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### Eye Oculo-Orbital Disease Due to Dental Causes

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### ABSTRACT

The etiopathogenic mechanisms that generate ocular-orbital diseases due to dental causes are: infectious, aseptic inflammatory, reflex and allergic. Orbital and adnexal diseases of the eyeball due to dental causes, they are predominantly infectious and manifest clinically through: eyelid abscesses, dacryocystitis, orbital cellulitis, thrombophlebitis of the cavernous sinus, very rarely through septic ocular seeding, panophthalmia, endophthalmia (serious conditions often accompanied by the functional and anatomical loss of the eyeball). Ocular inflammations with a dental focus are much more frequent and present a varied ocular pathology: anterior uveitis, chorioretinitis, panuveitis, keratoconjunctivitis, retinal periphlebitis, optic neuropathies. By affecting the trigeminal nerve and oculomotor nerves IV, VI (predominantly) of the sympathetic and parasympathetic in the context of dental disease, lacrimation, blepharospasm, oculomotor paralysis can occur. Oculoorbital damage can be present during or after dental treatment. Eye diseases due to dental causes require appropriate ophthalmological treatment, associated with appropriate etiopathogenic odontogenic treatment. A complete and competent ophthalmological and dental clinical examination is important.

### Keywords

Orbital cellulitis, Eyelid abscess, Uveitis, Optic neuropathy, Periapical granuloma, Osteitis, Canalicular treatment, Periodontitis.

### Introduction

Odontogenic infections are primarily of dental caries and periodontal disease with systemic implications in some cases. Infection of a maxillary canine molar mandibular teeth can extend in tissues of the face, eye, neck., in infection or dental abscess of the tooth can easily spread by continuity and be the cause of uveitis or other infections: in the tear duct, eye socket, lower eyelid.

Eye and ophthalmological disorders can occur following dental injury transient or chronic. The flora of the oral cavity is dominated by bacteria Streptococcus viridians (the most common) and other gram positive, anaerobic bacteria gram-negative bacteria odontogenic infections are multimicrobial [1],

### **Relations Between The Eyes and Teeth**

- o Oculo-orbital diseases have a multiple etiology, in which intervention odontogenic is an important element and is possible through the relationship between the eyes and teeth.
- **Embryological** volumetric development and medial fusion of buds facial in the 5th, 6th week explains the contiguity between the orbital cavity and although there is topographic distance.
- **Anatomically**, the eye and the dentition have indirect rations: osteoperiostal, vasculonervous and cellular [2].
- Osteoperiostal
  - □ The jawbone welded by its contralateral counterpart delimits the cavities orbit and buccal. By the age of 6 years the jawbone is Pneumatized by maxillary sinus. These cavities are papered by the mucosa and drained relatively random in the nasal passages. Under the floor of the nasal fossa, the bottom of the sinus sac it forms

a receptacle that moulds the palatine apophysis. This carries the teeth the upper arch of which some, called antral, protrude within sinus (premolars and first molars, less often posterior molars and canines).

- □ Included or ectopic teeth (close to the orbital cavity) may be responsible symptoms of oculo-dental pathology
- □ The upper jaw participates in the formation of the internal wall of the floor orbiting.
- □ At the level of the internal wall is the lacrimal sac located in the lacrimal fossa, which it can be the source of some inflammation (dacryocystitis) and the bone planum of the ethmoid which explains the orbiting complications within ethmoiditis (common in child).
- □ Through the malar bone, the jaw provides support to the eyeball.
- □ bone blade of the papyraceous bone, separates the maxillary sinus from the orbital cavity explaining the diffusion of infectious or tumor processes.
- □ The vestibular mucosa adheres strongly, especially at the level of the dental parcel, starting point of subperiosteal abscesses.

### Vasculo Nerve Connection

- □ The jaw is crossed by numerous channels through which components pass vasculo nervosa: suborbital artery and nerve, alveolar artery (ram of the artery internal jaws), anterior and posterior dental nerve (trigeminal ram). This sensitive and motor nerve has rich connections with the oculo-motor nerve common and pathetic, which can explain the genesis of some ophthalmic neuralgia.
- $\Box$  Vascular connections are made at:
  - venous level through the angularar vein that carries out an anastomosis of tyrolinguofacial trunk with ophthalmic vein, spilling into cavernous sinus (allows explanation for thrombophlebitis craniofacial)
  - at the arterial level: are connections between the ophthalmic artery and the facial artery through the angular artery and between the maxillary artery and the ophthalmic artery.

