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Andrews Bridge System –A Review

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Abstract
Loss of teeth often results in loss of a variable amount of adjacent soft and hard tissue. Prosthodontic rehabilitation of a large anterior ridge defects is often a challenge. Such defects require not just the replacement of the missing teeth, but also closure of the defective area so as to achieve proper speech and esthetics. Fixed-removable partial dentures are particularly indicated for patients with extensive supportive tissue loss and when the alignment of the opposing arches and/or esthetic arch position of the replacement teeth create difficulties for placement of a conventional fixed partial denture. Andrews Bridge is a fixed-removable prosthesis that is one of the treatment modality indicated in patients with large ridge defects. This prosthesis successfully replaces the missing teeth along with complete closure of the defect, restoring speech and esthetics.

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I. Introduction

An Andrews Bridge is a fixed-removable prosthesis that is one of the treatment modalities indicated in patients with large ridge defects. This forms an alternative faster and efficient treatment option compared to surgical correction and rehabilitation following the placement of implants.

Loss of teeth is one of the natural sequelae of aging process. There are multiple causes of tooth loss including caries, periodontitis, trauma, and extraction as a part of surgical excision of tumors. This will results in the subsequent loss of the adjacent alveolar process and the soft tissues around it. The extent of this tissue loss depends on the severity of the cause. Replacement of the lost teeth requires that the deficient supporting tissues (if any) be restored for an esthetic outcome of the resulting prosthetic replacement. These defects can be restored by surgical intervention or by artificial substitutes. Prosthodontics is the dental specialty pertaining to the diagnosis, treatment planning, rehabilitation and maintenance of the oral function, comfort, appearance and health of patients with clinical conditions associated with missing or deficient teeth, and/or maxillofacial tissues using biocompatible substitutes.[1]

Complete esthetic surgical replacement of the lost tissues is difficult and unpredictable, particularly when a greater degree of residual ridge has been lost due to trauma, congenital defects or other pathologic process.

The prosthetic treatment options for a short span edentulous clinical situation include:

1) Conventional fixed partial denture (FPD),
2) Implant supported FPDs,
3) Removable partial denture (RPD) or
4) Fixed-removable partial denture.[2]

Prosthodontic rehabilitation of a large anterior ridge defects is often a challenge. This requires replacement of form, function and aesthetics. Pre-operative classification of the localized alveolar defect can be used as a guide in evaluating the prognosis and technical difficulties.[3]

Seibert classified alveolar crestal defects as Class I, Class II and Class III [4]

1) Class I: Buccolingual loss with crestal height maintained.
2) Class II: Vertical loss with buccolingual width maintained.
3) Class III: Combination of buccolingual and vertical loss.

Various treatment options available to treat such ridge defects are[5-9]

1) Soft Tissue Procedures include various options like.
    - The Roll Technique: for Class I defects.
    - The Interproximal Graft Technique: for Class II and III defects.
2) Free Gingival Graft.
3) The Onlay Graft for augmentation of ridge width and height.

4) Distraction osteogenesis.
5) Combination of a ridge augmentation using bone grafts followed by implant supported prosthesis.
6) Other methods include removable cast partial dentures, fixed partial denture and fixed removable partial denture (Andrew's Bridge). To replace such large alveolar defects with a fixed prosthesis would result in overly long pontic to contact the residual ridge and often resulting in over contoured and aesthetically poor restorations.

II. Andrews Bridge System:

Dr. James Andrews of Amite Louisiana (Institute of Cosmetic Dentistry, Amite, LA, USA) first introduced a fixed-removable prosthesis in 1966.[10]It is also called as Andrew's Bridge which consists of a fixed retainer and removable pontics.[11] The fixed removable partial denture has a pontic assembly that is removed by the patient for preventive maintenance. The retainers are either porcelain fused to metal (PFM) or full veneer metal, which are permanently cemented to the abutments. The retainers are joined with prefabricated castable bars and then cast together, or a prefabricated metal bar is soldered to the metal copings after casting. Two types of bars are used, a single bar to use anteriorly and a twin bar for posteriors. The removable pontics are retained by a clip on the intaglio surface which fits precisely over the bar attachment. Primary indication for this restoration are cases where the abutments are capable for supporting a fixed dental prosthesis (FDP) but the residual ridge has been partially lost due to trauma, congenital defects or other pathologic process, so that a conventional FDP would not adequately restore patient's missing teeth and supporting structures.[12] It is also indicated when the esthetic arch positioning of the replacement teeth is not possible using a conventional FPD due to difference in alignment of the opposing arches or segmental deficiency in a particular arch.

