not conform to coincide with the normal wear patterns occuring with mastication or swallowing. With sufficient wear pulpitis may result, with resultant pulp necrosis. Additionally, fractures of the teeth, restorations and roots may occur more frequently with bruxism.

Mobility of the teeth is often seen with bruxism. Hist and Muhlemann using a force meter to measure tooth mobility, found that bruxism was associated with a regular and pronounced increase in tooth mobility at night in a group of patients. The elimination of the bruxism was followed by the disappearance of nocturnal tooth mobility.

Muscles : Increased muscular tonus and a poor ability to relax or manipulate the mandible side to side is common in patients with bruxism. Often, hypertrophy of the masseter muscles, either unilaterally or bilaterally is present. Another observed symptom of bruxism is tenderness of the muscles of mastication to palpation, usually more pronounced in the morning. The hypertonicity of the muscles of mastication secondary to bruxism may lead to painful dystrophic changes in the muscles. These muscle changes and the associated pain may only be with palpation, or they may be symptomatically painful throughout part or all of the day. Many patients complain of a tired feeling in the jaws in the morning, or a dull ache from the nocturnal bruxing causing muscle fatigue and headache. Several reports suggest that bruxism may directly lead to headache based on referred direct pain from the jaw-closing muscles, and that bruxism may even cause protective splinting (myospasm) of these muscles.[12,26]

Temporomandibular joint (TMJ) : [26]

TMJ disturbances are in many cases the result of bruxism. Excessive biomechanical loading of TMJ can occur when bruxism and an unstable dental condition coincide. Abnormal muscle function associated with bruxism can lead to unco-ordination of the lateral pterygoid and disc. Additionally, referred pain to TMJ to the muscles of mastication. Damage to the TMJ may result in crepitation or clicking of the joint, pain in the joint, restriction of movement, and deviations of movements of the mandible.

EFFECTS OF BRUXISM ON PERIODONTAL PATIENTS

The effect of bruxism on a patient with periodontal disease is a subject of much debate. The literature supports the position that bruxism can cause traumatic changes in the periodontium, but that it does not initiate loss of attachment in the abscence of periodontal disease by this trauma. Once inflammatory periodontal disease is present, the literature is divided as to the possible additive effects that trauma from occlusion may have to destruction and loss of the periodontium and apical migration of the epithelium attachment. It is thought by some that this trauma may be an essential factor for the genesis of loss of attachment and vertical bone loss.[5,6,9]

Other investigations both in man and animals have not shown the progression of loss of attachment with occlusal trauma alone.[17]

RECOGNITION OF BRUXISM :[7]

Prominent Masseters : The patient who has been bruxing or clenching for some time shows prominent development of these muscles. The average diet is not conducive to such development, nor is the intake of essentially soft or liquid food.

Taut-tense Orofacial Muscles : Upon retraction of these tissues for oral examination, they are found to be relatively inelastic, not easily stretched. It is frequently difficult to insert a normal sized impression tray because of the tautness of the muculature. Retraction of the lip or cheek for extended dental procedures requires considerable effort.

Facets : The prescence of shiny facets, particularly gross ones, is indicative of the exertion of considerable pressures. In as much as tooth-to-tooth contact seldom occurs in mastication, such facets are usually produced by swallowing, clenching or bruxing. While buccal and lingual facets may be produced by swallowing, with the possibility of deleterious effects associated with such non-axial forces, the masseters are not likely to be prominent or over developed because of this function such muscle finding in conjunction with obvious facets indicates indulgence in bruxing or clenching.

Depressed natural posterior teeth : Posterior teeth which appear unduly short- considerably below the average occlusal plane on the lower, above the occlusal plane on the upper, or both- may indicate the exertion of bruxing or clenching pressures if prominence of masseters or orofacial muscle tautness is present.

Iatrogenically induced depressions may be seen with removable bite-opening appliances used by clenching or bruxing patients. The originally depressed natural teeth, are further depressed by the appliance.

Depressed free saddle areas : Such denture areas which are unduly depressed into ridges and have a history of rapid settling, soreness and need for frequent relief, indicate pressures greater and more frequent than those exerted in mastication and deglutition.

History of bruxing and clenching : Questioning for these habits is not reliable, as the patient may be unaware of them or be disinclined to mention them. Subsequent questioning at another visit sometimes brings an admission.

TREATMENT [7]

Inform the patient : The patient in whom there is evidence of pathosis due to bruxing or clenching should be informed that the frequent and sustained pressures he is exerting are of considerable magnitude, and are causing destruction of tissue and interfering with its repair, and are thus jeopardiz-

ing the proposed periodontal and restorative treatment.

