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### Key Words

Oral and maxillofacial, pathology, ophthalmology, eye disorders, vision

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**Received:** 25 November 2023

**Accepted:** 15 December 2023

**Published:** 16 December 2023

**Citation:** Harepriya Meganathan Karthikeyini, Karthik Shunmugavelu, Evangeline Cynthia Dhinakaran and M. Marimuthu, 2023. Intersection of Ophthalmology and Oral and Maxillofacial Pathology - A Systematic Review. Int. J. Trop. Med., 18: 54-58, doi: 10.59218/makijtm.2023.4.54.58

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## Intersection of Ophthalmology and Oral and Maxillofacial Pathology - A Systematic Review

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### ABSTRACT

Lesions involving eye are evidently seen in oral and maxillofacial pathology or head and neck pathology. Due to the oral and maxillofacial pathology, sometimes eyes may get infected because of the side effects of the medication taken to cure oral and maxillofacial diseases and hence the dental professionals along with the ophthalmologists can treat the disease which affects the eyes along with the oral and maxillofacial diseases by the keen observation, early detection and early treatment. The current systematic review focuses on intersection of oral and maxillofacial pathology (OMFP) and ophthalmology. A detailed literature search was done pertaining to OMFP patients and their association with eye involvement. Inclusion criteria include various studies done on the above based topics. Grand total of 200 cases were identified from 35 papers published in English language literature. Of these 35, 25 were filtered narrowing down to 16 fully downloaded studies pertaining to the topic. Perspective from an ophthalmologist should be done in an exceptional way in patients with OMFP in order to achieve long-term success. Oral and maxillofacial, pathology, ophthalmology, eye disorders, vision.

## INTRODUCTION

When there is any oral and maxillofacial pathology, there are chances of side effects caused by the medication and hence this may be prone to several eye infections. The oral cavity disorders include jaw claudication, swollen tongue and swollen lips. As well, there are many eye disorders seen due to many reasons like transmission of the virus from infected person to the healthy person. Depending upon the type of virus that infects the eyes and the symptoms seen in the eyes, there are many types of eyes disorders in which reddening of the eyes, vesicles formed on the eyelids, scarring of the cornea and conjunctivitis are the most common symptoms seen. So, the dental professionals along with the ophthalmologists play an important role in detecting and diagnosing the diseases related to oral and maxillofacial pathology and ophthalmology. Due to the severity in the infection of the eyes, sometimes it may give rise to impaired vision or totally loss of vision. So, early detection and early diagnosis is highly recommended.

## MATERIALS AND METHODS

A comprehensive research was done. Articles from beginning to till date are considered. The literature databases included were pubmed, web of science, google scholar, scopus, medline followed by cross references. Keywords included were ophthalmology, oral, dental, eye, lesions. Multi journals involving oral and maxillofacial surgery, oral and maxillofacial pathology, ophthalmology and oral and maxillofacial medicines were included. Literatures in English language which are fully available were included. The important points include publication date, author name, journal name, date of issue, treatment and number of cases.

## RESULTS

**Literature search:** The vast literature search was ended up in 16 published articles which are fully downloaded in English from various databases. The universal language of science is English. In order to avoid biasing and erroneous decisions, other languages were excluded. Duplicate articles were removed. Articles which were not able to fully download were removed. Key areas included oral and maxillofacial pathology, oral and maxillofacial surgery, ophthalmology, oral and maxillofacial medicine, etc.

**Lesions:** There are many common diseases that occur and affect the oral region and also include the eyes area. These diseases are mainly diagnosed and treated by the dental professionals. The various diseases that occur are namely, primary ocular herpes simplex is a type of disease seen mainly in children. The infection

