Bimaxillary protrusion is one of the most common dentofacial malocclusions in the South Asian population. Orthodontics and orthognathic surgery have been used to correct such deformities. However, orthodontic camouflage requires occlusal components to aid in the treatment whereas orthognathic surgery has a higher level of risk of fracture. Implant supported prosthesis have shown successful results in rehabilitation of maxillary proclination. This article presents a case report of a 40 year old patient with proclined teeth. The patient presented with Kennedys class I maxillary and mandibular ridges with horizontal overlap of 11mm. Alveoloplasty was done to reduce the maxillary excess and implant supported fixed prosthesis was provided. The final prosthesis had an end on relationship which provided lip competency and improved esthetics.

Keywords: bimaxillary protrusion, implants, maxillary arch rehabilitation

I. BACKGROUND

Bimaxillary protrusion is one of the most common dentofacial malocclusions in the South Asian population which presents with a proclined upper and lower dento alveolar component, steep mandibular angle, resting lip gap of more than 4mm associated with lip incompetence, anterior open bite and a convex facial profile. There is no fixed diagnostic tool or a concrete treatment plan for this malocclusion as it relays on various factors such as
the dentoalveolar component or the skeletal component, growing or non growing patients, systemic conditions or the patient habits.

Based on the type of presentation different treatment plans that includes orthodontics, dentofacial orthopaedics and orthognathic surgery have been tried with significant results. In a study done by Kinzinger, Orthognathic surgery led to the most marked profile changes compared to the other treatments.²

Surgical post treatment outcome is very promising for typical dentate patients with proclination but surgical management of conditions that presents with significant maxillary excess in partial or complete edentulous state can be very challenging. Edentulism or partial dentulism in the maxilla often leads to maxillary atrophy, requiring extra care when completing the osteotomies or splits.³ Maxillary bone after tooth loss becomes a difficult bone to manipulate surgically mainly due to anatomical factors such as thinning of the labial plates and loss of bone in the posterior maxilla due to residual ridge resorption and pneumatization of the maxillary sinus. During surgery there are chances of intra operative errors such as unfavourable fracture lines that can permeate to the base of the skull. Maxillary bone has also been attributed to vascular compromise causing complete or partial necrosis.⁴ The results of an orthognathic surgery aren’t predictable and most often the treatment has to be adjudged with further orthodontic stabilizers. The expense for these surgeries also range in the higher end that makes most of the patients to thwart this treatment.

Alternative treatments such as conventional complete dentures or tooth supported overdentures have been used but not upto the satisfaction of the patient. The degree of oral satisfaction of implant supported prosthesis was significantly higher than patients with conventional complete prostheses.⁵

Functional efficiency and esthetics is much better in implant supported prosthesis. Patients tend to have more confidence in social scenarios because of the elimination of various conventional denture limitations.⁶,⁷,⁸ Thus endosseous implants provide reasonably higher benefits for patients with maxillary proclination in partially dentate or edentulous state.

This article presents a case report of bimaxillary protrusion with a horizontal overlap of 11mm treated with alveoloplasty and implant supported fixed prosthesis.

II. CASE PRESENTATION

This article presents a case report of bimaxillary protrusion with a horizontal overlap of 11mm treated with alveoloplasty and implant supported fixed prosthesis.

A forty year old patient reported to department of prosthodontics with a chief complaint of proclined teeth. (Fig 1) On clinical examination the patient presented with Kennedys class 1 in both maxillary and mandibular arch. On intra oral evaluation failed FPD with respect to 11, 12, 13, 21, 22, 23 was seen. There was an increase in the horizontal and vertical overlap of 11mm and 8mm respectively. Patient had a convex profile with lip incompetence.

An esthetic facial evaluation with frontal facial analysis and profile analysis was done. Cephalometric evaluation, Panoramic radiographs were ordered.

PREOPERATIVE RECORDS:

The ortho pantomograph, lateral cepahalograph was ordered inorder to analyse the bone height and trace the sinus and mandibular canal.

LABORATORY PROCEDURE:

A model dental surgery was planned on the casts of the patient to analyze the amount of reduction required to attain a desirable profile. For this an orientation jaw relation was recorded and the casts were mounted in a semi adjustable articulator.

