Review Article

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SWING LOCK DENTURE : A REVIEW ARTICLE

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ABSTRACT:

A swing lock denture is an alternative approach when conventional removable denture have limited value for patients whose remaining teeth have advanced periodontal disease, generalized mobility and a questionable prognosis. It is a treatment option for those patients who, for a variety of reasons, are not suitable for fixed prosthodontics or implant retained prostheses or conventional removable partial denture therapy. It is treatment facet with high degree of clinical effectiveness ,however it is a little-taught RPD concept that offers clinicians additional choices in the treatment of perplexing situations which a conventional RPD design may not be feasible.This article attempts to reviews the past and current literature concerning the swing-lock RPD and its modifications providing some clinical considerations involving the treatment planning and fabrication of this RPD to promote the dentist, the use of swing lock denture as which is gradually fading into oblivion .This might might help in evolution of newer design and modifications to overcome its design complexities.

Key-words: Periodontal weak anterior, splitting, swing lock, hinge and lock denture

INTRODUCTION

Conventional removable denture may be of limited value for patients whose remaining teeth have advanced periodontal disease, generalized mobility and a questionable prognosis. Swing lock denture as treatment option for those patients who, for a variety of reasons, are not suitable for fixed prosthodontics or implant retained prostheses or conventional removable partial denture therapy. In these situations, a swing lock denture is an alternative approach.[1,2] This article reviews past and current literature concerning the swing-lock RPD and provides some clinical considerations involving the treatment planning and fabrication of this often-useful RPD.

Swing lock denture provides maximizing stability and retention stability by access to more tooth structures and undercuts with the unique clasping mechanism offered by the incorporation of lock, hinge and gate assemblies .It consists of a labial or buccal bar with projections fastened to the RPD framework by a hinge at one end latch at the other end. Reciprocation is achieved through a lingual plate that contacts all of the teeth by the projection of the labial bar. It was first described by Dr Joe J. Simmons In The Texas Dental journal in February 1963.[1,2] This was also described at later dates by Brown, 1970 Sprigg, 1977. It is indicated in missing or weakened key abutment teeth, such as a bilateral distal extension.[3,4]Tooth mobility in patients who have undergone periodontal

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therapy or have major bone loss and require some type of stabilization. It is also indicated in those patient who have undergone ablation surgery for the therapy for oncology and have few remaining teeth, for example patients who have had a hemimaxillectomy or mandibular resection. It is economical. It provides inadequate retention.. It is contraindicated when a patient exhibits poor oral hygiene, when a patient's manual dexterity is so poor that he or she could not open or close the clasp portion of the swing lock, when a patient presents with a shallow vestibule or high frenal attachments, and when interocclusal or interarch space would prevent the successful accommodation of the prosthesis.[3,4] It is relatively inexpensive method of using all or most of the remaining teeth for the retention and stabilization of a prosthesis either fixed splinting of the remaining teeth and the construction of a conventional removable partial denture.[4] It provides a poor esthetics and in case of a long distal extension base it is likely to move towards the tissue under the forces of occlusion.it is technique-sensitive, especially during hinge and lock fabrication, and the durability of the retentive element of the locking mechanism decreases with the progressive wear of the metal latch attachment. This infrequently utilized technique allows the use of undercuts that are unapproachable with other partial denture designs.

The clinician must consider lip position, facial sulcus depth, position of frena, and the periodontal health of potential abutment teeth when considering a swinglock removable partial denture. Specific instructions for blockout, relief, and position of hinge and clasp assemblies should be part of the written laboratory instructions.[5] Fabrication of a swing lock partial denture the following steps:

Selection of Metal for Swing-lock Framework: Chrome alloy is chosen instead of gold alloy because gold alloy shows wear (due to constant movement of the hinge) after a short time of use. If gold alloy is to be used a greater deal of metal has to be incorporated into the framework to increase rigidity and strength.

Surveying and Design: The cast is mounted on a surveyor with the occlusal plane parallel to the base and surveyed. The path of insertion is from a lingual direction with the labial arm open.[6]

Lingual plate: It should be designed to end above the survey line and hence it prevents the tissue ward displacement of the denture.

Occlusal rest : It helps to prevent tissue ward displacement of the denture.

Major connector: The mandibular major connector of choice is a lingual plate. It extends above the survey line with scallops extending up to contact points. The maxillary major connector of choice is a complete palate or a closed horseshoe with borders extending up to or above the survey line.