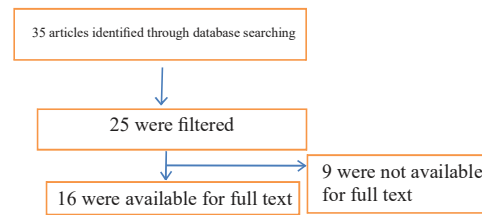


Fig. 1: Flowchart of literature search

is mainly characterized by conjunctivitis, redness in the eye, along with vesicles which are seen on the eyelids. Mainly children are affected when the adult who is already infected, if kisses the child on the region which is covered by the orbicularis oculi otherwise called as periorbital region. Herpes labialis is another type of ocular herpetic disorder that is caused mainly by Herpes Simplex Type I. The infection caused by this virus does not show much of the symptoms and this virus is transmitted to the eye by saliva which may fall from any person who is already infected with this virus or auto-inoculation. Ocular Herpes Epidemics is also one of the disorders which is caused when the sports like rugby or wrestling is played in between the infected players which is also called as herpes gladiatorum<sup>[1]</sup>. Lesions are seen on the vesicles of the eyelids and also symptoms like redness and itchy eyes are seen. Recurrent Ocular Herpes is a disorder associated with the cornea of the eye. The scarring of the cornea due to the infection may take place which also results in the impaired or decrease vision. Corneal irritation or corneal infection is otherwise called as keratitis. This disorder is caused through the transmission of the virus from the infected individuals and also auto-inoculation. Herpes simplex cutaneous lesions are caused due to the spread of the virus and there are various ointments and eye-drops used in the treatment of these eye disorders like acyclovir ointment which is applied on the infected area and this may prohibit the pathway of the virus to move further as well trifluorothymidine eye-drops are also used in this treatment. The eye-drops or ointment that contains steroids must be strictly prohibited for the use as they may cause replication of the viruses. Another syndrome called as Sjogren's syndrome is also caused which consists of dry eyes called as keratitis sicca, joint pains and xerostomia<sup>[2]</sup>. The symptoms seen in this syndrome are, patients will complain some foreign particle present in the eye along with xerostomia which is nothing but the dry mouth and dental caries the patients should immediately go to the dentists and get treated as soon as possible. Both lacrimal and the

Table 1: List of the diseases showing effects on both eyes and oral cavity<sup>[1]</sup>

Name of the disease	Eye disorders	Oral disorders
Herpes simplex	Redness of eyes keratitis conjunctivitis vesicles on eyelids	Gingivostomatitis herpes labialis
Temporal arteritis	Ischemia disorders blindness	Ischemic glossitis oral ulcers claudication of jaws
Sjogren's syndrome	Keratitis sicca dry eyes	Xerostomia dental caries
Gardner's syndrome	Epithelial hypertrophy retinal pigment	Super numerary teeth mandibular osteomas
Mucormycosis	Orbital inflammation visual loss	Black palatal eschar
Behcet's disease	Iritis vasculitis with vision loss	Vesicles and blisters on mucosa
Iatrogenic	Orbital emphysema blindness	High speed air drill local anaesthesia
Tuberous sclerosis	Retinal astrocytic hamartoma	Enamel pitting
Congenital syphilis	Bilateral interstitial keratitis	Mulberry molars hutchinson's incisors
Acquired syphilis	Unilateral interstitial keratitis	Glossitis Oral mucosal patches
Reiger's syndrome	Glaucoma Iris hypoplasia	Cone-shaped incisors

Table 2: Overview<sup>[3-16]</sup>

Journal	Year	Author	Oral	Ophthal
JADA	1994	Edsel	Herpes	Blindness
Br med j	1967	P.L. blaxter and M.J.A britten	Ulceration	Amarousis
JADA	1990	Michael J. buckley <i>et al</i>	Ulceration	Emphysema
J endodontics	1990	Arthur S. goldenberg	Trismus	Diplopia
Br j oral surg	1978	Robin L.M. gray	Facial nerve paralysis	Conjunctivitis
Am J ophthalmol	1992	Edward J. holland	Ulceration	Conjunctivitis
Ann ny acad sci	1991	Greg mlynarczyk	Enamel pitting	Conjunctivitis
Ophthalmology	1981	Mondino	Ulceration	Conjunctivitis
Oral surg oral med oral pathol J	1990	Ashfaq shuaib <i>et al</i>	Ulceration	Conjunctivitis
Biomedicines	2023	Soares <i>et al</i>	Ulceration	Blindness
Acta derm venerol	1987	Cabellero <i>et al</i>	Toothpit	Angiofibroma
Ann ophthalmol	1988	Tomazalli gerosa <i>et al</i>	Atrophy	Amaurosis
Int j med sci	2012	Cankaya <i>et al</i>	Odontoma	Blindness
Transl pediatr	2017	Kamboj <i>et al</i>	Ulceration	Exophthalmos
Oooo	2022	Melo <i>et al</i>	Ulceration	Blindness
J rheumatol	1988	Mizushima Y <i>et al</i>	Ulceration	Conjunctivitis

