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Review on Denture Stomatitis : Classification, clinical features and treatment.

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Abstract: *Even when utmost care is taken in the fabrication of denture there are always unforeseen problems that arise when the patient is attempting to adjust to the new denture. These problems may be comfort , functions , esthetics and phonetics .Post insertion care plays vital role in maintaining biological health of oral mucosa. Poor hygiene maintenance leads to growth of adverse microflora, which initiates various diseased conditions like denture sore mouth or Oral thrush which is also called as denture stomatitis.*

I. Introduction

Dentistry involves a blend of mechanical and biomedical factors. In no discipline is this blend more apparent than in the field of complete denture Prosthodontics.Success of in the treatment of the complete denture patients requires not only mechanical skills and proficiency but also a knowledge of the physiology of the involved anatomic structures and an understanding of the possible pathologic changes the at may occur after the treatment .

Denture sore mouth is one of the most intriguing conditions of the oral mucosa associated with complete dentures. In most patients there is a generalized redness of the tissues and metallic tastes in the mouth may be reported by the patient. Petechie may be present, and in rare instances vesicles occasionally may form. The most dramatic objective symptoms are usually seen under the maxillary denture, although the most severe subjective symptoms may be associated with the mandibular dentures**.** Shulman found in his study that of 3450 removable denture wearers, 963 (27.9%) had denture stomatitis . Denture stomatitis prevalence was associated with wearing maxillary and mandibular complete dentures continuously; smoking more than 15 cigarettes per day ,vitamin A deficiency .[1]

Pires found that denture stomatitis is frequently associated with high levels of *Candida* in saliva and deficient denture hygiene. Denture stomatitis and *Candida* in saliva were more common in females. Their results showed that denture replacement and denture hygiene improvement were useful for denture stomatitis resolution. However, oral and denture hygiene must be continuous, inasmuch as salivary *Candida* counts remained high and it is considered an important pre disposing factor for DS.[2]

II. Chronic Denture Stomatitis.

(Denture sore mouth, denture stomatitis)

To make the condition more confusing there may be extreme redness of the tissues with no discomfort reported by the patient. On the other hand visible changes in the tissues may absent although the patient will report great pain and discomfort. For this type psychogenic factors must be considered. Burning of the tongue may be symptom. The term “chronic denture stomatitis” also applies when the patient has new dentures that are clinically good or adequate but continues to have decubital ulcer that develop long after a normal adjustment period.


Various causes of these conditions have been suggested. Including clinically inadequate dentures, nutritional factors, hormonal factors, nonspecific unfavorable characteristics of the body chemistry, habits such as bruxing or clenching, poor oral hygiene, and the practice of wearing the denture for 24 hours.

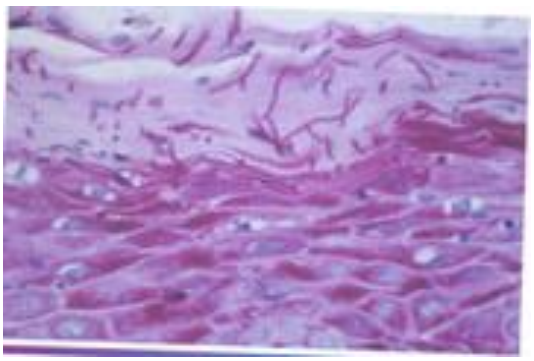
Emami and his associates collected a data at a one-year follow-up from 173 edentulous elders who had randomly received mandibular implant overdentures or conventional dentures. Elders wearing conventional dentures were almost 5 times more likely to have denture stomatitis than those wearing mandibular two-implant overdentures . Thus, implant overdentures may reduce oral mucosal trauma and control denture stomatitis.[3]

For such patients successful treatment include;

1) A procedure to return tissues abused by existing dentures to good health.
2) Accurate impression made with a minimum of pressure.
3) Record jaw records.
4) An occlusal pattern that shows equalized contacts in centric relation free of interfering cusps.
5) Non interfering anterior teeth.
6) Meticulous oral hygiene.
7) Avoidance by the patient of habits that increase the tendency to crush the mucosa between the bone and the denture base.
8) 8 hours of rest daily for the tissues by leaving dentures out of the mouth.

