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Review Article

Residual ridge resorption-an overview of management

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ABSTRACT

Residual ridge resorption is an inevitable process which affects the prosthodontic prognosis majorly. This review article aims to provide a brief overview toward the management of this condition using various treatment modalities, techniques and principles that are categorised under preventive, conventional and osseointegrated approach.

Keywords: residual ridge resorption, atrophic jaws, management of residual ridge resorption.

INTRODUCTION

The physiologic process of reduction in residual ridge following extraction of teeth has been described as a DISEASED state of the edentulous mouth marked by severe loss of bone. This has a cumulative effect leaving a diminished bone quantitativly and qualitatively [1].Residual ridge resorption is an inevitable process however the rate may vary [2]. Sequele of this condition is poor prosthodontic prognosis in terms of retention, stability, support and aesthetics [1].

Various classification systems are given for the diminshing bone. These include: atewood's classification [3], Lekholm And Zarb classification [4], Cawood & Howell Classification [5], American college of Prosthodontics classification based on bone height (mandible only) [6] etc.

Reduction in residual ridge can be assessed in terms of quantity and quality by various radiographic techniques [7] which include opg [8], lateral cephalograms [9], dental panoramic tomography [10] and cbct [11].

ETIOLOGY

The multifactorial etiology of resorption of residual ridges has been categorized by Atwood under various subcategories [12]:

Anatomic factors- residual ridge resorption is directly related to the anaomy of bone in terms of amount and density.[3,12]

Metabolic factor- this includes local and systemic factors. Local factors affecting bone resorption are Endotoxins, Osteoclast activating factor, Prostaglandins, Human gingival bone resorption stimulating factor, Heparin [13]. Systemic factors are those affecting metabolism of calcium, phosphorus and proteins, hormonal influences and genetics. [12]

Functional factors- the magnitude, direction, type and frequency of force applied to the ridges are directly related to the reduction of residual ridges. [12]

Prosthetic factors- this includes various materials, techniques and concepts applied in fabricating the prosthesis [12]

MANAGEMENT

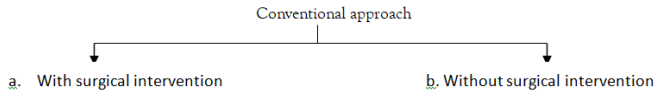
Management of residual ridge resorption

Preventive approach Conventional approach Osseointegrated approach

A. PREVENTIVE APPROACH

Acknowledging M.M Devan, all the necessary measures should be taken to improve the prognosis of the remaining teeth and the missing teeth should be replaced as soon as they are lost [14]. Various options for rehabilitation of partially edentulous state includes- rpds [15], cpds [16], implants [17], tooth supported overdentures [18], precision attachments [19] etc.

B. CONVENTIONAL APPROACH



Conventional approach includes the complete denture for rehabilitation. It can be done either after surgical intervention or without. Surgical intervention is required in cases of severly resorbed ridges to improve denture foundation.

a. Surgical intervention includes various preprosthetic surgeries like ridge augmentation, vestibuloplasty, distration osteogenesis, shelf reconstruction, secondary epitheliasation and grafting procedure. Surgical procedures although improve the prognosis of the denture but these may not be possible in every case such as

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underlying systemic diseases or unfavorable quality and quantity [20].

b. Without surgical intervention

Compromised ridges have always proposed to be a rehabilitative challenge as patients possess highly variable expectations. Fenlon M and Sherriff M suggested that patient satisfaction depends upon the quality of complete denture prosthesis fabricated [21].

To some extent these challenges can be overcome by following certain postulaed guidelines for fabrication of complete denture prosthesis

i. Impression making-

1. Following principles of snow shoe effect [22]

2. Bouchers selective pressure techniques emphasising pressure to be applied on the anatomic areas which can take load and releaving those which are anatomically not suitable [23]

3. Custom tray without spacer for final impression [24]

4. Modified impression techniques like-functional impression [25], admix [26], all green [27], cocktail [28], conventional [29] and elastomeric technique. Yadav b et al. compared all these impression techniques in terms of retention and concluded that functional impression techniques had highest mean value of retention while conventional and cocktail showed lowest result. [30]

ii. Jaw relation-

1 Neutral zone- ensuring balance between the forces by tongue and by labial and buccal musculature thus enhancing retention, stability and comfort of the prosthesis [31]

2. Optimum freeway space to be established as increase in vertical dimension leads to further increase in residual ridge resorption. [32]

iii. Teeth selection and arrangement

1. Posterior teeth selected should be narrow buccolingually and should be less in number so as to restrict the dislodging forces. [33-35]

2. Either balanced occlusion to enhance denture stability, or lingualized occlusion so that the occlusal forces are directed to the center of the alveolar ridges.[36]

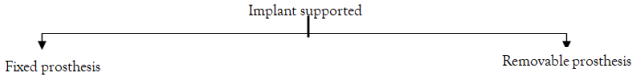
iv. Type of denture

1. Hollow denture- hollow denture is lighter in weight than the conventional denture thus decreasing further ridge resorption. [37]

2. Liquid supported denture- this serving as a soft liner when the prosthesis is at rest, reduces the resorption caused by ill fitting denture to an extent [38].

C. OSSEOINTEGRATED APPROACH

Osseointegrated approach is indeed better than the conventional approach in terms of enhanced retention, stability, function, comfort and patient satisfaction. [39]



Implant supported fixed prosthesis possess chalange for rehabilitation of atrophic jaws in tems of anatomical limitation, quality of bone, sinus pnematization in case of maxilla etc. (37). Various techniques have been proposed to overcome this-

• Improving the bone in quality and quantity by graft reconstruction. [40]

• Modifying implant in design and techniques- sinus lift procedure, zygomatic implants, pterygoid implants, mini implants, all on 4 concept and its variations- All-on-4: zygoma implants and quad zygoma, All-on-4 "V-4", All-on-4 shelf: Maxilla, All-on-4 shelf: Mandible. All-on-4 transsinus technique [41]

Implant supported removable prosthesis (RP4/RP5 overdenture) is considered where fixed prosthesis is not fesable as it is not affected by anatomical limitations and is more economical. [42]

CONCLUSION

There is not any evidence suggesting that the reduction of residual ridges have been reversed following extraction hence the clinician should have thorough knowledge of this diseased state and the principles involved in its management. Though implant is more predictable management option, conventional approach is still acceptable considering systemic condition, socioeconomic status and patient acceptance in developing countries.39

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