salivary glands may show invasion in the lymphocytic cells present in them, thus giving rise to both eye and the mouth symptoms. The eye drops like lubricating drops and punctual occlusion which is a procedure in which dry eye syndrome is rectified are used for the eye treatments. Eye or the ocular problems are tested by following tests like schirmer test and the other test that includes dyes like fluorescein and rose bengal for the diagnosis. Polymyalgia rheumatic otherwise called arthralgia, craniofacial pain, increase in the erythrocyte sedimentation rate value and headaches are seen along with temporal arteritis are the basic symptoms seen in the patients<sup>[3]</sup>. Other symptoms seen are ischemia which can be severe and this severity can give rise to stroke and blindness. The temporal arteritis includes the symptoms like glossitis, claudication of the jaw and ulcers are seen in the oral cavity. Pain in the temporomandibular joints is seen while chewing seen in the symptom called jaw claudication. The temporal arteritis which is commonly seen in elderly patients is diagnosed when the patient comes with the complain of severe headaches due to claudication of the jaw or visual loss, where increased levels in erythrocyte sedimentation rate is seen and positive biopsy result is seen in the temporal artery<sup>[4]</sup>. The temporal arteritis is treated by high dose steroids. The steroids are administered accordingly based on the symptoms of the patients and the erythrocyte sedimentation rate value. The steroid doses may not reverse the visual loss but may cause prevention in the other eye. The steroid dose can be increased according to the severity of the

jaw claudication. Kaposi's sarcoma, perioral molluscum contagiosum and hairy leukoplakia are seen in the patients with visual loss are immediately taken to the ophthalmologist and also the physician for the recovery as the above symptoms are the first signs of AIDS<sup>[5]</sup>. The Kaposi's sarcoma is seen in the conjunctiva in HIV infected people. The visual loss is related to cytomegalovirus retinopathy which is prevented by the usage of foscarnet or ganciclovir which is given by intraocular or intravenous way. Congenital and acquired syphilis are also observed. Mulberry molars and Hutchinson's notched incisors are the symptoms seen in the congenital syphilis which when untreated may give rise to scarring of the cornea called as bilateral interstitial keratitis which is nothing but infection seen in the cornea including many ocular manifestations. A part from the ocular symptoms, other symptoms like saddle nose and deafness is also seen. The acquired syphilis is characterized by painless oral chancre, glossitis, oral mucous patches or gumma<sup>[6]</sup>. Apart from the oral infection the ocular infection is seen such as the pupil, retina, optic nerve, vitreous and eyelid may get infected. When untreated, acquired syphilis causes unilateral interstitial keratitis. The patient who has syphilis should go for the blood tests such as MHA-TP, HIV and RPR blood tests as well penicillin of higher doses is used in the treatment of acquired syphilis. A part from the above diseases, some other diseases are also noted like Gardner's syndrome which is an autosomal dominant disorder in which intestinal polyps are seen in multiple numbers which