Clinicians often come across clinical situations with localized alveolar ridge defects. It has been reported that only 9% of the patients with the anterior teeth missing between the two canines did not have ridge defects.[13]

The most commonly seen defects are the combined Class III defects (56% of cases), followed by horizontal defects Class I (33 % of the cases).[13] Vertical defects were reported to be found in 3% of the patients.[14]Large vertical and horizontal bone defects pose a prosthodontic challenge as it is difficult to restore esthetics and function along with the complete closure of the defect. Such clinical conditions are not successfully treated by conventional fixed or removable prosthesis.

Indications

- Movable joint in fixed-removable bridgework.
- To provide movable joint in removable bridgework, semi removable bridges, semi removable pontic section.
- To stress break, free end saddles.
- To retain hybrid dentures.
- To stabilize unilateral saddles.
- As contingency devices for extension or conversion of existing fixed appliances.
- Pier abutments.
- Titled molars. Fixed partial denture's in severely misaligned abutments.
- Use in over dentures (different forms of retainer are bare, telescopic, use of auxiliary attachments).
- Fixed removable implant restorations. [15]

Contraindications

- In sick and senile
- Periodontitis
- Gross periodontal disease
- High caries rate [15]

III. Advantages Of Andrews Bridge System:

1) Andrews Bridge has both fixed and removable properties. Andrew's system provides maximum esthetics and optimum phonetics in cases involving considerable supporting tissue loss, jaw defects and when the alignment of the opposing arches and/or esthetic arch position of the replacement teeth create difficulties.
2) Another favorable property of the Andrews bar system is that it can be removed by the patient thereby providing access for maintaining hygiene around the abutments and surrounding tissues. Moreover, the pontic assembly can be relined as the ridge resorbs.[12]
3) Compared to a conventional RPD, the fixed-removable partial denture is more stable because it is totally tooth borne, and the occlusal forces are directed more along the long axes of the abutment teeth. [12]

4) Compared to a FDP, the pontic teeth are arranged during the esthetic try-in appointment. The flange of the pontic assembly can be contoured to improve comfort, esthetics and phonetics, and to resist torque during function. Replacement of the teeth along with an acrylic denture flange is an added advantage as it does not require a separate prosthesis for the gingival defect as in the FDP.
5) Andrew's Bridge has been adapted to implant prosthesis very well.[17]
6) Andrew's Bridge provides a better therapeutic and emergency treatment.[18]
7) Since the prosthesis is retained by a bar retainer, the normal perception of taste is maintained as the flange need not to be extended palatally for support.
8) Surgical correction of the defects using grafts and placement of implants is an expensive treatment plan for some patients. Surgical procedures also require patient's consent and compliance. In conditions, where conventional removable or fixed prosthesis is not a feasible option as in the case presented above, a third treatment option of Andrew's Bridge can prove successful in restoring function, esthetics, speech and closure of the defect.

IV. Disadvantages Of Andrews Bridge System:

1) The failures are mainly due to inadequate soldering. However, this was completely eliminated by attaching retainers to the bar in a single casting.
2) The need to frequently remove the prosthesis for cleaning and the associated loss of retention of the clips.
3) Tooth preparation is required.
4) Teeth with large and vital pulp are often at risk because of large amount of tooth structure that has to be removed.
5) Crowns with short height are usually unfavorable.
6) Their problems in free end saddle cases because of complexity of movement and their so-called stress breaking action, which is often theoretically unsound.
7) Expensive, time consuming and high technical expertise is also required .[15]

V. Conclusion

Andrews Bridge provides maximum aesthetics and optimum phonetics in cases involving considerable supporting tissue loss, jaw defects and when alignment of the opposing arches or aesthetic position of the replacement teeth creates difficulties. Another favorable criterion of the Andrew's bar system is that it can be removed by the patient for hygiene access. Surgical correction of the defects would require greater patient compliance.

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