis thereby leading to significant increase in mouth opening.

Ayurvedic Review

OSMF is a multifactorial disease with a wide range of clinical symptoms; hence, it can't be linked to a single disease or condition in *Ayurveda*.

On the other hand, OSMF can be related to *Tridoshaja Sarvasara Mukha Roga* based on scattered symptoms found in classical sources [Table 8].

According to *Acharya Vaghbhatta*, purification of the body and *Shiroshuddhi* (head cleansing) is the initial lines of the treatment for *Mukhrogas* (diseases of the oral cavity). *Shiroshuddhi* (head cleansing) removes obstructions in channels and opens the pathways for absorption in the supraclavicular region, potentially improving the efficacy of all drugs and procedures employed. *Mukharogas* commonly use external application, gargling, and retaining oil or decoction in the oral cavity as local remedies for diseases of the oral cavity. OSMF is treated with a variety of single and combination medicines. They are:

1. *Haridra* (Turmeric).
2. *Tulsi (Ocimum sanctum.)*
3. *Kumari* (Aloe vera).
4. Ashwagandha(Withania somnifera).
5. Tomato.
    - *Haridra* (Turmeric): Antitoxic, antiseptic, hepatoprotective, antifungal, antiviral, antiplatelet, antioxidant, and anti-inflammatory property. Turmeric showed anti-inflammatory and fibrinolytic action among patients.
    - *Tulsi (Ocimum sanctum)*: Analgesic, antioxidant, antistress, antiseptic, etc. *Tulsi (Ocimum sanctum)* helps to improve in mouth opening distance among patients
    - *Kumari* (Aloe vera): Aloe vera is also known as the plant of immortality.[12] It reducing the symptoms of OSF such as burning sensation and increase mouth opening.
    - Ashwagandha (Withania somnifera). Anti-oxidant, anti-inflammatory property, etc. *Ashwagandha* improves patient's immunity.

Table 3: Pindborg in 1989 divided OSMF into three stages are given as:

Stages		*Clinical features*
Early stage	I	Mucosal ulcer, stomatitis with erythematous mucosa, vesicles, leathery mucosa, mucosal pigmentation, and mucosal petechiae.
Moderate stage	II	Fibrosis occurs, depapillated tongue, blanching of oral mucosa appears, stiff and small tongue, marble/blister like appearance, bud or shrunken uvula, sunkun cheek, pigmented gingival, blanched and atropic tonsils, and not comparable with age or nutritional status.
Advanced stage	III	Squamous cell carcinoma occurs, leukoplakia becomes (>25%), speaking, and hearing loss due to blockage of Eustachian tube.

OSMF: Oral submucous fibrosis

Table 4: In 1992, Katharia *et al*. mouth opening between lower and upper incisors to the patients

Score	*Mouth opening*
0	>41 mm
1	37–40 mm
2	33–36 mm
3	29–32 mm
4	25–28 mm
5	21–24 mm
6	17–20 mm
7	13–16 mm
8	09–12 mm
9	05–08 mm
10	0–04 mm

Table 5: Classification based on all parameters such as clinical features, histopathology, and managements was developed by Khanna and Andrade (1995) grouped OSMF into different stages[7]