"Denture sore mouth" is an uncommon condition occurring in patient who may or may have new set of dentures. The condition not due to a true allergy, since patch testing with the denture materials gives negative results. Some cases appear to be due to an infection with Candida albicans, although the typical white patches of thrush do not usually develops. Lehner is classified the condition as chronic atropic Candidiasis. Newton has suggested that denture sore mouth may be related to the sweat retention syndrome. In which keratin plug formation of the sweat glands or accessory salivary glands forces the sweat or saliva into adjacent tissues with subsequent inflammation. Nikawa stated that denture plaque containing *Candida* could cause not only oral candidiasis, like oral thrush or denture-induced stomatitis, but also caries, root caries and periodontitis of abutment teeth. [4]

Coco and his associates found that predominant oral yeasts isolated were *C. albicans* (75%) and *Candida glabrata* (30%), which were isolated in higher proportions in patients with the highest grades of inflammation (100 and 80%). [5] Although the C albicans associated with denture stomatitis, biopsy specimens of denture stomatitis seldom show candidial hyphae actually penetrating the keratin layer of the host epitheliums. Furthermore if the palatal mucosa and tissue contacting surface of the denture are swabbed and separately streaked onto a Sabourauds agar slant. The denture typically shows much heavier colonization by yeast.



The fallowing factors are mentioned in literature as probable causative factors for denture sore mouth.

1. Ill fitting denture may have a chronically traumatizing effect on the underlying mucosa. The situation may be aggravated by rocking of the denture during chewing or speaking. The role of trauma as etiological factors is not yet clear.
2. Inadequate cleansing of denture may cause an accumulation of material as food and epithelial cells, which provide a favorable medium for the growth of bacteria /fungi. Ozkan found that there was a statistically significant relationship between denture stomatitis, yeasts presence and denture cleanliness.[6]
3. Heat accumulation is theoretically possible under a denture material having low thermal conductivity. The influence of this factor is not yet clear.Hentze and Wannermacher considers heat accumulation as a distinct etiological factors.
4. Denture sore mouth may be one of the symptoms of the systemic disease in which resistance to trauma or infection is lowered. Among such diseases are anemia, diabetis mellitus, vitamin C def, nephritis, intoxications.
5. The possibility of that stress induced muscle activity.
6. Delayed hypersensitivity reaction of the oral mucosa does not differ essentially from those of skin. The absence of a keratin layer, hair follicles,and sebaceous glands modify the contact reactions. The presence of saliva and abundant mucosal vascularization leads to rapid dispersion or Absorption of the allergen.

Clinical features:

The mucosa beneath the denture becomes extremely red swollen, smooth or granular and painful. Multiple pinpoint foci of hyperemia, usually involving the maxilla, frequently occur. A severe burning sensation is common. The redness of the mucosa is rather sharply outlined and restricted to the tissue actually in contact with the denture.

Treatment and prognosis:

Treatment of this condition may not be successful. However Webb ,Thomas and Whittle in their study concluded that both Hypochlorite and microwave irradiation significantly reduced the numbers of *Candida* and aerobic bacteria on both dentures and both methods significantly reduced *Candida* on the palate. However, palatal aerobic bacteria were not significantly reduced by either method and the controls showed insignificant changes at all three sites for both *Candida* and aerobes.[7] In addition when the denture fit poorly construction of new appliances and instruction on hygienic care of the dentures aid in correcting the situation. If new dentures are not constructed the old dentures must be sterilized daily by soaking in a nystatin solution overnight during the treatment period. Rebasing dentures with soft tissues conditioners is also reported of benefit in conjunction with nystatin.

Laurylene and co-workers evaluated the use of a gel containing the extract of *Punica granatum* as an antifungal agent against candidiasis associated with denture stomatitis. Sixty patients with denture stomatitis confirmed by clinical and mycologic examination were selected. The patients were randomly allocated in two groups of 30 individuals each according to the medication prescribed: group A used miconazole (Daktarin® gel oral) and group B used a gel of *P. granatum* Linné (pomegranate). Both groups used the medicines three times per day for 15 days. Forty-eight hours after finishing the treatment the patients were re-examined and a second set of samples was collected for mycologic examination. The medicines were evaluated for their clinical response and negativity for *Candida*. The clinical results showed a satisfactory and regular response in 27 and 21 subjects of groups A and B, respectively. Negativity of yeasts was observed in 25 subjects of group A and 23 of group B. They concluded that the extract of *P. granatum* may be used as a topical antifungal agent for the treatment of candidosis associated with denture stomatitis.[8]

III. Inflammatory Denture Hyperplasia.(Epulis Fissuratum)

One of the most common tissue reactions to a chronically ill fitting denture is the occurrence of hyperplasia of tissue along the border of the dentures. such hyperplasia of the oral mucosa is not restricted to this location but occurs in many areas where chronic irritation of any type exists such as on the gingival, buccal mucosa and angle of the mouth.

Clinical features:

Inflammatory fibrous hyperplasia as a result of the denture injury is characterized by the development of elongated rolls of tissue in the mucobuccal fold area into which the denture flange conveniently fits. This proliferation of tissue is usually slow in developing and probably is as much a result of the resorption of the alveolar ridge as of the trauma of the loose dentures.

This excess fold of tissue is not usually highly inflamed clinically although there may be irritation or even ulceration in the base of the fold into which the denture flange fits. The lesion is firm on palpation.

Histological features:

The hyperplasic mass of tissue is composed of an excessive bulk of fibrous connective tissue covered by a layer of stratified squamaous epithelium which may be normal thickness or show acanthosis. Pseudoepitheilmatous hyperplasia is often found.hyperorthokeratosis or parakeratosis is frequently present.

The connective tissue is composed chiefly of coarse bundles of collagen fibers with few fibroblasts or blood vessels unless there is an active inflammatory reaction present. Such a reaction is frequently seen however in the vase of the fissures adjoining the denture flange. Especially if the tissue is superficially ulcerated. Cutright reported the histopathologic finding in 583 cases of inflammatory fibrous hyperplasia and discussed their significance.Once additional histological finding often seen in the surface epithelium of inflammatory fibrous hyperplasia is mucopolysaccharide keratin dystrophy.

Treatment and prognosis:

Inflammatory fibrous hyperplasia should be surgically excised and either new denture constructed or the old dentures rebased to provide adequate retention. If the denture is replaced or repaired, the lesion is should not recur. Complete regression even after construction of new dentures will not occur. Although subsidence of the inflammatory reaction may produce some clinical improvement of the condition.

IV. Inflammatory papillary hyperplasia

Papillary hyperplasia is an unusual condition involving the mucosa of the palate. It is of unknown etiology but may be considered f form of inflammatory hyperplasia associated in most instances with illfitting dentures. Which permit frictional irritation and a poor fitting dentures never acquire papillomatosis however there must be some as yet unidentified predisposing factors present in those persons who develop the lesion.

Clinical features:

Papillary hyperplasia occurs predominantly in edentulous patients with dentures, but is seen on rare occasions in patients with a full complement of teeth and no prosthetic appliance. The lesion presents itself as numerous closely arranged red edematous papillary projections, often involving nearly all of the had palate and imparting to it a warty appearance. The lesion may extend onto the alveolar mucosa and mandibular alveolar mucosa involvement occasionally occurs. The microscopic section of papillomatosis shows numerous small vertical projection each composed of parkeratotic or sometimes orthokeratotic stratified squamous epithelium and a central core of connective tissue. Pseudoepitheliomatous hyperplasia, in varying degrees, is seen in the vast majority of cases, this is sometimes so severe as to be interpreted by the experienced as epidermoid carcinoma. However, most authorities now agree that true epithelial dysplasia and malignant transformation do not occur in palatal papillomatosis. Relatively severe inflammatory cell infiltration is nearly always present in

the connective tissue, as is chronic sialadenitis in the accessory palatal glands. In the latter instance, metaplastic changes in acinar and ductal epithelium may mimic neoplastic transformation.

