

Beautiful Smiles with Functional Occlusal Harmony

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Abstract

The purpose of this article is to highlight the importance of relationship of teeth with masticatory system. Masticatory system includes TMJ, muscles of mastication and teeth. Treatment plan is designed after evaluation of masticatory system; collecting detailed data of records and facebow mounted casts in centric relation. Success of occlusal treatment depends on anterior and canine guidances as they protect the posterior teeth. It is important to have absolute harmony between all the three components of masticatory system while doing any dental treatment.

Keywords: Masticatory System; Facebow; Centric Relation; Anterior and Canine Guidances.

Introduction

90% of cases that fail, fail not during the restorative phase but in the treatment planning phase. "Failing to Plan is Planning to Fail" .

You cannot be effective in making the best treatment decisions without facebow mounted casts in centric relation.

To evaluate TMJ, determining centric relation is very important. Bilateral manipulation to find "verified centric relation" or "adapted centric position" is crucial in diagnosis and treatment planning of the whole case. Centric relation is the only condylar position that permits an interference free occlusion.

Treatment planning in detail helps the dentist and the patient to work out every detail in provisional

stage and "Ensures Error Free Finals".

Case Report

This case which is presented is a speciality patient. She is concerned about front teeth becoming shorter and also sensitivity on her back teeth. Patient had composite laminates done on all upper front teeth, 47 was missing, old crowns seen wrt 33,35,36, 37,38, 45,48. Severe wear, dentin exposed on all upper posterior teeth and on all lower teeth.

A facebow relates the upper arch to the condylar axis. Transfer to the articulator maintains that relationship of the upper cast to the axis on the articulator. The lower cast is then mounted with the Centric Relation bite record.

So it is also related to the correct axis. Even The Most Perfect Centric Relation bite record is inaccurate if used without relating it to the condylar axis. A Facebow is A Necessity For Accuracy.

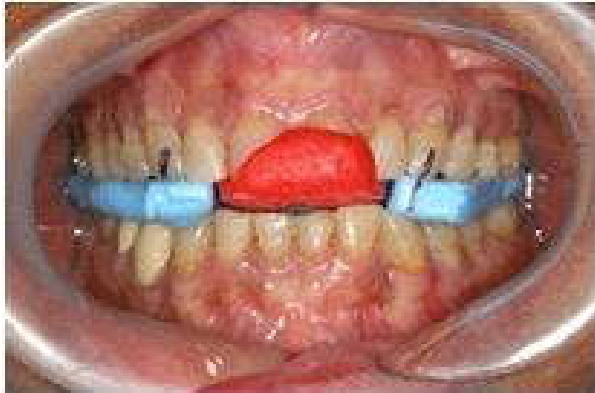
(Centric relation record and facebow pictures are of other patient as we could not take the pictures for the presented case.)

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Picture 1: The Centric relation record



Picture 2: Facebow

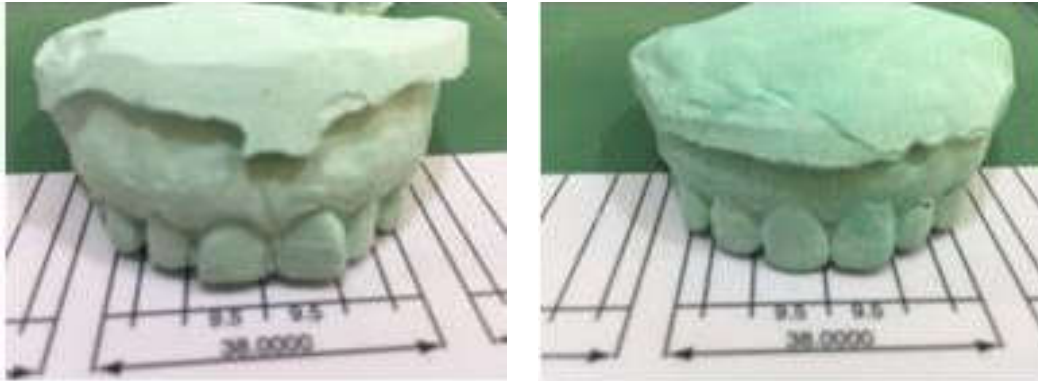
Diagnostic Pictures



Picture 3:



Picture 4: Articulated Models Using Kinematic Facebow



Picture 5: Anterior Teeth Wax up's on Articulated Models

Anterior Guidance

- Principle role of anterior guidance is protecting posterior teeth
- Success of occlusal treatment depends on anterior guidance
- Incisal edge position is important as it reflects difference in envelope of function. So, customize incisal edge position.