Arbitrary reduction of the tooth, after measurement of the teeth, was done till a desired outcome of the profile was attained. An acrylic stent was fabricated using clear heat cure clear acrylic.

SURGICAL PROCEDURE:
The pharmacological protocol commenced one day before surgery for 8 days. (500mg amoxicillin) The surgery was performed with local anaesthesia. A full thickness flap elevation was carried out along with extraction of the teeth and the prosthesis (Fig 2). Excess flap was excised. Alveoloplasty was done carefully so as to not cause any unfavourable exposure of the nasopalatine canal. A surgical stent was then used to confirm the reduction.

Two anterior implants (3.5/9.5mm) were placed in the canine areas and two posterior implants (3.5/9.5mm) placed in an inclined position near the molar area. Bone augmentation was done using the bone chips collected from the patient mixed with allograft (0.5g of 0.25-1mm particles Rocky mountain Tissue Bank). A slow resorbable collagen membrane (Periocol GTR) was then placed and the site was sutured using 3.0 Vicryl suture.

Immediate postoperative OPG was ordered in order to confirm the placement.

Patient was provided with a post-surgical analgesic treatment (aceclofenac-50mg) and antibacterial mouthwash (chlorhexidine gluconate 2%) was prescribed.

Patient was recalled after three months to verify healing. A clinical assessment of the lateral profile was made (fig 3). Patient was provided with an interim maxillary denture with tissue conditioner for esthetic purpose only. Patient was then recalled after 6 months of healing period for second stage surgery. Implant level impressions were made using Polyether in acrylic custom trays with long transfer coping to provide dimensional accuracy. Final casts were poured. Abutment selection was done using the abutment selection kit provided by Ankylos. Angulated abutments were chosen and torqued in the patients mouth.

A temporary prosthesis was made out of heat cure tooth coloured acrylic (DPI) with an ovate pontic design. Sequential increase of the ovate design was done over a period of 6 weeks in order to contour the soft tissue to a scalloped gingiva. (Fig 4)

Patient was then recalled for the testing of the metal framework in the mouth. A centric relation record was registered with the metal frame in the mouth using Aluwax.

The porcelain was fabricated and the occlusal contacts were evaluated. The abutments were torqued to 25n/cm². The screw access holes were sealed with composite resin. The metal ceramic final prosthesis spanning up to the second premolar region (shortened dental arch) was delivered using zinc phosphate. (Fig 5)

Oral hygiene instructions were also provided to the patient. Patient was recalled for follow up routines. A six-week conditioning phase followed, during which the patient was instructed to avoid overloading the implant by following a soft diet. Posterior Mandibular ridge rehabilitated with implants would have provided a better result. Due to treatment cost and limited time, a cast partial denture was provided for the mandibular arch as per the patient’s request.

Although we could only achieve edge to edge bite in the anterior teeth since the mandibular teeth was proclined, we did achieve a significant esthetic outcome. An 18 month follow up OPG showed stable implant-bone interface. (Fig 6) A comparison was made of the lateral profile of the patients lateral cephalograms pre and post rehabilitation which should a significant improvement.

### III. INVESTIGATIONS

**Radiological investigations:**

Ortho pantograph was ordered inorder to analyse the bone height, trace the sinus and mandibular canal;

Lateral cephalograph for the lateral skeletal profile.

CBCT sections were taken to track the vital structures and plan the position of implants by virtual placement of implants.

**Hematological Investigations:**

Bleeding time, clotting time, Prothrombontime, Platelet counts, Haemoglobin percentage, total leuckocyte counts, erythrocyte sedimentation rates were identified. The glucose levels were also estimated. **Radiological investigations:**
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IV. DISCUSSION

Hematological Investigations:

Bleeding
time,clottingtime,Prothrobontime,Plateletcounts,Haemoglobinpercentage,totalleuckocytecounts,erythro
cyte sedimentation rates were identified .The glucose levels were also estimated.

TREATMENT

After thorough investigations  the following treatment plan was formulated:

Extraction of the failed prosthesis.

Immediate implant placement .

Augmentation of the defective ridge .

Prosthetic rehabilitation after 6 months of healing period  with shortened dental arch .

