CLINICAL PRACTICE GUIDELINES FOR THE MANAGEMENT OF ORAL DRYNESS

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Abstract:

Subjective complaint of dry mouth due to hyposalivation / changed salivary composition results in xerostomia. Hyposalivation is the objective sign which occurs due to decreased salivary flow. Both these conditions result in various oral manifestations like candidiasis, halitosis, dental caries, ascending (suppurative) sialadenitis. The etiology of oral dryness is multifactorial. The aim of this study is to investigate the diagnosis and provide a treatment algorithm for the oral dryness.

Keywords: Oral dryness, xerostomia, hyposalivation, salivary substitutes.

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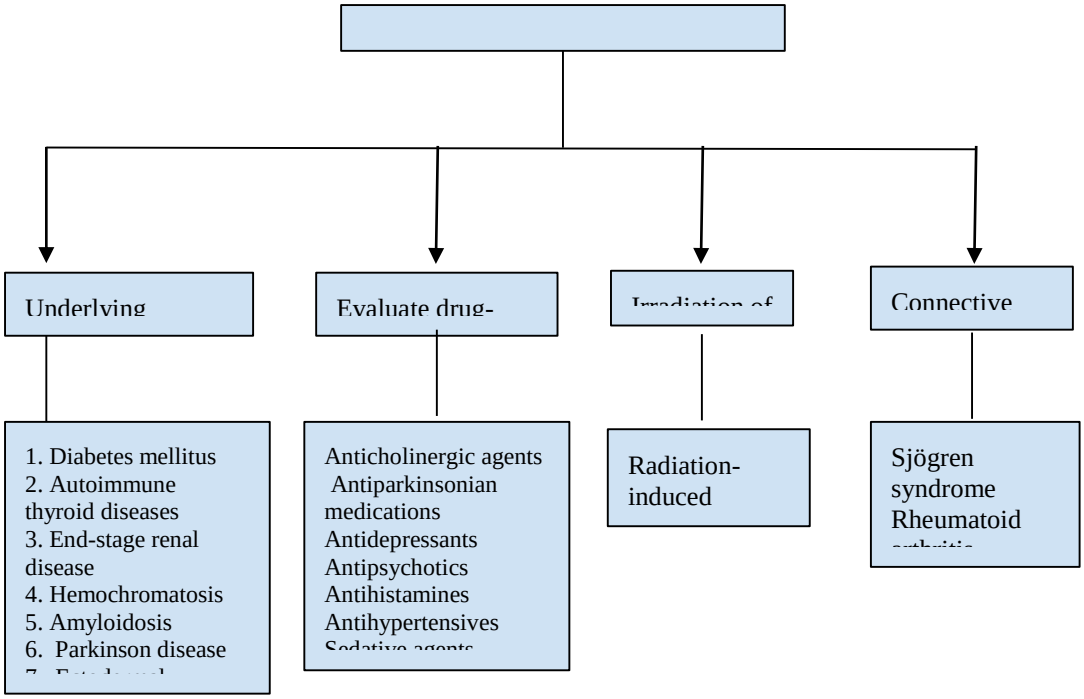
1. Introduction:

Saliva is a complex fluid substance consisting of salivary gland secretion and the secretion of the gingival sulcus. Salivary gland secretion comes from the major salivary glands including the parotid gland, submandibular gland, sublingual gland and minor salivary glands, as well as from the Von Ebner's glands- posterior deep lingual glands. Saliva performs many biological functions essential for the maintenance of oral health such as lubrication, cleansing, buffering, and digestion(1). Patients who have decreased salivary flow rate may develop infections as a consequence of the reduced defenses(2).Dry mouth or Xerostomia used to describe the subjective sense of dryness which is usually associated with reduced salivary flow rate (hyposalivation) and changes in the composition of saliva. Hyposalivation is the objective sign and xerostomia is a subjective symptom(3). Sometimes, patients complaining of xerostomia frequently do not show any objective sign of hyposalivation and their symptoms may be secondary to qualitative and/or quantitative changes in the composition of saliva(4).

Whole saliva has the mixed fluid contents of the oral cavity and is composed of more than 99% of water and less than 1% of proteins and salts(5). Normal daily production of whole saliva ranges from 0.5 L to 1.5 L. Normal stimulated salivary flow rate ranges between 1.5 to 2 mL/ min. Unstimulated salivary flow rate ranges from 0.3 to 0.4 mL/min. In cases of hyposalivation, the stimulated salivary flow rate will be 0.5 to 0.7 mL/min and the unstimulated salivary flow will be less than or equal to 0.1 mL/min(6).

