VOLUME - 12, ISSUE - 02, FEBRUARY - 2023 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Orthodontology

A CUSTOMISED 3D CONSTRUCTION BITE

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KEYWORDS :

INTRODUCTION

The most common appliance used for the management of skeletal class II malocclusion in growing patient is Twin Block, which was first described by William Clark in U.K year of 1977.[1]

The registration of construction bite or working bite is most important factor for fabrication of functional appliance, which relates mandible to maxilla in all three planes.[2]

The degree of activation built into the appliance, aiming to reposition the mandible to improve the jaw relation is determined by construction bite. To provide a positive proprioceptive mechanism the degree of activation should stretch the muscle of mastication sufficiently.[3]

The most common reason for the failure of functional appliance is incorrect posturing of the mandible during the registration of construction bite.[4]

This article describes a new method for three dimensional registration of construction bite.

METHOD OF REGISTRATION

The most commonly used method in most of the countries is the traditional wax bite registration, other instruments are also available as Project bite gauge/blue bite gauge/ Exactobite[3], George gauge[2] and 3D bite[5].

Material

Most commonly used material for the construction bite is modeling wax. Silicon putty may be used as an alternative to wax but hardness of the material make it more difficult to locate the models correctly in construction bite.[3]

General Guidelines: -

There are some guidelines which is followed by clinician to

Take Construction Bite:-

1. Rule of 10 – Total horizontal and vertical should be equal to 10.[4]
2. Clinical studies have shown that orthopaedic force should be in the range of 400-600gms for the dentofacial orthopaedics.[3]

Graf (1961, 1975) & Witt & Komposch (1971) have shown 1mm anterior displacement the force of stretched retractor muscle amount to approximately 100 grams.[3]

According to Wit vertical opening of 2-4mm will develop force of 70-175grams.So overall advancement is such that it can develop force in the range of 400-600grams or above.[6]

DESCRIPTION

Acrylic Template: -

We are using an acrylic template which has incisal table, lateral wings, handle and upper and lower stopper as seen in fig 1 and 2. The thickness of incisal table should be as minimum as 2.5 to 3mm.Lateral wings should be as thin as 1-1.5mm, with 2-3 holes each side to enhance the adaptation of wax. Handle should be of the same thickness as incisal table and will have one central hole which will help us in marking midline. We are using a self-made mould for replicating the acrylic template.

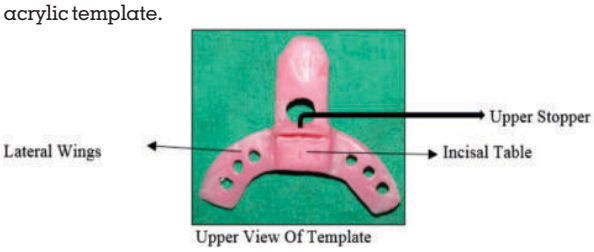

Figure 1

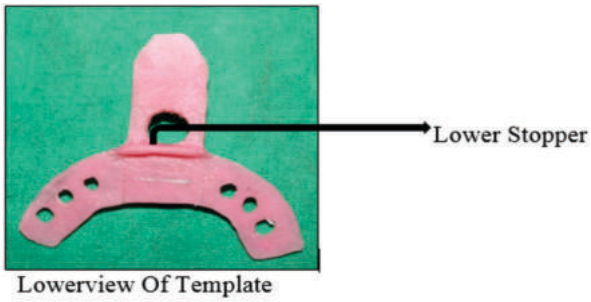

Figure-2

Registration Technique: -

Rules For Horizontal Advancement

1. Three quarters of mesio-distal width of first permanent molar.[6]
2. Rule of thumb –construction bite should always be atleast 3mm posterior to most protrusive position.[6]
3. 2/3rd rule of condylar rest.[7]
4. According to Rocabado 70% advancement of mandible of the maximum protrusion or the total joint displacement is physiological for TMJ movement.[3]

According to William Clark upto 10mm of overjet in Class II div I patient, can be corrected by single advancement considering maximum protrusion of 13-14mm in growing patient.

We followed the Rocabado principle for horizontal advancement.

Case: -

Patient by name Nitya Gowda, age 12 years reported to V S Dental College, Bangalore, to the Department of Orthodontics and Dentofacial Orthopaedics with a chief complaint of

forwardly placed upper front teeth.Patient was diagnosed as Angle's Class II division I malocclusion with an overjet of 12mm and overbite of 8mm as seen in figure 3

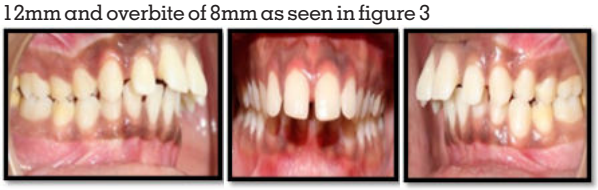

Figure 3

Method: -

Measure the maximum protrusion of the patient and take 70% of that. Develop an advancing acrylic stopper on the lower part of template as seen in figure 4 & 5, if you are not planning for edge to edge construction bite

Example: -

Case as shown above have overjet of 12mm and maximum protrusion of 12mm, so we develop an advancing stopper 4mm behind from the lower stopper of the template so that patient can advance the mandible by 8mm.The advancing stopper should not exceed more than 2-4mm in width because it can cause change in the mandibular movement.

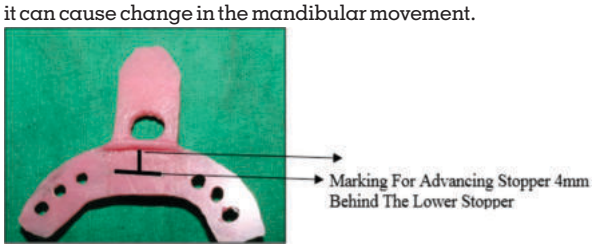

Figure 4

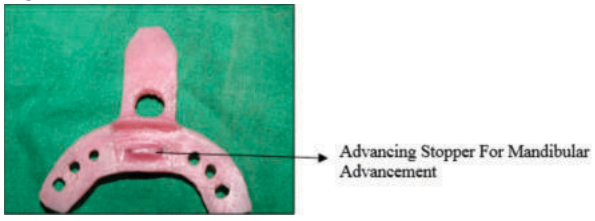

Figure 5

Transverse /midline Consideration

Generally, construction bite should follow the resting position mandible. If upper and lower midline are co-incident in rest and occlusion the midline should line up in same relation during forward posturing. If there is dental midline discrepancy due to malposition and shifting of teeth it can be corrected by fixed appliance. If there is dental midline discrepancy construction bite should line up the midline of maxilla and mandible. If there is actual lateral translation of mandible than we should match the jaw midline.[4]

Method: -

Place the template in the patient mouth. Mark the dental midline or skeletal midline according to patient. Clinical presentation on upper and lower stopper.

As seen in the case shown above patient has no midline discrepancy so we have marked the midline of the patient on upper and lower incisor stopper as seen in figure 6

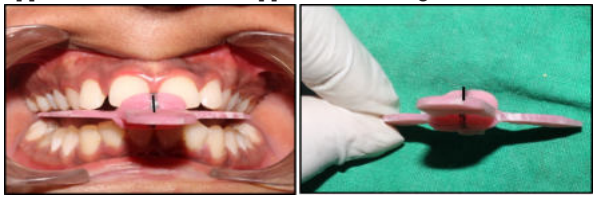

Figure 6

Vertical

Most confusing among all three advancement of mandible. It depends on

1. Kind of dysgnathic or dysplastic problem
2. Development state, age and sex of the patient
3. Freeway space[4]

According to Clark it should be thick enough to open the bite slightly beyond the freeway space as it is necessary to ensure that the patient does not posture out of the appliance when the mandible is in rest position. On average,block should be 5-6mm thick in the 1st premolar or deciduous 1st molar region & 3-4mm in molar region. This thickness can be achieved in Class II Div I deep bite case by registration of 2mm vertical inter-incisal opening.[3]

Method

Place the template in patient mouth, orient the upper midline with marking on upper incisal stopper. Guide the patient to bite in front of advancing stopper if it is stepwise advancement or near the incisal stopper if it is edge to edge as seen in figure 7. Measure the vertical opening in premolar and molar area as seen in figure 8. Do the necessary trimming or add the acrylic to the incisal table if required. Trimming is easier so we keep the thickness of incisal table 2.5-3mm and will trim according to the requirement.

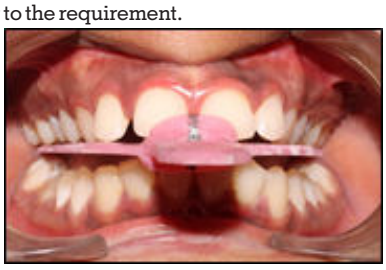

Figure 7

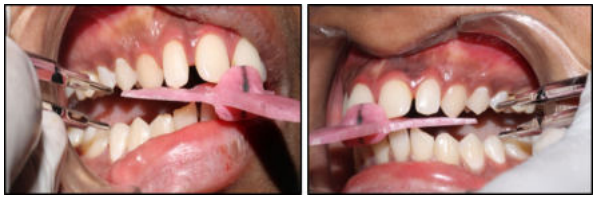

Figure 8

Steps Involved After Fabrication Of The Template: -

Take the wax sheet, divide it in two parts as seen in figure 9. Dip in warm water roll on each side of lateral wing usually the thickness of lateral wing with wax should be 10mm as seen in figure 10.Insert the template on maxillary arch by orienting the midline with marked midline on incisal stopper as seen in figure 11. Guide the mandible at the desired position. It is easier for the patient to bite at the desired position because patient can feel the lower acrylic stopper.

Take the construction bite out of the patient mouth. Trim the excess wax. Reinsert in the patient mouth as seen in figure 11. Store the construction bite and send it to the lab for the fabrication of functional appliance.

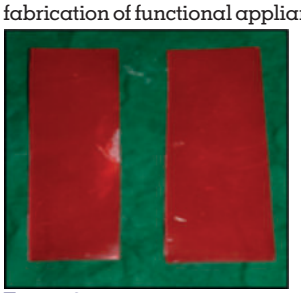

Figure 9

Figure 10

Figure 11

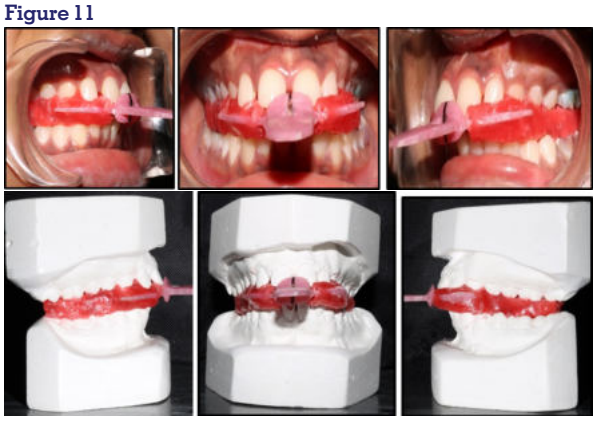

Figure 12

CONCLUSION

There are different methods of registering the construction bite which have their own pros and cons. We find this method easy, economic, well tolerated by the patient, more accurate and less time consuming.

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