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Management of severely worn dentition (Part I)

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Severe tooth wear is a potential threat to dentition and masticatory function. Many factors may combine to produce the worn dentition, and the etiology often remains unidentified. **Tooth wear has been classified into the following four types**: (1) **attrition**, which is the wear of teeth or restorations caused by tooth to tooth contact during mastication or parafunction; (2) **abrasion**, which is the loss of tooth surface caused by abrasion with foreign substances other than tooth to tooth contact; (3) **erosion**, which is the loss of tooth surface by chemical processes not involving bacterial action; (4) **abfraction**, that is a non-carious cervical wedge-shaped defect caused by occlusal stresses.[1]

Prevention of further tooth wear should form the basis of care, but in severe cases, interventive restorative treatment may be necessary to protect vulnerable tooth surfaces and reestablish satisfactory appearance and function. **Indications for interventive restorative treatment are**: Unacceptable appearance of the teeth, loss of normal function and Progressive tooth wear resulting in pulp necrosis and/or difficulty in teeth restoration (fig.1).[2]

In general, severe occlusal wear can be due to Congenital abnormalities, Para functional habit due to stress or wearing from the opposing restorative material.

Turner and Missirlian classified the patients with occlusal wear as follows: 1. Excessive occlusal wear with Loss of vertical dimension and space is available to restore the vertical height. 2.Excessive occlusal wear without loss of vertical dimension and space is available for restoration 3. Excessive wear without loss of occlusal vertical dimension but with limited space for restoration.[3]

Space requirements of the proposed restorative materials:

The survival and success of restorations is heavily influenced by the physical properties of what material the techniques use and the environment within which it is placed. Conventional porcelain fused to metal have the largest footprint, requiring up to 2 mm occlusal reduction and can result in up to 72% loss of tooth tissue (by weight). All-ceramic monolithic crowns can be less destructive, with the reduction guides for newer full contour zirconia crowns being comparable to conventional full metal crown preparations. Space requirements for adhesive restorations vary depending on the material properties and function. Adhesive metal onlays require a minimum of 1 mm occlusal clearance, whilst adhesive metal

Fig.1: Severely loss of tooth structure

Fig.2: Posterior occlusal wear Gained space from occlusal preparation

palatal veneers require a minimum thickness of 0.7 mm. Composite resin restorations require a minimum thickness of 1–2 mm, depending on manufacturer.

Methods of achieving space for restorative materials:

1-Occlusal reduction of those teeth to be restored, his can be particularly destructive to compromised teeth with short clinical crowns and reduced amount of tooth tissue(fig.2) 2-Conventional orthodontics, this provides a controlled and predictable method of creating localized interocclusal clearance,3- Localized minor axial tooth movement ('Dahl' approach). There is a variety of methods that combine differential intrusion and eruption of teeth to create interocclusal space, 4-Elective devitalization of pulps in order to utilize the root canal for retention of crown restoration. A destructive option that worsens the prognosis for the tooth as compared with other methods of restoration described, 5-Increase occlusal vertical dimension by reorganized occlusion, 6-Crown lengthening surgery, although this does not create space in itself, increased axial wall height aids in retention and resistance form for restoration.

Gingival recontouring may also modify the gingival architecture and improve aesthetics (fig 3).(5) The severely worn dentition often poses a challenge to the restorative clinician. Diagnosis and treatment planning involves a multidisciplinary and in-depth evaluation of etiological, esthetic, occlusal, functional and preventive factors. Modern dentistry has made tremendous progress in areas of decay prevention, treatment of periodontitis and preservation of natural dentition. (6) The clinician may have difficulties in deciding which treatment option to choose to resolve complex situations of advanced tooth wear. The available evidence suggests the use of diagnostic waxing-up and diagnostic teeth arrangement. The use of centric relation is advised for occlusal positioning for rehabilitation. Testing of the OVD increases with a removable appliance and the use of a provisional stage before definitive treatment is recommended. Both direct or indirect composite resins and glass ceramics are indicated, in the form of onlay, overlay or even full coverage. A protective appliance with regular post-treatment evaluation is advised for follow-up. (7)

Fig.3: (a),(b)before, after crown lengthing and (c)composite veneer restoration (5)

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