The prevalence of xerostomia highly varies according to geographical distribution. The estimated prevalence rate is around 0.9% and 64.8%(7). The differences arise due to measurement methods, population studies as well as the age of the study population. Few studies reported that the prevalence of xerostomia is lower in men (10-26%) than in women (10-33%). It remains an unresolved common complaint especially among the geriatric population, despite seeking medical or dental consultation. Studies have shown differences in the prevalence between the sexes and xerostomia appears to increase with increasing age(5). A possible explanation is that older individuals take several xerogenic drugs for their chronic conditions and this may lead to an overall reduction of the unstimulated salivary flow rate(8). The aim of this present study is to explore the evidence on management of patients affected by oral dryness and to provide a treatment algorithm for the same.

ETIOLOGY OF ORAL DRYNESS:



The etiology of oral dryness is numerous. It is common during periods of anxiety, mouth-breathers and significantly reduced during sleep. The main causes of xerostomia include medications, cancer treatments, salivary gland diseases or dysfunction, dehydration and psychogenic disorders(9). Apart from these factors, it can be associated with several systemic conditions like endocrine disorders, autoimmune disease, infectious disease and granulomatous diseases. Lifestyle factors can also play an important role in the occurrence of oral dryness(10). (flow chart 1)

Endocrine causes include Diabetes mellitus, Autoimmune thyroid diseases (eg, Grave disease and autoimmune thyroiditis (8). Xerostomia has been reported in 38% of children and 53% of adolescents with type 1 diabetes mellitus and in 14% to 62% of type 2 diabetes mellitus patients. Autoimmune causes include Sjögren syndrome, Rheumatoid arthritis ,Systemic lupus erythematosus, Scleroderma, Primary biliary cirrhosis. Under infectious conditions, Actinomycosis, Human immunodeficiency virus , Hepatitis C virus , Human T-lymphotropic virus type 1 virus, Cytomegalovirus, Epstein-Barr virus can influence oral dryness(11).

Medication inducement is a common underlying etiology. It is estimated that more than 400 medications affect the salivary gland function and lead to hyposalivation(3,11). Drugs with anticholinergic activity can cause hyposalivation by decreasing acetylcholine released by parasympathetic nerves(3). The drugs causing xerostomia can include : atropine, atropinics, hyoscine, antidepressants, antihypertensives, opioids, cytotoxic drugs, calcium channel blockers, diuretics, α-agonists, and beta blockers etc. Antihypertensives cause a change in the composition of salvia and affect the salivary flow rate.

Irradiation to the salivary glands can produce hyposalivation and xerostomia. They cause destruction of the acinar and stem cells of the salivary glands, leading to glandular atrophy and fibrosis. 60 Gray (Gy) or higher amounts of radiation can cause apoptosis and destruction of salivary glands(12). Lifestyle factors like smoking, alcohol consumption and caffeinated beverages can lead to oral dryness(13).

ORAL MANIFESTATIONS OF ORAL DRYNESS :

Cracker sign is positive, the presence of difficulty in swallowing. Difficulty in speaking, wearing dentures(11). Dry mucosa causes lips to adhere one to another and gives the mouth mirror stick sign positive. Lipstick or food debris sticks to the teeth due to oral dryness. A characteristic feature, lobulated tongue with complete depapillation. Other complications include oral malodour, smooth surface caries (lower incisor region), candidiasis which results in burning sensation, taste changes, intolerance to acids and spies, mucosal erythema, lingual filiform papillae atrophy, angular cheilitis and ascending sialadenitis(14,15).

DIAGNOSIS OF ORAL DRYNESS ;