Group	*Features*
Group 1 – Very early	a) Mouth opening is normal. b) Burning sensation. c) Excessive salivation d) Acute ulceration and recurrent stomatitis.
Group 2 – Early cases	a) Mouth opening: 26–35 mm (inter incisal opening) b) Soft palate and faucial pillars were the areas primarily affected. c) Buccal mucosa appeared mottled and marble like where dense pale and depigmented fibrosed area alternated with pink normal mucosa d) Red erythematous patches. e) Widespread sheets of fibrosis.
Group 3 – Moderately advanced	a) Mouth opening 15–25 mm (interincisal opening). b) Trismus. c) Vertical fibrous bands could be palpated and firmly attached to underlying tissue. d) Unable to blow out their cheeks and whistle. e) Soft palate – The fibrous bands were seen to radiate from the pterygomandibular raphe. f) Or the anterior faucial pillars in a scar like appearance. g) Lips- Atrophy of vermillion border. Unilateral posterior cheek involvement with only ipsilateral involvement of the faucial pillars and soft palate and opening reduced to 15-18 mm.
Group 4 – Advanced cases	a) Stiffness/inelasticity of oral mucosa. b) Trismus. c) Mouth opening 2–15 mm (interincisal opening). d) Fauces thickened, shortened and firm on palpation. e) Uvula was seen to be involved, shrunken, small, and fibrous band. f) Tongue movement restricted. g) Papillary atrophy (Diffuse). h) Lips circular bands felt around the entire mouth. i) Difficult intraoral examination.
Group 5 – Advance cases with premalignant and malignant changes.	a) OSMF and leukoplakia. b) OSMF and squamous cell carcinoma.

OSMF: Oral submucous fibrosis

Table 6 : Haither (2000)-Staged OSMF clinically and functionally[8]

Clinical Staging	*Functional Staging*
a) Stage 1: Faucial bands only. b) Stage 2: Faucial and buccal bands. c) Stage 3: Faucial and labial bands.	a) Stage A: Mouth opening 13–20 mm. b) Stage B: Mouth opening 10–12 mm. c) Stage C: Mouth opening 10 mm.

OSMF: Oral submucous fibrosis

- Tomato: Tomatoes consist lycopene as an antioxidant property and anticancer agent by inhibiting collagen production.

Compound Preparation used in OSMF

1. *Aswagandha Arista* – It is used for stress, neurological disorder, and *Rasayana*.
2. *Haridradi Taila* – It is used for ulceration, redness and erosion of oral cavity, difficulty in swallowing, etc.
3. *Jatyadi Taila* – It is used for wound healing, sinuses, abscess, bite wound, etc.
4. *Iremedadi Taila* – It is useful in various *Mukha Roga* (diseases of oral cavity) such as burning mouth syndrome, pericoronitis, and gum abscess.
5. *Khadiradi Gutika*- It is used in Ayurveda management of cold, asthma, bronchitis, and mainly use for *Mukha Roga* (diseases of oral cavity).

Table 7: Staging of OSMF reported by Nagesh and Bailoor in 2005 about OSMF diagnostic stages and clinical features[9]

Stage	*Features*
Stage 1 – Early OSMF	Mild Blanching
Stage 2 – Moderate OSMF	Moderate-to-severe blanching. Mouth opening reduced by 33%, tongue protrusion reduced by 33%, and reduced flexibility. Burning sensation even in the absence of stimuli. Presence of palpable bands. Lymphadenopathy either unilateral or bilateral. Demonstrable anemia on hematological examination.
Stage 3 – Severe OSMF	Burning sensation very severe. More than 66% reduction in the mouth opening, cheek flexibility, and tongue protrusion. In much tongue may appear fixed. Ulcers over the buccal mucosa. Thick palpable bands. Bilateral lymphadenopathy and definite nutritional compromise can be established in B complex (Angular cheilitis) and iron deficiency group

OSMF: Oral submucous fibrosis

Discussion

OSMF has become one of the most pressing issues in recent years. Chewing of betel nut has been recognized as one of the most important etiological factors for the causation of OSMF. Arecoline, which is *Kashayrasatmaka*, *Ruksha*, *Sheeta*, and *Vikasi*,[13] is found in areca nut. In patients with OSMF, there is *Atiyoga of Kashaya rasa* as they chew *Gutkha* in excess. This *Hetu* systematically vitiates *Vata* and causes *Rukshata*, *Kharata Stambha*, and *Shushkata* in *Sthanastha Dhatu*, which will develop fibrosed bands in the oral cavity.[14] The pungent, hot, penetrating, and *Pitta*-provoking properties of tobacco and lime lead to local tissue harm, and its systemic absorption vitiates *Pitta Dosha*, which contributes to the disease process. Excessive use of *Katu Rasa* and *Tikshna, Ushna Dravyas* like chilies and spices[15] acts locally and systemically, provoking *Vata* and *Pitta*, which aggravates the disease. As there is restricted movement of the mouth, the intake of food will be less, resulting in *Vatadhikya* and *Dhatukshinata* (nutritional deficiency), which will finally worsen the diseased condition.