are malignant<sup>[7]</sup>. Early diagnosis and detection can be done by the colectomy procedures. The people with Gardner's syndrome usually have multiple jaw osteomas which are characterized by the impacted and supernumerary teeth. So, in these types of cases the dentists and the ophthalmologist should communicate with each other so as to examine the hypertrophy that may be occurred in retinal pigment epithelium due to jaw osteomas, so that early diagnosis of Gardner's syndrome can be done or else if this increases, colonoscopy should be done. Another symptom called Gorlin's syndrome is an autosomal dominant disorder also called as basal cell nevus syndrome in which the patients have basal cell carcinoma which is detected in both face and the eyelids. Odontogenic keratocysts is seen in the jaw in this syndrome. Multiple endocrine neoplasia, type III is the disorder in which mucosal neuromas (the swollen lips, swollen tongue) enlarged nerves of the cornea and conjunctival neuromas are seen<sup>[8]</sup>. The patients having this syndrome may also have pheochromocytomas and medullary thyroid carcinoma. Mucormycosis also called as phycomycosis is infection caused by the fungus. The rhino-orbital mucormycosis is characterised by a necrotic slough which is seen on the nose or the palate in the immunocompromised patients. So these patients should consult the dentists as this disorder has high mortality and high morbidity. Surgical amphotericin and surgical debridement are the procedures followed by the dentists to treat this type of disorder. Behcet's disease and Ocular cicatricial pemphigoid are the ocular diseases that are related with the oral mucosal ulceration<sup>[9]</sup>. The scarring of the conjunctiva is seen in ocular cicatricial pemphigoid which is a non-specific chronic conjunctivitis. As it is a blinding condition, it is very difficult to do early diagnosis. As an eye doctor the ophthalmologists will not check the mouth, so a dentist should diagnose the oral subepithelial blisters or vesicles and then communicate with the ophthalmologist and both can easily diagnose the disease. Eye inflammation and Orogenital ulcers are seen in the disorder called Behcet's disease. Aphthous stomatitis which are painful ulcers caused in the oral cavity are the first and foremost symptoms seen in this disease, so in this condition, both the dentist and the ophthalmologist should communicate with each other for the early detection and early diagnosis. Sometimes, retinal vasculitis is seen when there is severe visual impairment. After the dental examination and diagnosis, sometimes the ocular Behcet's disease may revert because of the antigens which are released during the treatment. Tuberos sclerosus is a hamartomatous, multisystem autosomal dominant disorder characterized by seizures, mental retardation

and facial angiofibromas<sup>[10]</sup>. Dental enamel pitting is associated with tuberous sclerosis disorder and this is detected by usage of the solution which discloses dental plaque. So the dentist should communicate with the ophthalmologist and examine the patient's skin to find out retinal astrocytic hamartoma. Rieger's syndrome is an ocular dysgenesis of the anterior segment. The patients with this syndrome have cone-shaped incisors along with glaucoma and abnormalities in the iris. The Lefort fractures and blowout fractures, oculomandibulofacial dysostosis otherwise called as Hallermann-Streiff syndrome, carpenter syndrome which is nothing but acrocephalopolysyndactyly type II syndrome, craniofacial syndromes, osteogenesis imperfecta, familial dysautonomia which is also called as Riley-Day syndrome, lacrimo-auriculo-dentodigital syndrome, incontinentia pigmenti, Rubinstein-Taybi syndrome are the ocular and oral related conditions which are rarely detected and thus diagnosed by non-dental examining<sup>[11]</sup>. Sometimes, dental anaesthesia usage may damage the optic nerve, ocular motility nerves and the nerves related to facial region. After local anaesthesia is given, if the facial weakness does not get resolved within 12 hrs then there may be difficulty in the closure of the eyelid which means temporal branch of the facial nerve is affected and due to the impairment in eyelid closure, eye is not safeguarded and hence scarring of the cornea is noticed<sup>[12]</sup>. So, to prevent this condition, lubricating eye drops are to be used or the eyelid must be closed manually. As well the patient must visit the ophthalmologist as soon as possible without any delay. The use of the mandibular nerve anaesthesia gives rise to permanent visual loss which involves the nerves of the optic<sup>[13]</sup>. When a mandibular second molar is removed by air-cooled drill in the patients with orbital emphysema the damage of the optic nerve is observed, so the patients have to visit ophthalmologist immediately for the evaluation of the intraocular pressure<sup>[14]</sup>. Pneumatic dental hand-pieces that are used in the removal of required bone and severely broken teeth exhales air in the open wounds are to be strictly banned<sup>[15]</sup>. When maxillary molar extraction is done, orbital cellulitis is the disorder seen which is characterized by eye pain, swollen eyelids, bulging eyeball and maxillary tenderness. When it reaches the severity level, it may give rise to visual loss. Intravenous antibiotics, radiologic imaging and sinus drainage are associated with the ophthalmologic management<sup>[16]</sup>.

## CONCLUSION

The above concludes that several oral conditions are correlated with the ophthalmic disorders. The

dentists along with the ophthalmologist must communicate with each other and do the early detection and the early diagnosis so as the patient should overcome all the problems related to vision disorders and get the treatment without any delay.

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