Canine Guidance

- The principle role of canine guidance is to protect posterior teeth from lateral stresses.

Posterior Teeth Wax Up's on Articulated Models

Decided to keep vertical dimension of occlusion at the first point of contact (which is upper right 2nd molar in this case) and use that space to do additive equilibration.

Check equal intensity centric stops on all teeth.

Check balancing side and working side interferences on both sides and clear all interferences.

Finally, harmonize the anterior guidance.

- Check for complete posterior teeth disclusion on protrusion

- Check for canine guidances on both sides
- Once wax up's are ready, transfer them as provisionals into patient with indices made on wax up's.

Provisionals

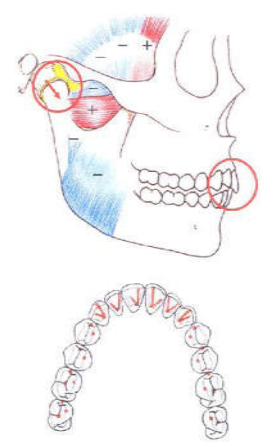
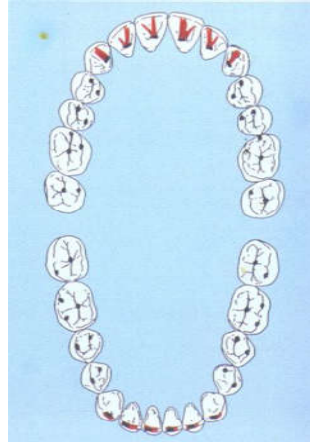
Waxed up models are used to fabricate indices using polyvinyl material. Provisionals are fabricated by direct transfer in the patient's mouth.

Provisional Check List

1. Refine and verify incisal edge position.
2. Establish centric holding stops.
3. Lip closure path.
4. Lip support in the line with alveolar bone.
5. Determine incisal edge length (using the smile line)
 - a. Rest position, 'E' position
 - b. 'F', 'V' sounds
6. Establish lingual contours in harmony with the envelope of function.
7. Evaluate 'S' sounds.



Picture 6:



Picture 8



Picture 7

Picture 6,7 and 8: Posterior Teeth Wax Up's on Articulated Models

Treatment Sequencing

Stage 1	Stage 2	Stage 3
Scaling Caries control	Reshape lower anteriors Extraction of 38,48 Occlusal equilibration	Mandibular anteriors (Ceramic Laminates) Maxillary anteriors (Ceramic Laminates) Lower Posteriors (Crown and Bridge work wrt 35,36,37,45,46-onlay) Composite restorations on all upper bicuspid & molars wrt 14,15,16,17,24,25,26,27.

Final Tooth Preparation

Check list of required items:

Matrices made on final provisionals.

- Incisal Matrix → Upper
 → Lower
- Labial Matrix → Upper
 → Lower
- Occlusal matrix → Upper
 → Lower

Upper & Lower full matrix - for transfer of temporaries.

- 1) Burs → Chamfer
 → 3-grid preparation burs

Specific set of matrices are fabricated from the waxed up's to be utilized while doing tooth preparations which will aid us to do conservative preparations.