Labial arm design : The vertical projections of the labial bar should be designed to touch the teeth below the height of contour. Hence, they prevent occlusal movement. The design of the labial arm can be of two types. In conventional design it consists of a labial bar with metallic vertical I-bar or T-bars attached to it. They contact the teeth below the survey line .In the modified form acrylic resin retention loops is used .It is indicated for patients with short or hypermobile lips and where aesthetics is of concern. The acrylic loops are translucent or tooth colour hence, they are more aesthetic. Rests are placed on teeth adjacent to the edentulous ridge. Placement of hinge is determined by the patient comfort.

Selection of impression material : Alginate is the impression material of choice. Large gingival embrasures and gingival recession will usually be present in these cases, the impression material should tear in the interproximal areas during removal. This will allow easy removal of the impression without any damage to the teeth. This is not possible in rubber base impression materials. Heavy bodied Alginate is preferred.[6] .Making the Impression: Impression procedure for swing lock dentures is similar to conventional dentures. Dual impressions may be required for distal extension cases.

Framework Fabrication: A master cast is poured from the secondary impression. The master cast is waxed and under-cuts are blocked out before duplication. The master cast is duplicated to form the refractory cast. The design of the denture is transferred to the refractory cast. After design transfer, the wax pattern is fabricated on the refractory cast. The refractory cast is invested, wax is burned out and casting is done. The resultant framework is trimmed, finished and polished.

Tray Selection: A custom tray is essential for recording maximum labial and buccal vestibular depths. Secondary impression procedures should be carried out. Holes should be made in the tray to help retain the alginate.

Fitting the Framework.: A framework is tried in the patient before arranging the artificial teeth .The procedure is similar to that done for conventional removable partial dentures except that the fit of the labial bar and the rest of the framework are checked separately.

Jaw Relations: After framework try-in, a temporary denture base is fabricated using the framework. Occlusal rims are fabricated over the temporary denture base. The framework with the temporary denture base and occlusal rim is inserted into the patient's mouth and all the three jaw relations are recorded .After jaw relation, the casts with the jaw relation records are mounted in an articulator.

Arranging artificial teeth to Occlusion: Occlusion should be such that no lateral forces act on the prosthesis during occlusion. Simultaneous contact between natural and artificial teeth

should be present. These factors are checked during denture try in. After arranging the artificial teeth, the modelling wax that is to form the denture base is contoured and polished . Consecutively the trial denture is flasked and acrylized as usual.

Insertion: A lingual path of insertion is used.[6] Pressure indicator paste is used to detect pressure areas. Occlusion is evaluated in centric and eccentric relations. In case of distal extension RPD, the vertical projections should be bent away from the teeth so that the anterior teeth are not tipped lingually by the labial bar under occlusal load.

Post-insertion Care: Oral hygiene measures must be emphasized. Distal extension RPD has to be frequently relined. Loosened lock mechanisms should be tightened. Teeth can be added to the frame work at later stages after the removal of any tooth.[6]

THE MODIFIED SWING-LOCK:

New designs for a swing-lock RPD as an alternative to the hinge and latch attachment came up for instance use of a vertical bar and plastic clip attachment .This modification in the locking mechanism overcomes some of the problems associated with the conventional swing-lock RPD.

1) Used of a vertical bar and plastic clip attachment as an alternative to the hinge and latch attachment.[7] .Use of a resilient extracoronal attachment as a hinge joint and locking mechanism results in the prosthesis grasping the teeth gently and less rotational and horizontal loading on the abutment teeth whenever the prosthesis moves downward against the mobile mucosa. Adjustment of the labial bar, the vertical struts are not required with the modified SL-RPD. Hader bar vertical attachment is the ability to cast the plastic attachment as an integral part of the metal framework unlike the conventional SL-RPD in which the prefabricated plastic hinge and latch attachment need to be cast separately before the metal framework is cast.

2) Production of a split-post lock can be used as an alternative in the construction of custom-made hinge clasps or for swing-lock dentures. If a loss or reduction in lock strength occurs through wear of components, then this split-post lock can be reactivated.[8]

3) A wrap around swing-lock design using the white acetyl resin which not only increased the retention and stability without compromising the esthetics.[9]

4) When labial bar is added to an existing removable partial denture, swing lock can also function as an orthodontic retainer to inhibit tooth migration of poorly aligned teeth.[10]

5) Swing lock partial denture removal tool consist of a wire loop that can be placed under the clasp of swing lock denture and with the application of force perpendicular to clasp the catch can be infasterned .This design especially for

patients who has lose their manual dexterity.[11]

Harshit Aggarwal describes the fabrication of a maxillary complete removable dental prosthesis with the swing lock system. For a patient presented with large undercuts on the buccal and labial areas of the edentulous maxillary arch and with a history of various failed alveoloplasty procedures that had attempted to remove the exostoses preventing denture insertion.[12]

Swing lock denture in maxillofacial defects: Conventional and swing-lock obturator prostheses can be highly effective in restoring maxillary defects when careful attention is paid to the principles of framework design. This modality, offers a conservative design option that lies somewhere between the conventionally designed obturator prosthesis and the prosthesis designed to use extensive fixed reconstruction or endosseous implants. When the Swing lock obturator is considered, single, double, or dual labial bar designs are possible and may be required by the length and complexities of the arc of closure. Such designs provide a flexible labial bar that transmits less stress to abutment teeth.[13]

Mandibular resections compromise the balance and symmetry of mandibular functions. Swinglock framework designs have been used to retain obturators for some time. Various modification and designs were proposed to overcome the drawbacks.

Incorporation of an ERA attachment as the latch assembly of a swinglock framework for an obturator. The premise behind this design was that wear would be at the expense of the nylon retention male component, which is easily interchangeable, rather than the metal component of the assembly. The life of the latch assembly, framework, and prosthesis would thereby be prolonged.

A surgical obturation using a gated prosthesis. : It was based on swing lock concept. The prosthesis allows for simple transition from wire retained/ stabilized to removable obturation .Wound access and transitional to an interim or definitive prosthesis was made easier.[14]

Ronald e Myers did a study on the a photo elastic study of stress induced by framework design a maxillary resection by four common removable partial denture obturator design. They were facial cast circumferential retention with palatal plating , swing lock design with palatal plating, facial cast circumferential retention and palatal cast circumferential clasp reciprociation and facial cast circumferntial reciprociation with palatal I bar retention. and reported that swing lock with palatal plating and facial cast circumferential reciprociation with palatal I Bar retention frameworks demonstrated the greatest stress on all teeth.[15]

Special cases: A new type of prosthesis, with collapsible mandibular swing-lock complete denture, was introduced as prosthodontic treatment modalities for an edentulous patient with microstomia which is often difficult and ingenious. The prosthesis incorporates a cast cobalt-chromium framework with a lingual hinge and a conventional labial swing-lock. This combination allows the prosthesis to be collapsible while maintaining structural durability. John J.Wahle (1992).[16]

SWING LOCK AND ORAL HYGIENE

John k. Schulte did a clinical evaluation of swing lock partial dentures and he found that there was no significant changes in mobility , sulcus depth, bone level , caries. He also found that patience acceptance of the swing lock denture was good and concluded that swing lock removable partial denture will function satisfactory if the dentist follows the basic principles of construction and if the patient maintains a good level of oral hygiene.[17] B C Gomes did a study on clinical study of periodontal statues of abutments teeth supporting swing lock denture and he found that there is no differences in pocket depths and plaque scores and the degree of inflammation of the gingival status that were covered and uncovered by the components of the swing lock removable partial denture.[18]

CONCLUSION:

The swing-lock removable partial dentures are used relatively infrequently and little-taught concept that offers clinicians additional choices in the treatment of perplexing situations involving periodontally compromised dentitions, missing key abutments, and other clinical situations of compromised anatomy or where the pattern of tooth loss is unfavourable where a conventional RPD design may not be feasible.

The concept is recommended for maximizing stability and retention by access to more tooth surfaces and undercuts with the unique clasping mechanism offered by the incorporation of lock, hinge, and gate assemblies Since its introduction, the swing-lock RPD has gained some degree of acceptance However there are some of the problems associated with the conventional swing-lock RPD. This article reviews past and current literature concerning the swing-lock RPD and the various modification of swinglock and provides some clinical considerations involving the treatment planning and fabrication of this often-useful RPD. This comprehensive maxillofacial rehabilitation plays a pivotal role towards upliftment of patient's overall quality of life.

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