Treatment and Prognosis.

There is no well recognized and accepted course of therapy for this condition. Discontinuing the use of the ill-fitting dentures or construction of new dentures without surgical removal of the excess tissues will generally results in regression of the edema and inflammation, but the papillary hyperplasia persists. Preferably, surgical excision of the lesion prior to new denture construction will return the mouth to a normal state. The use of a tissue conditioner to rebase an old denture often results in some improvement of the lesion, but seldom complete regression unless it is in an early stage.

V. Trumatic Ulcer

(SORE SPOTS)

The traumatic ulcer caused by denture initiation is the same type of ulcer that may be produced by a variety of other physical injuries .

Clinical features:

The denture ulcer one or more commonly develops within a day or two after the insertion of a new denture. This may be result of over extension of the flanges, sequestration of spicules of bone under the denture or a roughened or high spot on the inner surface of the denture.These ulcers are small painful, irregularly shaped lesion usually covered by a delicate gray necrotic membrane and surrounded by an inflammatory halo. If treatment is not instituted there sometimes may begin proliferation of tissues around the periphery of the lesion on an inflammatory basis.

Histological fatures:

The traumatic ulcer is a nonspecific ulcer and microscopically showed loss of continuity of surface epithelium with fibrinous exudates covering the exposed connective tissue. The epithelium bearing the ulcer demonstrates proliferate activity. There is chronic lesion polymorphic nuclear leukocutes in the connective tissues, particularly beneath the area of ulceration, although in chronic lesions these may be replaced by lymphocytes and plasma cells. Capillary dilatation and proliferation may alson be evident. Fibroblastic activity is sometimes present, and macrophages may be present in moderate numbers.

Treatment and prognosis:

The treatment for the traumatic denture ulcer consists in correction of the underlying causes; relief of the flange, removal of a tiny sequestrum or relief of high spots. When this accomplished the ulcer usually heals promptly.

SORE SPOTS IN VESTIBULE.

Cause- overextension.

Recognizing- direct vision in mouth on gentle retraction of lips and cheeks(displacement of sulcal tissues and frenae). Observe if denture displaced on digital manipulation of cheeks and lips, and tongue movements performed by patient, as when molding borders of impression.Slow elevation of lower denture when mouth half open and cheeks and lips immobile(should not be confused with neutral zone). Slow fall of upper denture not diagnostic of overextension since lack since of seal may produce same effect.Remove the denture look for sore point at reflection of sulcal tissues.

Overcoming- Reduce overextension, using the disclosing material if necessary.repolish denture order.

Avoiding- slightly under-extend borders of custom impression tray and accurately mould using adequately softened tracing compound. Beware patients with large variation in sulcus depth between resting and functional positions; adapt border to later.

SORE SPOTS POSTERIOR LIMIT OF THE UPPER DENTURE:

a) Posterior palatal seal too deep.
b) Sharp posterior palatal seal.
c) Overextension.

Recognizing- examine tissues in area of prescribed postdam, may be reddened or ulcerated (especially pterygo hamular notch)

Overcoming- relive appropriately it may require removal of present postdam and addition of a replacement in greenstick. Return the denture to laboratory for permanent addition of new post dam.

Avoiding- careful assessment of anatomical and physical consistency at junction of hard and soft palate . Proficient impression technique plus appropriately carving the groove for post dam on master cast**.**

SINGLE SPOTS OVER RIDGE.

a) Malocclusion in the area.