### **Cellular Ratio**

The bare eyeball is placed in cellulo-fat tissue inside a bone cavity much larger than him. This allows an extreme mobility of the eyeball, but also the diffusion of the septic process inside the orbital cone and the middle floor of the base of the skull. This periorbital tissue reacts promptly to an inflammatory or infectious aggression coming from to the pterygomaxillary fossa through the maxillary slit and celluloadiposous layer of the face. Filling tissue between the various elements of the muscular system superficial aponeurotic. The orbital cavity enters relative to the region: genyantritis and pterygomaxillary through the adipose body of the bubble: Bichat.

# Etiopathogenic Mechanisms of Oculo-Orbital Disorders of Natures Odontogenic Are:

- Anatomical and embryological relationships are produced by infectious, inflammatory, reflex, allergic and mechanism.

### o Infectious Mechanism

- Seeding germs starting from a dental outbreak occurs through: neighborhood extension, bone or sinus periosteum or sanguir pathway. retrograde venous along the facial or angular veinsthey are devoid of valves.
- □ Through the canal of the ophthalmic vein, the infectious process could, rarely: be the cause of a thrombophlebitis of the cavernous sinus
- □ Arterial diffusion is exceptional, and seeding: lymphatic path is unlikely, since the vessels of the maxy regionit drains into the pretragium and under the jaw.

# - Type Incriminated Tooth Plays a Role in the Localization of Orbital Infection:

- □ Seeding from the level of an incisor is done in the tissues of the incisor: venous retrograde face.
- □ Infection from the antral teeth it will reach the region of either by the above path, or by means of a sinusitis maxilare it may or may not be accompanied by an impairment of ethmoidal that will diffuse to the cellulo-fatty elements; infection of molar origin can first affect the elements pterygomaxillary and then reach the prior orbital cavity sphenomaxillary.

## Oculo-Orbital Clinical Manifestations with Mechanism Infectious

I do through seeding septic through neighborhood extension or retrograde venous pathway, the clinical picture orbitals and dental it is important and sometimes associated with general signs. Germs can be: zolat at the level of both localizations which allows establishing the cause/effect relationship, frequently highlighting anaerobic bacteria. Simultaneous treatment of damage dental and ocular allows healing.

### Orbital and Adnexal Diseases of Odontogenic Nature [6,7]

- Predominant **palpebral abscesses in the lower eyelid** through contiguity dental septic.
- Infections of the lacrimal pathways: pericystitis, dacryocystitis secondary to a osteoperiostitis of the jaw, and which are recognized by warm, red and painful swelling in the internal angle of the eyelids and which at compression in the region of the lacrimal sac determines removal of pus at the lacrimal point;
- Periorbital cellulitis that did not go beyond the orbital septum and ear not apheetes than eyelids and orbit cellulitis rarer, but more serious associated with eyelid oedema, exophthalmos, chemosis, anesthesia corneal, ophthalmoplegia. The evolution of cellulite of an odontogenic nature in absence of treatment

can be:

- Preseptal orbital cellulitis with eyelid edema, chemosis, without exophthalmia or functional signs.
- □ Intraorbital cellulite with painful exophthalmos, possible touch of oculomotricity, pupillary reflexes and acuity visuals;
- Orbital cellulitis is a rare but serious complication of dental infection untreated dental caries in children may lead to rare complication, orbital cellulitis, orbital abscess or loss of vision. Untreated can progress to blindness, cavernous sinus thrombosis, meningitis, brain abscesses and death is necessary vigorous treatment.
- Orbital subperiosteal abscess with painful exophthalmos. Nonaxial inflammation with the eye deviated on the opposite side subperiosteal abscess; limitation of movements is present ocular, but with pupillary reflexes, visual acuity and fundus normal eyes at onset.
- **Intraorbital abscess** in which to the previous signs is associated ophthalmoplegia, decreased visual acuity, touch pupillary reflexes, damage to the fundus: the prognosis is reserved even with prompt treatment and suitable.
- Thrombophlebitis of cavernous sinus shows a gravisin picture. Symptoms associated with protrusion of the eyeball, vasodilation conjunctival and episcleral in the jellyfish head, ophthalmoplegia. Papillary oedema, meningeal signs and general signs of tip septicemic; vital prognosis is limited by a mortality grown up.
- Less often other clinical forms can be remembered:
  - □ **Intraocular abscess** secondary to premolar infection and molars with progressive invasion of fossa: pterygopalatine, then of the sphenomaxillary slit and finally orbiting subperiosteal space.
  - □ Gas gangrene of the orbit was described rarisir secondary to a periapical granuloma infected level a higher wisdom tooth.
- Eye damage by septic seeding (rare)
  - □ Infectious panophthalmias, endophthalmitis
  - **Keratitis** in patients with immunodepression (AIDS, cortisone)
  - □ Septic metastasis by hematogenous migration of infectious agents C. starting point an abscess of the upper molar.
- The treatment of an odontogenic infection of the with involve a dental procedure and treatment of the eye (tobramycin, vancomycin, moxifloxacin ophthalmic solution)
  - Treatment often involve enteral or intravenous antibiotics
    o First line antibiotics
- Amoxycilin (double in severe infection)
- Phenoximetyl penicilin (double in severe infection)
- Metronitazol alternative in the pacients alergic to penicilin
- Clindamicin
  - o Second line antibiotics for dental abscess
  - o Amoxiclav
  - o Clarithromycin
- Management of sepsis