Endosseous implants can be a boon to patients who have extreme maxillary prognathism and who cannot undergo an orthognathicsurgery.Studies showed successful outcome of immediate placement of implants following dental extraction and alveoloplasty.9 Alveoloplasty facilitates bone reduction to provide a restorative space to accommodate prosthetically driven placement of implants.In this case alveoloplasty was done till we attained the planned profile following which four implants were placed.10

The edentulous maxilla presents a challenge to the clinician mainly due to available bone quantity and edentulous ridge topography. It has higher trabecular bone pattern and usually D3 and D4 density.11,and because of the pneumatisation of the sinus floor there is very less bone to work with. Inclining the implants helps provide more implant to bone contact area without sinus lifts or grafting. Ankylosaccomodates abutment angulationupto 30° .

A healing period of six months provides an adequate window for osseointegration. A shortened dental arch was provided so as to provide maximum functional with placement of minimum number of implants.12 Post operative OPG showed intact crestal bone levels.Ideal emergence profile is critical for improved esthetics. Contouring flat thick gingival tissue to a scalloped gingiva eliminated black triangles giving the prosthesis a natural look.13 This case report report showed that Implant supported fixed dental prosthesis for abimaxillaryproclination improved facial profile, lip competence and gave a whole new level of confidence for the patient. Albeit the posterior maxillary arch showed slight recession due to thin gingival biotype,this treatment achieved optimum results with lesser expense and time, and lesser morbidity to the patient compared to an orthognathic surgery. Patient was unwilling to undergo another implant surgery in the mandibular region,which we believe ,could have given a better occlusal scheme as opposed to the cast partial denture. Patient was advised to return for regular follow ups. A five year old follow up xray showed that the crestal level being maintained ,The implants were surrounded by stable crestal bone levels . A comparison was made of the lateral profile of the patients lateral cephalograms pre and post rehabilitation which should a significant improvement.

Limitations and Conclusions.

There are various shortcomings of this procedure that has to be addressed.

The implants were deliberately angulated inorder to avoid augmentation.

The mandibular ridge was rehabilitated with a cast partial denture ,which is not a definitive prosthesis.
V. CONCLUSIONS:

Implant supported prosthesis is an ideal treatment protocol for bimaxillary protrusion patients who are not ideal candidate for an orthognathic surgery. Limited resources and patient compliance can falter the treatment plan. Prosthetically driven implants with lateral augmentation of both the maxillary and mandibular ridges would provide long lasting success. Endosseous implants can be a boon to patients who have extreme maxillary prognathism and who cannot undergo an orthognathic surgery. Studies showed successful outcome of immediate placement of implants following dental extraction and alveoloplasty. Alveoloplasty facilitates bone reduction to provide a restorative space to accommodate prosthetically driven placement of implants. In this case alveoloplasty was done till we attained the planned profile following which four implants were placed.

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A healing period of six months provides an adequate window for osseointegration. A shortened dental arch was provided so as to provide maximum functional with placement of minimum number of implants. Post operative OPG showed intact crestal bone levels. Ideal emergence profile is critical for improved esthetics. Contouring flat thick gingival tissue to a scalloped gingiva eliminated black triangles giving the prosthesis a natural look. This case report showed that Implant supported fixed dental prosthesis for abimaxillary proclination improved facial profile, lip competence and gave a whole new level of confidence for the patient. Patient was unwilling to undergo another implant surgery in the mandibular region, which we believe, could have given a better occlusal scheme as opposed to the cast partial denture. Patient was advised to return for regular follow ups. A five year old follow up xray showed that the crestal level being maintained, The implants were surrounded by stable crestal bone levels. A comparison was made of the lateral profile of the patients lateral cephalograms pre and post rehabilitation which should a significant improvement.

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REFERENCES

Figures:

Figure 1: Frontal facial profile at rest.

Fig 2: Implant placement (top) & Bone augmentation in the buccal aspect of left quadrant of the maxillary arch after implant placement.

Fig 3: Frontal & lateral profile post surgery
Fig 4: above: gingiva pre-provisionals Below: gingiva post 6 weeks of provisions

Fig 5: Final prosthesis with ideal papillary fill.

Fig 6: Follow up OPG.