In OSMF, Ayurvedic herbs and formulations show efficacy in improving symptoms and signs. *Pratisarana* may be more effective when used with medications that have *Lekhana*, *Ropana*, *Shothahara*, and *Vata Pitta Pradhana Tridosha Shamaka* characteristics. The *Snehana* and *Shamana* varieties of *Kavala* with *Sneha* processed by *Vata* and *Pitta Shamaka* medications, together with *Ropana* effect, may be more useful for the movement of the stiffened oral structure. *Abhyanga* and *Swedana* are performed in *Kavala's Poorva Karma*, which reduces tissue stiffness while also enhancing blood circulation, potentially increasing mucosa vitality and medicine absorption. The OSMF's systemic therapy aims to restore equilibrium and increase the vitality of the oral mucosa. This could be accomplished by implementing *Rasayana Yoga* on an interior level. Furthermore, because OSMF is a chronic *Urdhwajatrugata Vyadhi*, systemic treatment of OSMF begins with *Dehashudhdhi* and *Shiroshudhdhi* and is required before the

Table 8: Mukha Pakas are mentioned under Sarvasara Mukha Roga, Name of the diseases Dosha/Dhatu/Signs, and Symptoms/Treatment principles Prognosis References

S. No	*References*	*Name of the diseases*	*Dosha/ Dhatu*	*Signs and Symptoms*	*Treatment principle*	*Prognosis*
1.	*SU.NI-16* *SU.CH-22* *AH U-21* *AH U-22*	*Vataja Mukhapaka*	*Vata*	Dry-rough progressive inflammatory ulceration of oral mucosa associated with pain and more sensitivity to cold items.	*Vatahara Chikitsa, Snehana, Swedana, Gandusha, Nasya, Snaihika Dhuma*	*Sadhya*
2.	*SU.NI-16* *SU.CH-22* *AH U-21* *AH U-22*	*Pittaja Mukhapaka*	*Pitta*	Ulceration and inflammation of oral mucosa with severe burning pain and bitter taste	*PittahataChikitsa, Snehana, Swedana (Mrdu), Nasya, Gandusha, Shamana, Dhuma and Nasya.*	*Sadhya*
3.	*SU.NI-16* *SU.CH-22* *AH U-21* *AH U-22*	*Kaphaja Mukhapaka*	*Kapha*	Ulceration and inflammation of oral mucosa with mild pain, itching sensation, with, unpleasant sweet taste	*Kaphahara Chikitsa, Snehana, Swedana, Nasya, Gandusha, Shamana, Dhuma, Nasya and Lekhana with Pratisarana.*	*Sadhya*
4.	*AH U-21* *AH U-22*	*Raktaja Mukhapaka*	*Rakta*	All the signs and symptoms of Pitta Dosha are presesnt	*Like pittaja Mukhapaka*	*Sadhya*
5.	*SU.NI-16* *SU.CH-22* *AH U-21* *AH U-22*	*Sannipataja Mukhapaka*	*Tridosh*	Mixed sign and symptoms of Tridosha are present	*Tridoshahara Chikitsa*	*Sadhya*

administration of *Rasayana* drugs. Acharyas have also mentioned *Kayashiraso virechana* as the first line of the treatment in general *Mukharogas* treatment. The majority of the medications include antioxidant, anti-inflammatory, and cancer-preventive effects, which may have improved dhatus' condition.

Conclusion

This article is an honest attempt to connect references from a variety of the literature and compare and contrast the two terminologies. *Sarvasara Mukharoga*: Based on the disease's signs and symptoms, OSMF should be evaluated. The procedure described by Acharya in *Mukharoga* can be used to cure OSMF (*Sarvasara*). This comparison of the two terminologies may be helpful in Ayurvedic research.

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