### Inflammatory Mechanism

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- *aseptic inflammatory* phenomena affecting the eye and appendages secondary to a dental outbreak in which the antigenic material is foundered anaerobic treatment of pulpal gangrene and some topical drugs for or dental pulp.
- The deep layers of the eyeball are more often affected by the mechanism

**Ocular inflammation with dental focus** causes clinical expression especially ocular it is caused by a remote dental outbreak by immunoallergic mechanism or hypersensitivity: [4,5]

- Anterior uveitis are the most common manifestations of complications of ophthalmic diseases of dental origin; anterior uveitis-iridocyclitis 60% acute, serous, negranulomatous with few sineks (adhesions; iridocrystalinian). Clinically it is manifested by a decrease in visual acuity more or less important, photophobia, eye pain. Sometimes uveitis is exudative with important irido-cristialinian synechia. Healing can: do in severe cases with sequelae: secondary glaucoma, cataract, detachment retina. Is possible the coincidence of uveitis, dental pulpitis and gingivitis.
- Posterior uveitis chorioretinitis
- Total uveitis panuveitis
- Endogenous endophtalmitis is possible after dental procedures or a dental implant.
- **Kerato-conjunctivitis** clinically translated by painful eye, conjunctiva hyperemic, photophobia and lacrimation
- Vascularitis, the most common being periphlebitis, can determine secondary vitreous, retractions of the posterior hyaloid, alterations vascular responsible for recurrent bleeding.
- **Optic neuropathies** in the form of papulitis or retrobulbar neuritis.

• Causal dental diseases can be represented by suppurate pericoronaritis, pulp abscesses, deep caries, apical granulomatous secondary maxillary abscesses.

- **Reflex Mechanism** 
  - □ In odontogenic ocular pathology are important relationships of the nerve trigeminal with sympathetic and parasympathetic system.
  - □ The existence of this mechanism, suggested from the findings clinical, is difficult to proven.
  - □ Etiological treatment dental and the disappearance of the irritating spina, can, by getting pies to establish a cause/effect relationship.

Reflex ocular manifestations of odontogenic cause - excitation of endings sensitive disorders of the trigeminal nerve can cause motor disorders, sensitive, sensory. Irritating spines can be traumatic, toxic, inflammatory. Appearance after a dental treatment allows to establish the causal relationship. Clinical aspects are multiple:

- Lacrimation by irritation of parasympathetic fibers

- Neuralgia in the ophthalmic territory of the trigeminal what can simulate a migraine ophthalmic.
- Oculomotor paralysis that more frequently touches the external right muscle (VI), sometimes large oblique (IV);
- Brutal amaurosis by spasm of the central artery of the retina.
- Various oculomotor disorders: blepharospasm, accommodation disorders, mydriasis.

• *Allergic mechanism* of eye disorders is sometimes present in dental infection

• Oculo-orbital manifestations of tumor origin are tumors with a dental starting point dezvoltate either in the jaw infrastructure, or with sinus invasion and extension.

- Cysts of dental origin-benign affecting the included teeth (teeth of superior mind) cortical sinus and or adjacent antral teeth the orbital floor can generate oculo-orbital determinations.
- The cynical diagnostic is based on, Yugal deformation, turbulations of Statics palpebral, decreased visual acuity, pain.
- Confirmation is done radiologically by simple cliches, or tomography computerized in which coronal and axial incidences allow the study relationship between lesion and Orbital cavity. MRI has the advantage of differentiating tumor lesions from inflammatory ones.
- They described themselves:
  - □ Conjunctival tumors of lymphomatous appearance secondary to some sinus granulomas of dental origin.
  - Unilateral edematous optic neuropathy secondary to some cysts upper jaws of odontogenic origin;
  - Dental cystic starting point carcinomas with invasion of the orbit.

• Oculo-orbital impairments secondary to dental treatments - this type of oculo-orbital impairments paradoxically occurs when the initial ailment is treated. Tooth extraction can cause an increase in ocular symptomatology, but - can lead to a-cure- definitive; Periodontal treatments can be cause of septic inoculation, being able to: accompanied by bacteremia.