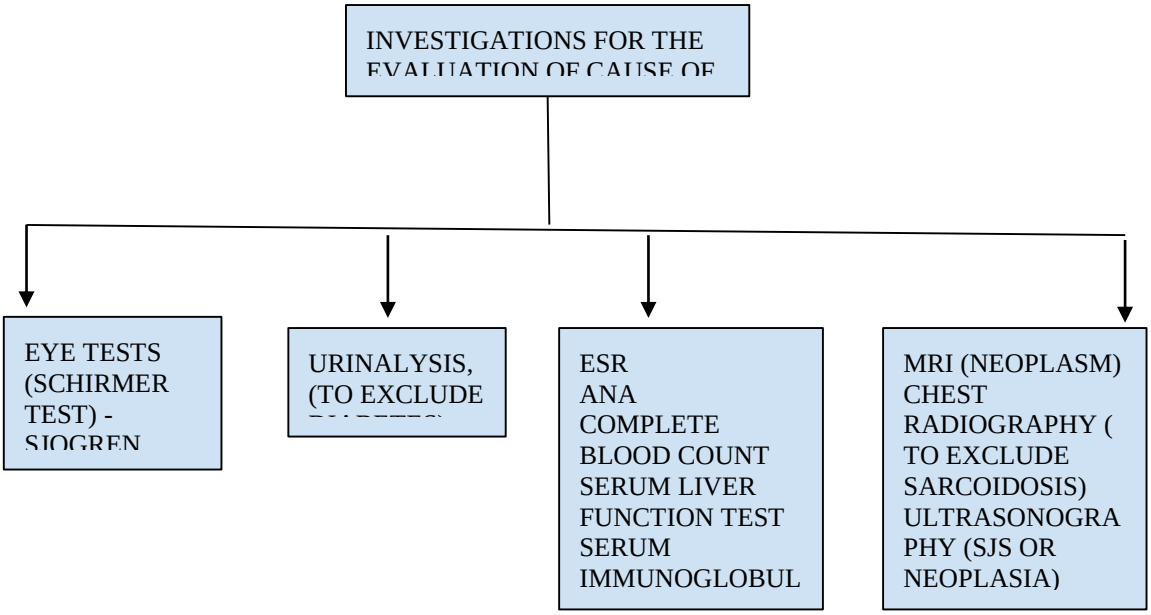
The diagnosis begins with proper medical history. Questions regarding the difficulty in swallowing, speech, chewing, speaking, altered taste sensations and underlying systemic disorders and medication history. Several questionnaires have been proposed to identify patients with xerostomia and hyposalivation(16). The most recent concise questionnaire to measure xerostomia is the Summated Xerostomia Inventory—Dutch Version. This summated rating scale asks patients to rate five statements regarding dry mouth clinical manifestations, using one of three response options (“Never,” scoring 1; “Occasionally,” 2; and “Often,”). The responses are then scored and summed to give a single score, with higher scores representing more severe clinical manifestations(17)

Fox et al developed a questionnaire on the severity of dry mouth, which may predict true hyposalivation .A positive answer to all the questions was associated with low saliva flow rates(16). A few years later, Thomson et al created an eleven-item summated rating scale on the severity of chronic xerostomia (Xerostomia Inventory).Each response was scored and summed to give a final score. Van der Putten et al shortened the Xerostomia Inventory and proposed the Summated Xerostomia Inventory-Dutch. Only five items were included. In the questionnaire developed by Sreebny and Valdini, the question “does your mouth usually feel dry” was found to have had a sensitivity of 93%, a specificity of 68%, a negative predictive value of 98%, and a positive predictive value of 54% for hyposalivation(18).Eisbruch et al studied the grade of xerostomia through a validated scale made of three grades(19). Finally, Pai et al proposed an eight-item visual analogue scale with which patients were asked to score their xerostomia(20).

Salivary studies are helpful to document salivary function by salivary function studies, especially studies of the salivary flow rates(3). Sialometry is a simple, non-invasive, inexpensive but it is a non-specific indicator of salivary gland dysfunction. Ultrasonography gives information about the major

salivary glands during inflammation. Sialography used to evaluate dilated or obstructed salivary ducts(7). Salivary scintiscanning non-invasive method used to examine all major salivary glands simultaneously. Salivary gland biopsy will be helpful in diagnosing autoimmune diseases(21). (Flow chart 2)

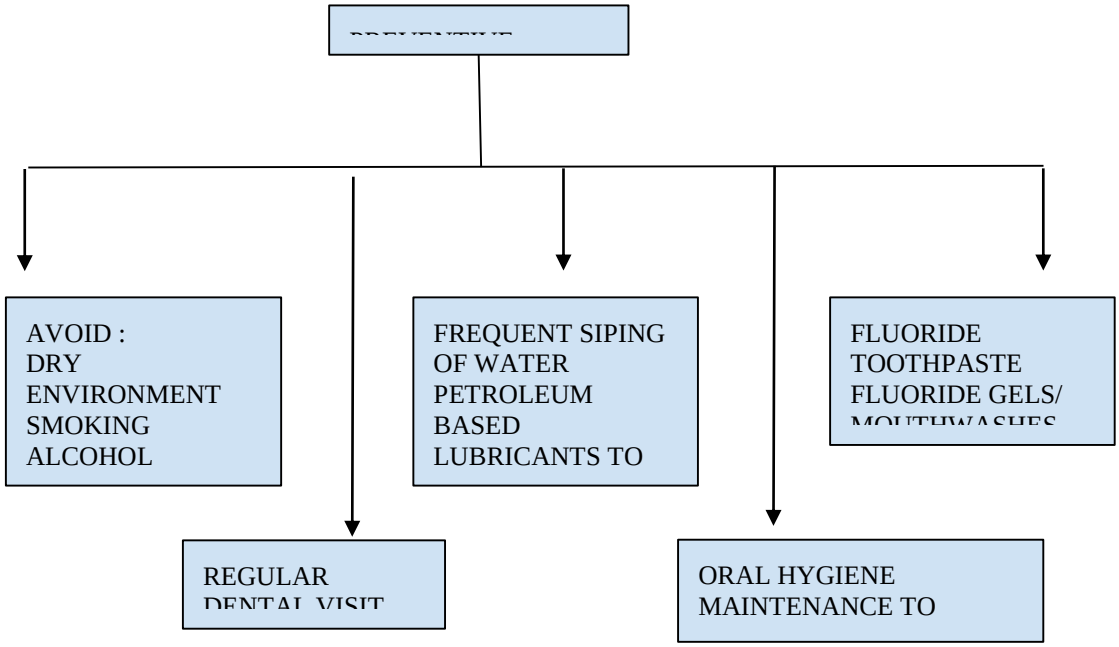
FLOW CHART 2



MANAGEMENT OF ORAL DRYNESS

The management of oral dryness should include evaluation of etiological agents, oral signs and symptoms followed by salivary measurements(22). Preventive measures were enlisted in flow chart three. The appropriate diagnostic aid should be used after the evaluation of medical history and clinical examination. The treatment algorithm is enlisted below :

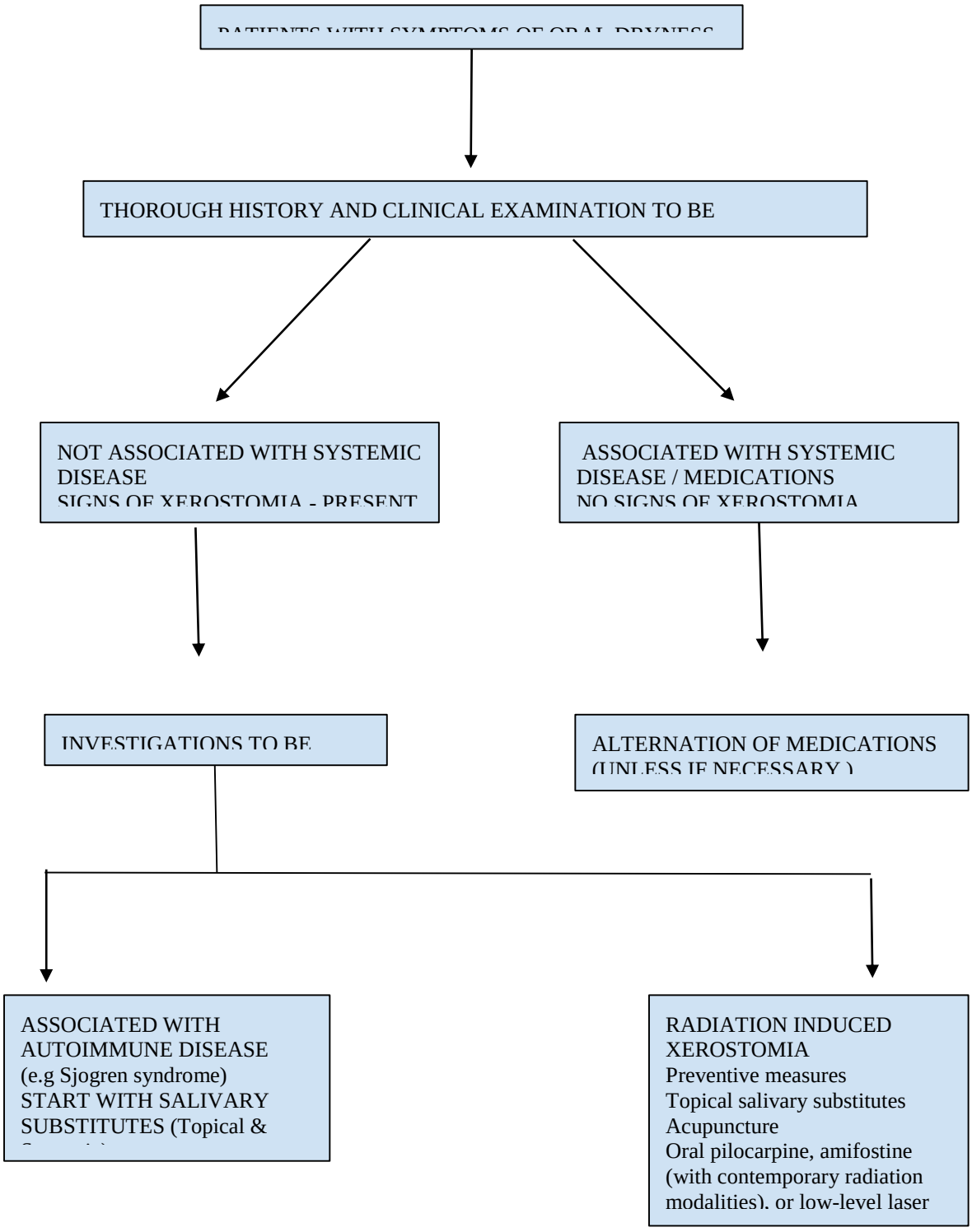
FLOW CHART 3:



Prevention of dental complications is a very important aspect in the management of oral dryness. Using fluoride toothpaste, fluoride gels or mouthwashes, avoidance of sugar intake or sticky foods can prevent dental caries(23). Proper counseling of patients regarding the oral hygiene instructions like removable of dentures at night, using of antifungals if necessary and mouth rinses with chlorhexidine(24).

The common topical agents used in the management of of oral dryness include Carboxymethylcelluose, Hydroxypropylmethylcellulose, Hydroxyprophylmethylcellulose, Glycerol, Canola oil, Olive oil, Linseed extract, Oxygenated glycerol triester, Prophylin, Xanthan gum(25). The systemic medications include Pilocarpine 5-7.5 mg,Cevimeline 30 mg, Anetholetrithione, Bethanechol,Nizatidine. Sprays have been used for the treatment of xerostomia(26). A sialogogue spray, composed of 1% malic acid, has produced benefit in antihypertensive- and antidepressant-induced xerostomia, but it has a potential risk for enamel loss(1,3). Physical therapies like Acupuncture (Hwato 0.32mmx 40 mm needles were inserted to ST3, ST6, LI4, ST 36 points bilaterally to 5-10 mm depth, followed by manipulation until the DeQi needle sensation was obtained) and electrostimulation includes application of an electrical current on the skin covering the parotid gland area and on the oral mucosa augmented salivary secretion(27). For head and neck radiation patients Amifostine, Hyperbaric oxygen and Intensity-modified radiation therapy can be used(28).

FLOW CHART 4:


PATIENTS WITH SYMPTOMS OF ORAL DRYNESS
THOROUGH HISTORY AND CLINICAL EXAMINATION TO BE
NOT ASSOCIATED WITH SYSTEMIC DISEASE
SIGNS OF XEROSTOMIA - PRESENT
ASSOCIATED WITH SYSTEMIC DISEASE / MEDICATIONS
NO SIGNS OF XEROSTOMIA
INVESTIGATIONS TO BE
ALTERNATION OF MEDICATIONS (UNLESS IF NECESSARY)
ASSOCIATED WITH AUTOIMMUNE DISEASE (e.g Sjogren syndrome) START WITH SALIVARY SUBSTITUTES (Topical &
RADIATION INDUCED XEROSTOMIA
Preventive measures
Topical salivary substitutes
Acupuncture
Oral pilocarpine, amifostine (with contemporary radiation modalities), or low-level laser

Apart from these measures, research extended towards biological therapy and gene therapy.
The former induces salivation by CD20-targeting rituximab and it also includes therapies targeting tumour necrosis factor-alpha. The latter treats genetic deficiencies by delivering genetically engineered genes in viral or non-viral vectors into the body to replace the defective gene and its product. The other agents include Low dose interferon alpha, 150 or 450 IU given orally and Alpha-tocopherol (400 IU daily)(29). Our team has extensive knowledge and research experience that has translate into high quality publications (30–39))

2. Conclusion

Xerostomia and hyposalivation remain a debilitating condition for many individuals. This review summarizes the diagnostic and therapeutic approaches to manage xerostomia and hyposalivation. Although no standard treatment guidelines are available, many treatment options exist for the management of xerostomia and hyposalivation: topical agents to alleviate and/or prevent xerostomia, systemic therapy, or newer devices. While systemic agents such as pilocarpine or cevimeline have been largely given, side effects of these medications should be taken into consideration.

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