Recognizing-Check the support is acceptable then closely examine occlusion for occlusal balance in RCP. Position index fingers on buccal flanges of lower denture, with thumbs under chin pad ask the patient to close slowly into RCP. Watch for sliding ICP. Therefore check for balanced articulation in protrusion. Also right and left lateral excursions-should have balancing contacts.

Overcoming-Adjust the occlusion by selective grinding at chairside or in laboratory after re-registration. If severe error, reset, using the face-bow and new interocclusal record.

Avoiding- sound registration techniques and careful reappraisal at trial insertion stage.

b) Inaccurate denture base.

Causes-Lack of or inappropriate relief areas unlikely to withstand compression/displacement, eg.tori,sharp ridges,exfoliating bony spicules, retained roots, ridges with atrophic mucosa which are unable to tolerate the much loading or superficial mental nerve. This may subsequent to pre-prosthetic surgery or overzealous carving of post dam on master cast. Also lack of relief for frena or muscle attachments or of muscles. Eg. Mandibular denture overextended buccally and masseter muscle constrained.

Recognizing: Examine denture bearing area closely and assess diplacebility of mucosa over ridges, buccal shelves, palate etc, palpate the ridges with a finger and record any blanching seen or discomfort experienced by patient during this exercise.
Compare the contours of denture to contours within mouth.

Overcoming-Use disclosing material to locate and then relieve denture for most of the denture accompanying list except for Retained roots-consider extracting.

Avoiding- This problems may be anticipated and treated for by careful examination including the use of appropriate radiographs where indicated.
Use of appropriate impression techniques.
Clear instruction to technician concerning site. Extent and thickness of relief.

GENERALIZED SORENESS OVER THE RIDGE

a) Vertical dimension too great

Excessive vertical dimension- pain usually reported to be periphery of dentures, in depth of sulci. May be discomfort or pain in affected muscles of mastication, e,g. masseter and posterior fibers of temporalis. Pain tends to intensify as day progresses (by evening I have to take them out). May be attributable to burning mouth syndrome.
Most prosthodontists today are in agreement that it is probably better to have vertical dimension closed than opened.

Recognizing -Symptoms generally pathognomonic. Often the history of tramlines or ulcers on buccal shelves with repeated adjustments. A vicious circle of complaints and adjustments occurs.

Overcoming- If excess is less than 1.5mm grind to provide freeway space. If greater than 1.5 reregister and reset at new vertical dimension of occlusion.

Avoiding-Use functional tests, eg speech, registration and try in appointments.
Provide the freeway space commensurate with age and functional capability of patient.

SORENESS UNDER LINGUAL FLANGE OF LOWER DENTURE.

a) Centric occlusion not in harmony with centric relation, drives the lower denture forward
If no overextension of denture base or unrelieved bony exostosis, look for protrusive slide from RCP to ICP.

Recognizing-Stabilize the lower denture with forefingers and ask the patient to close together gently, when the patient is viewed from profile a forward slide into ICP may be seen.

Overcoming-Mark the deflective inclines of posterior teeth with articulating paper; these will be the mesial-facing slopes of the upper buccal cusps and distal facing slopes of the lower buccal buccal cusps. If slide is greater than half a cusp width, reregister and retry.

Avoiding-Take care at registration stage. As an option to conventional techniques arrow head tracing methods tend to give more consistent results.
Check at the try in stages and reregister where appropriate using facebow transfer plus RCP and protrusive records.

b)overextended lingual flange

Overextending of lingual flanges- impinges on to mylohyoid ridge.

Recognising- Denture lifts when tongue is protruded, ulcers on mucosa overlying mylohyoid ridge or pain during swallowing.

Overcoming-Use disclosing material to identify the position and extent of over contour and relieve appropriately. Ensure that any trimmed acrylic is thoroughly polished prior to reinsertion.

Avoiding-
Through examination to identify extent of posterior lingual sulci and use of appropriate impression technique.
Clear instruction to technician regarding maintenance of prescribed denture form.