Occlusal adjustment : The elimination of close cuspal confinement by the Jankelson technique lessens the desire to escape from this straitjacket type of jaw restriction by bruxing. Such occlusal adjustments `frees' the locked bite and provides freedom of access to centric closing masticatory stroke. The removal of such restraints in addition to lessening or eliminating the bruxing problem reduced non-axial forces and lessens the abnormal width of contacting surfaces caused by many facets,

Palatal bite plate : This appliance, with its thickened cuspid to cuspid horizontal plane, permits only the lower anterior teeth to touch and thus relies on proprioception to prevent any forceful muscle action. It is used with a labial arch wire if the upper teeth are periodontally involved. The appliance is worn night or day or both, during the periods that bruxing or clenching takes place. It need not, however be worn during mealtimes.

Full time use of the palatal bite plate results in elongation of the posterior teeth in a few months. This may be desirable if these teeth have been depressed, by the habit under consideration, particularly if the anterior teeth have been subjected to unusual wear or have migrated anteriorly. When such opposing posterior teeth come into contact, the occlusion must be checked out and corrected/adjusted.

Following recovery of periodontal tissues, a test period of two weeks is undertaken during which the patient does not wear the bite plate. If the patient reports no resumption of the habit, and if there is no increase in the tooth mobility , progressively longer test periods are tried. A resumption of the bruxing or clenching indicates the need for permanent part time or full time use of the bite plate. This should mean no more of a problem to the patient than the wearing of contact lenses, if the survival of the dentition is at stake.

Biteguard : This appliance is for use in bruxing rather than clenching where only night time use is indicated and where a splinting effect for mobile teeth is desirable. It is made of clear plastic and covers the occlusal and incisal surfaces of all the teeth of one jaw, plus of the buccal, labial and lingual surfaces. The occlusal surface is essentially flat, with virtually no occlusal imprints of the opposing teeth. All opposing teeth occlude simultaneously against it. It is used on the jaw with the greatest problem of tooth mobility. If both jaws are thus involved, upper and lower biteguards are made with smooth gliding occlusal surfaces. While this appliance eliminates close cuspal confinement and tooth movement during bruxing, the severe bruxer may wear through the biteguard,

Tranquilisers : These drugs may be used where the previously outlined procedures cannot be applied or fail to eliminate or lessen the bruxing or clenching habits sufficiently to permit recovery of the periodontal tissues. The meprobamate drugs such as Miltown and Equanil act as tranquilisers and muscle relaxants. The patient's physician should be informed of the problem and of the plan to prescibe three 400 mg. tablets daily with meals, for an extended period of time. Prescription of such drugs by physicians for anxiety and tension states has had the benefial side effects of eliminating bruxing and clenching in these patients.

RESTORATIVE PROCEDURES FOR BRUXERS AND CLENCHERS [7]

OPERATIVE : The tendency to cusp fracture with tooth to contact under the great pressures exerted by these patients requires some modification of restorative procedures. The structurally weakening effect of caries should not be accentuated by excessive "extension for prevention". Extensive occlusal dovetails for proximal restorations should be avoided where possible, unless these areas are cariously involved. An MOD amalgam in a bruxer risks splitting the tooth, particularly in bisuspids under such muscular stresses. Inlays should cover the entire occlusal surface to prevent the natural cusp tips from shearing off. Medium hardness gold should be used where other tooth surfaces are essentially enamel. Where considerable dentin is visible, softer gold is preferable to permit more even wear throughout the mouth. Weak enamel areas must not be left unprotected, and thin bevels should be avoided. It should be remembered at this point, that shoeing of cusps must not introduce buccal or lingual surface contacts. These should be tested for, with the adhesive green wax before and following the insertion of restorations.

CROWN AND BRIDGE : In the fabrication of these restorations, the locked bite with close buccal and lingual tooth surface contacts should be avoided because of the straitjacket confinement and nonaxial forces it introduces. Only occlusal contacts permitting axial forces to be exerted are desirable. Opposing posterior teeth in an end to end relationship should not be wraped in wax-ups of full crowns or pontics for the purpose of providing intercuspation. Apart from the confining nature of such a relationship with its predisposition to bruxing, there is the possibility of introducing mesial or distal non-axial forces. Bruxing sometimes occurs in an anteroposterior direction, as well as in the more familiar mediolateral direction.

REMOVABLE PARTIAL DENTURES : Abutment teeth may, in bruxing and clenching patients, be subjected to undue strain particularly where there are free saddle areas. To avoid this strain, removable partial dentures are made tissue-borne where ever possible by omitting the occlusal rests and making cylindrical the teeth to be clasped. The elimination of buldges on which a clasp may ride up and down , and undercuts which a clasp may ride in and out of, lessens torsional stresses considerably. The importance of