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Full Mouth Rehabilitation Utilising the Shortened Dental Arch Concept and Implant Supported Over Denture (A Case Report)

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Abstract:-
Traditionally dentists believe replacement of all missing lost teeth is necessary to meet functional demands of the patient and to preserve integrity of the masticatory apparatus. Not replacing all the lost teeth is believed to affect TMJ and supporting tissues of teeth. Dr MM De Van through his works and observations concluded that perpetual preservation of what is remaining is more important than replacing what is lost. Many times replacing minimum number of teeth or maintaining few teeth in oral cavity is enough to meet patient's esthetic and functional demands. Shortened Dental Arch (SDA) concept has evolved through the works of dutchprosthodontistArnd Keyser and collegues 1981,who studied the dynamics of having shortened dental arch and its impact on masticatory efficiency and on masticatory apparatus. Implant supported overdenture is also proved to be the most accepted treatment modality for mandibular edentulous arch. This case report is explaining the step by step approach to manage the maxillary arch with shortened dental arch (SDA) teeth supported fixed dental prosthesis and implant supported overdenture in mandibular arch.

Key Words:-full mouth rehabilitation, shortened dental arch concept, implant supported overdenture.

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I. Introduction:-

The shortened dental arch (SDA) concept was originally introduced by ArndKayser in 1981[1]. It is defined as having an intact anterior region but a reduction in the occluding pairs of posterior teeth. This approach appears to be cost-effective and has shown to improve the quality of life of patients. Implant supported overdentures have proved to be one of the best alternative options in prosthetic rehabilitation of various cases of edentulism[2]. They satisfy the patient's expections, improve quality of life with their long term serviceability and predictable outcomes.[3] Over the years, significant advancements have taken place in the implant systems and the methods of attachments. This paper describes a case report in which a completely edentulous patient was rehabilitated with an implant supported overdenture in mandible and a complete full mouth rehablitationutalisingshortened dental arch concept in the maxilla[4].

II. Case Report:-

A 46 year female patient was reported to the department of prosthodontics, Career Post Graduate Institute of Dental Sciences & Hospital, Lucknowwith a chief complaint of difficulty in eating and bad appearance since 1 year. Patient had undergone extraction of some maxillary teeth and complete mandibular teeth 1 year before. Patient had faulty fixed dental prosthesis in relation to upper maxillary anterior region. Patient had no relevant medical history. Intra-oral examination revealed missing 12,17,18,21,22,24,27,28 and

complete edentulousmandibular arch. Faulty fixed dental prosthesis in relation to 11, 21, 22, 23 and 16. On radiographic examination with Orthopantomograph showed sufficient amount of bone height and width for implantplanning in mandibular anterior region. Fig (3) and root canal treated 16,23Diagnostic impression of both maxillary and mandibular arches were taken and cast was retrieved fig (1). Record base and occlusal rim was fabricated on cast. Tentative jaw record and facebow transfer done.The inter-ridge distance was assessed. Diagnostic wax-up and teeth arrangement was done to evaluate the outcome of treatment plan. Routine blood examination revealed no abnormal findings.Advantages and disadvantages of different treatment options were discussed and patient was convinced for teeth supported fixed shortened dental arch prosthesis in upper jawand implant supported overdenture in lower jaw.

III. Treatment Procedures:-

First faulty fixed dental prosthesis was removed and oral prophylaxis was done. Crown lengthing was done in relation to 13, 11, 23 with dental laser. Endodontic treatment in relation to 11,13,14,15,25,26was done. Final impression and border moulding of mandibular arch was done and master cast was retrieved. Fig (4,5). Occlusal rim was fabricated on master cast. First the upper anteriorteeth were prepared followed by upper posterior teeth. Check impression was taken and cast was retrieved Temporization was done with the help of putty index of diagnostic wax up i.e indirect method.Final impression of maxillary arch was taken after complete finishing of prepared teeth. Master cast of maxillary arch was retrieved and die-cutting and die ditching was done.fig (6,7) Face bow and final jaw record was done.Fig (8,9,10) Teeth arrangement of mandibular arch and coping fabrication of maxillary arch was done in laboratory. Fig (11) Fixed dental prosthesis was divided in 3 segments first segment was joint bridge in relation to 11,12,13,21,22,23 for restoration of missing 12,21,22. Second segment was 14, 15, 16 joint crown. Third segment was joint bridge in relation to 24,25,26 for restoration of 24 (cantilever crown in relation to 24). After coping trial, shade selection and unglazed trial was done.Denture trial was also done in relation to mandibular arch.Final finished glazed prosthesis was cemented and processed lower denture was delivered to patient.fig (13). Recalled after one week. Patient was fully satisfied with the esthetics and phonetics.

Second stage surgery and loading of mandibular implant supported overdenture:-

Second stage surgery in mandibular arch was done after 3 month period of implant placement.fig (3). Gingival former was placed for 1 week. Stud Attachments was placed,fig (12) sufficient relief was made on the impression surface of mandibular dentures. Auto-polymerizing resin was mixed and o ring with housing was picked-up on mandibular denture.During pickup mandibular denture was closed in centric relation.Afterocclusal adjustment, post insertion and an oral hygiene instruction was given to patient. During 6 month follow-up period patient was satisfied with form, function and esthetics.