SORENESS UNDER LABIAL FLANGE OF LOWER DENTURE.

a)Too much overbite.
Pain and/or ulceration on labial aspect of lower ridge that is not attributable to undercut flange or acrylic pearls; cause is insufficient incisal overjet giving incisal locking and tripping between dentures. Sometimes this may be associated with pain around the incisal papilla as upper denture rocks.

Recognizing-
Examine relation of upper and lower incisors as patient slides from RCP into protrusive; if incisal guidance is too steep, then the lower incisors will trip on the uppers, causing rocking or dislodging of lower and/or upper denture.

Overcoming-
Reduce the vertical overlap by removing excess from labio-incisal aspect of lower incisor or from palato-incisal aspect of upper incisors. If appearance is compromised reset of the incisor may be required.

Avoiding-
Careful determination of upper lip support and functional determination of incisal positions for upper and lower teeth at both registration and trial insertion stages.

b. Patient habit, wants to masticate in protrusive.
Educate and discourage the habit and balanced articulation.

DENTURE BASE NOT RELIVED IN REGION OF UNDERCUT

Recognizing-
Look for undercuts and /or erythematous or ulcerated areas on sides of ridges. Patient usually complains of pain when denture is inserted or removed.

Overcoming-Use disclosing material on localized area of denture, care should be taken to evaluate displacebility of the tissues at maximum contour of the ridge/tuborosity as an excessive amount of denture base may be removed with subsequent reduction in retention.

Avoiding-Survey the master cast and instruct the technician to block undercuts or alternatively utilize app selected undercuts where there is displaceable tissue is present.

LACK OF OR INAPPROPRIATE RELIEF IF AREAS UNLIKELY TO WITSTAND COMPRESSION / DISPLACEMENT, EG TORI, SHARP RIDGES, EXFOLIATING BONY SPICULES, RETAINED ROOT, RIDGES WITH ATROPHIC MUCOSA.

Recognition-Examine the denture bearing area closely and assess displace ability of mucosa overrides, buccal shelves, palate etc, palpate the ridges with finger and record any blanching seen or discomfort experienced by patient during this exercise.

Overcoming -Use disclosing material to locate and then relieve denture for most of the accompanying list except
- Retained roots-consider extraction.
- Tori-take a wash impression inside the denture and reline.
- Beware of prescribing the resilient lining for patients with superficial mental nerves- unless appropriate relief is prescribed a plug of liner may aggravate the problem.

Avoiding- This problem could be anticipated and treated by;
- Careful examination, including the use of app radiographs where indicated.
- Use of app impression tech.
- Clear instruction to tech concerning site , extent and thickness of relief.

STRESS INDUCED MUSCLE ACTIVITY; A POSSIBLE ETIOLOGIC FACTORS IN DENTURE SORENESS.

A small percentage of patients exhibit a generalized form of mucosal soreness resistant to treatment in which none of the factors mentioned can be implicated. The origin of the trouble may be related to overloading could be caused by chewing but since chewing occupies comparatively little time during the day this is unlikely. Alternatively discomfort could arise from prolonged overloading caused by abnormal nonfunctional muscle activity, such as chewing. A comparable type of persistent and generalized soreness can arise when the occlusal height of denture is excessive leading to continuous tooth contact and pressure upon the underlying mucosal membrane. A similar situation might arise with denture having a correct vertical dimension if excessive and prolonged activity of mandibular elevator muscles were to occur.

VI. Summary And Conclusion

Complete dentures are foreign objects in the oral cavity that are accepted and tolerated by the tissues to a degree great extent that is surprising.

At the same time we must be mindful complete dentures are not the innocuous devices we often think they are, success in the treatment of the complete denture patient requires not only mechanical skill and proficiency but also a knowledge of the physiology of the involved anatomic structures and an understanding of the possible pathologic changes that may occur after treatment. When patient complains of sore spots it is necessary to analyze the cause then treatment should start from alleviating the cause factor.

Best treatment of abused tissues is by removing the offending denture until condition of abused tissues returns to normal.

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