### **Buco-Dental Etiologies**

Clinical expression of oculo-orbital manifestations of odontogenic origin is:

- Orbital and adnexal in case of infectious mechanism.
- Ocular in case of inflammatory mechanism.
- Neurological disorders in the case of the reflex mechanism.
- Consequence of tumor

Buco-dental etiologies likely to be at the origin of ocular manifestations orbiting are: [8]

- Dental causes
  - o Complications of pulp mortification: cysts, granulomas periapical, osteitis. May occur as a result of the evolution of a cari: or consequence of a trauma affecting vitality pulp.

- o Iatrogenic causes must always be suspected.
- o The quality of canalicular treatments will be analyzed, in search incomplete treatment or obturation with steps nonresorbable beyond the apex of the root, therefore the level of the alveolar bone or sinus cavity.
- Peridental causes are rarely responsible for occuloorbiting, seeking:
  - o Paradontolysis that could explain the infection in an l6 periodontal
  - o Mucous lesion of infectious, inflammatory or tumor type. Located on one of the walls of the oral cavity, tongue, tonsils.
  - Solution of bone continuity following treatment and that translates to an injury to the dental joint. hematoma of the oral cavity or orbit, defect oculomotricity;
  - o Benign tumor lesion (cyst of dental origin) or malignant tumor (of mucous origin or infrastructure of the body): alveolo-dental).
- The etiological diagnosis of odontological oculo-orbital determinations is difficult to achieve, the dentist returning the indication diagnosed and specialized therapeutic orientation.

The clinical odontogenic infections invariable depending on the source of infection, the infection is localised or dissemined. The clinical diagnosis of oculo-orbital damage of odontogenic origin is made by positive agnostic of oculo-orbital manifestation and evidence of the buco dental faces. It allows us to establish causal relationships.

# The Examination of the Patient is Extremely Important and Includes:

- **Anamnesis** will try to establish dental treatments conservatoire performed and prosthetics [9];
- Inspection will look for a possible mucosal lesion, ulceration, fistula buco-sinus communication. Will be reported absence of teeth on the arch possible caries. The signs of mortification of the modified type shall be specified. The color of the enamel, the quality of the occlusion will be appreciated.
- Palpation will determine the mobility of the teeth. Painful character or expression of pus in the parcel. The paradontium must be explored probe to highlight latent or evolutionary lesions

• **Complementary examination** confirm clinical data or highlight a latent focus clinically viable.

- X-rays are necessary to establish the focus of infection wet panoramic cliche systematically practiced.
  - □ Intrabucal retroalveolar or occlusal incidents centered on suspicious teeth (especially those mortified, interested in periodontitis or those cystic lesions);
  - The existence of sinus signs requires the incidence of Blondeau or Waters for highlight a dentosinusal

infectious focus (cyst, overcoming obturated paste).

#### • Treatment [10]

For the cure of oculo-orbital disorders probably odontogenic is necessary to treat the bucodental infectious focus, in addition to specific treatment ophthalmologic. In a patent bucodental infectious outbreak with obvious lesions accompanied by clinical and Radiological signs, the attitude must be radical, and the avulsion if justified, it will be done under the protection of antibiotics. Outbreak latent bucodental infectiousness requires a judicious analysis of each case in order not to unnecessarily bully the dentition. In this case the severity of the damage ophthalmology is of major importance:

- If oculo-orbital symptomatology is important, treatment will be radical for any dental injury: included teeth, radiculo cysts dental, evolutionary parodontosis, under a proper antibiotic prophylaxis.
- If the ocular symptomatology is minimal the attitude will be more conservative even if sometimes intensive;
- Restoration of incomplete canalicular tooth treatments mortified;
- Apical resection with curettage of dental radiculo incisivo cysts canine;
- Radicular hemisection of posterior pylorus when possible preservation of a root;
- Avulsion of teeth included with pericoronary cysts; surgical treatment of foci of parodontosis;
- Therapeutic sinusoscopy for foreign bodies or mucocele.

Any therapeutic maneuver is done under the protection of antibiotics, otherwise there are risk of worsening oculo-orbital symptomatology.

#### Conclusions

Oculoorbital pathology can be etiopathogenically determined by odontogenic factors through the embryological and anatomical relationship between eyes and teeth. The infectious mechanism with the seeding of germs from a dental outbreak can generate orbital infections - orbital cellulitis and appendages at the level of the eyelids, lacrimal apparatus. Aseptic dental inflammation causes multiple eye diseases: uveitis, retinal vasculitis, papillitis, retrobulbar neuritis and very rarely endophthalmitis and panophthalmia. Affecting the nerve endings of the trigeminal, sympathetic and parasympathetic nerves in the odontogenic process can cause: blepharospasm, accommodation disorders, mydriasis, oculomotor paralysis (Ne IV and VI) brutal amaurosis due to spasm of the central artery of the retina. Ophthalmological treatment must be associated with appropriate dental treatment to obtain a cure for the eye disease.

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