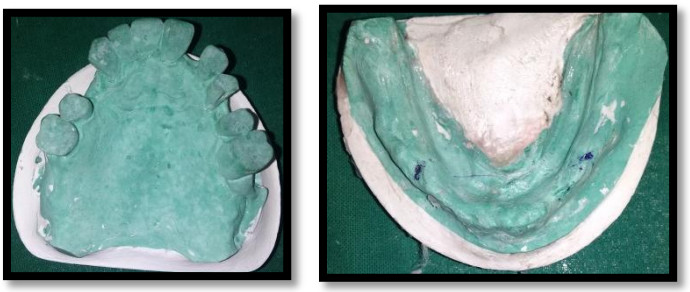
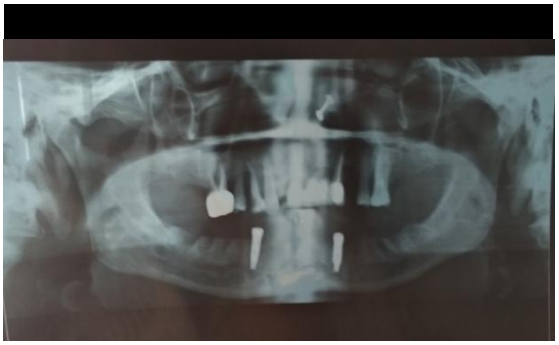


Fig 1 Diagnostic maxillary and mandibular cast



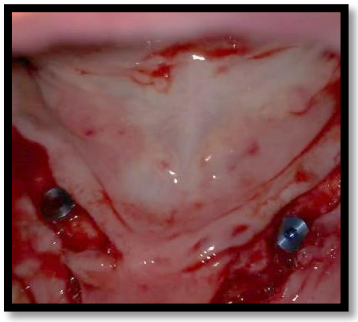


Fig 2 Post-op Orthopantomogram view Fig 3 Implant placement

Fig 4,5.Bordermoulding, final impression and master cast.

Fig 6.Final impression fig 7. Master cast after teeth preparation

Fig 8 Facebow record Fig 9 Facebow transfer Fig 10 Coping trial in patient mouth.

Fig 11 Denture try-in and unglazed trial.

Fig12.Gingival former, O ring attachment and Pick-up

Fig13. Final prosthesis after denture fabrication

IV. Discussion

A healthy smile is the symbol of the joy and love of the others. To overcome this problem shortened dental arch concept (SDA) has been widely accepted by the dental professionals , it is still not widely practiced. Many of the concerns surrounding SDA concept which were listed in the literature are maticatory inefficiency, occlusal instability, distal migration of posterior teeth, anterior teeth overloading and periodontal breakdown and TM joint dysfunction[1,9]. Watanabe et al study on the occlusal and TMJ loads in patients with shortened dental arches. They evaluated load on TMJ by voluntary clenching in patient with complete and shortned dental arch[6]. They reported that loading was less in patients with shortened dental arch. Witter et al study also found that the shortened dental arch is not a risk for temperomandibular dysfunction. They further evaluated use of free end saddle rpd in reducing symptoms of TMD and concluded that use distal extension rpds did not prevent signs and symptoms of TMDs. They also reported no improvement in function using RPDs. Kayser et al in their study found that there was no masticatory ineffeiciency reported in patient with four occlusal units[8]. They found masticatory efficiency decreased significantly in patients less than four occlusal units. They concluded that there were enough adapative capacity for patient to maintain adequate oral function in shortened dental arches. Masticatory inefficiency and occlusal instability were mainly reported in extremely shortened dental arch having 1 to 3 occluding units (one occluding unit compromises of one pair opposing premoalrs, a molar corresponds to two occluding units)[7]. Hence in SDA concept treatment is usually concentrated in preserving anterior teeth till premoalrs. In this case, challenge was to preserve integrity of the anterior teeth segment, which was done with endodontic treatment [10]. SDA concept renders itself as better treatment option as it meets most of the functional and esthetic demands of the patient and provides ease of maintenance both to patient and dentist[11]. Mandibular anterior region was selected for implant placementas it has sufficient bone in height and width in the interforaminalregion[12]. Two implants were planned as literature shows that there is not much difference between the use of 2 implants versus 4 implants for overdentures connected with stud allows accuracy of fit, parallel placement of attachments and use of heat activated resin to retain the attachments

V. Conclusion

Shortened dental arch (SDA)[2]concept offers solutions for minimum replacement of teeth which reduces cost and duration of the treatment. It avoids risk of over treatment of the patient. SDA concept has evolved strongly with evidences to back up itself as viable treatment option while considering treatment planning for replacement of the teeth[5]. Many dentist and prosthodontistconsider SDA Concept as important tool in treatment planning. This clinical report described the successful management of edentulous patient with implant supported overdentures[11] with stud attachment in mandibular arch and full mouth rehabilitation in maxillary arch(SDA)
It can become an excellent and profitable addition to every prosthodontic practice.

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