Picture 9:



Restoration & Material Selection

Type of Restoration	Material Used	Tooth no's
Veneer	E-MAX-CAD-Lithium Disilicate (Strength-360 MPa)	11,12,13,14, 21,22,23,24, 31,32, 41,42,43
Full coverage crown	E-MAX-PRESS-Monolithic (Strength-400MPa)	33,45
Bridge	Monolithic Zirconia with ceramic layering (Strength-1200 MPa)	35,36,37
Onlay	E-MAX-PRESS-Monolithic (Strength-400MPa)	46
Composites	Nano Hybrid Composites (Strength-270MPa)	15,16,17,25,26,27, 34,44

Picture 10:



Picture 11:

Lab Communications

Finals/Definitive Restorations

Now we can provide the lab with all the information required:

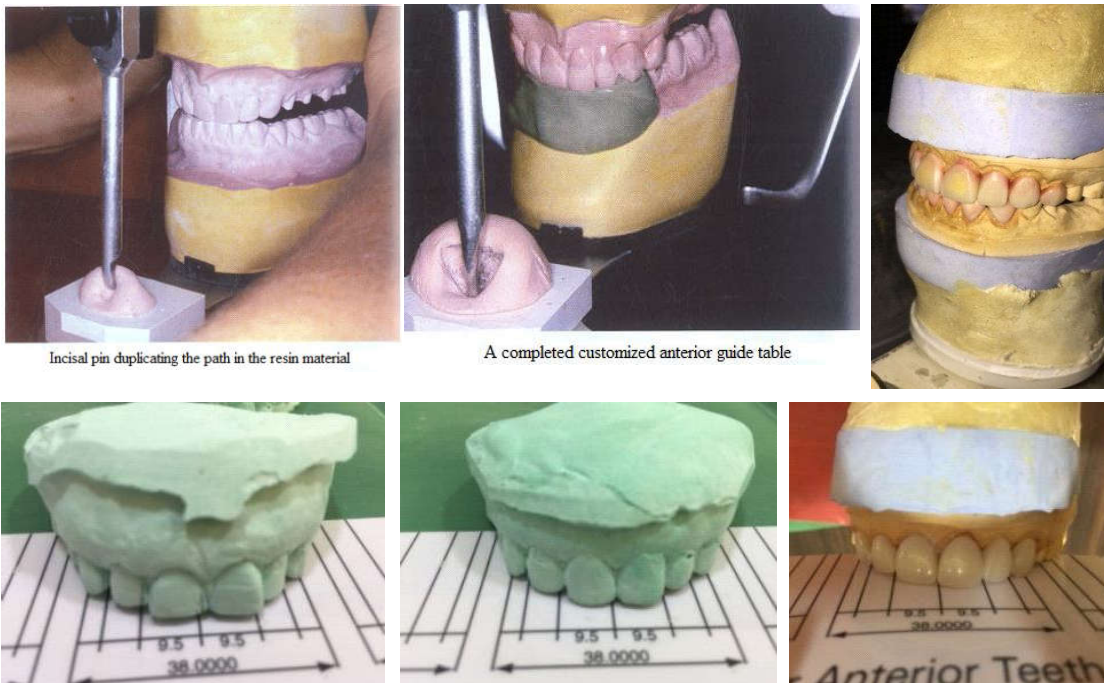
1. Upper and lower rubber base impressions.
2. Articulated models of final provisionals.
3. Incisal edge matrix (using putty on the mounted provisional restoration, make an incisal edge matrix)

This will help the lab to reproduce the horizontal and vertical incisal edges of anterior teeth.



Picture 12:

4. Custom anterior guide table: A small ball of resin or composite is placed on incisal table with lubricated surface. The provisional models are then moved in all excursive movements, which will capture the guidances and lingual guidance surfaces of finally worked up provisionals.



Picture 13:

Final Cementation

When dentist receives final restorations from the lab, dentist should receive back the two key indices - Incisal edge matrix, anterior guide table.

If all protocol is followed, there is absolutely no stress about patient's acceptance and expectations not being met. Restorations can be presented with confidence and very little adjustments.

Try in of Final Restorations

1. Removal of provisionals and isolation of teeth.
2. Try in the restorations individually.
3. Try in the restorations all together.

4. Try in the restorations with a cement simulator (try in paste of same shade as final adhesive resin cement)

5. Evaluation :-

Have the goals of esthetics and function been met?

Check with the photographs whether the desired goals are met?

Delivery of Final Restoration

1. Removal of provisionals and isolation of teeth.
2. Try in restorations individually.
3. Try in the restorations all together.
4. Evaluation- Have the goals of esthetics and

function been met?

5. Preparation and Conditioning of the teeth and restorations

Preparation of the restoration using 5% Hydrofluoric acid etchant.

IPS EMPRESS- for 60 sec

IPS E-MAX - for 20 sec

No etching required for zirconia

Conditioning of the restoration using primer (silane)-all restorations for 60 sec.

Preparation of tooth using 37% phosphoric acid (etchant).

Conditioning of tooth using bonding agents (Primer)

6. Bonding, cementation and clean up.

Applying bonding agents on tooth (adhesive and helio bond).

Cementation of - Veneers using light cured base (transparent shade- Variolink N).

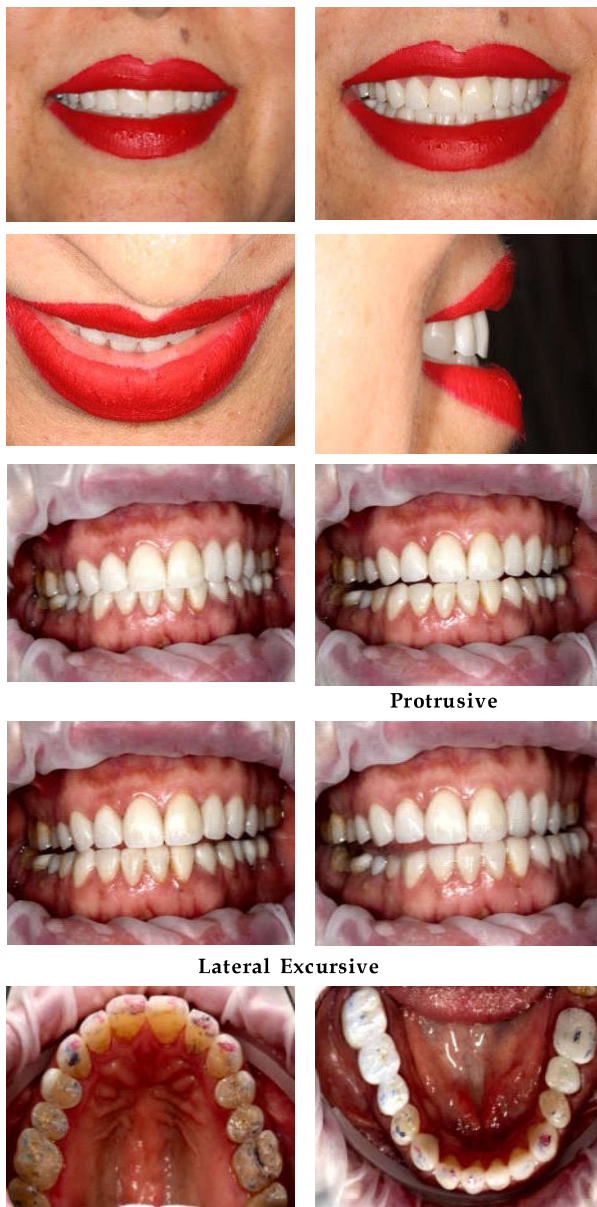
- Onlay using multilink N.

- Crown using multilink N

- Zirconia bridge using multilink N.

7. Occlusal verification

8. Review after 48 hour's post cementation



Conclusion

By following a disciplined protocol and going through the whole process in a systematic step wise manner, we can reach our destination without errors. Being able to complete patient's work with good esthetic result which is predictable and durable makes it worthwhile for the patient and the dentist.

Acknowledgement

I would like to express my sincere thanks to Dr. Peter E. Dawson who inspired me.

Dr. Peter E. Dawson, D.D.S. is considered to be one of the most influential clinicians and teachers in the history of dentistry. He authored the best selling dental text, Evaluation, Diagnosis and Treatment of Occlusal Problems, which is published in 13 languages. Dr. Dawson is the past president and life member of the American Equilibration Society, a past president of the American Academy of Restorative Dentistry and the American Academy of Esthetic Dentistry.

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Picture 14: