

# Practical Occlusion for Everyday Dentistry

by Jose-Luis Ruiz, DDS, & Renee Paul, DDS

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## Educational objectives

Upon completion of this course, participants should be able to achieve the following:

- Understand why it is so important to treat occlusal disease if we want our patients to keep their teeth for a lifetime.
- Know how to implement occlusal treatment into an overall oral treatment.
- Know the seven signs and symptoms of occlusal disease.
- Understand why and how to use a semi-adjustable articulator for more advance diagnosis.
- Understand when to take a CR bite.
- Understand a simple and practical system for occlusal equilibration.

The subject of occlusion and the diagnosis and treatment of occlusal disease (OD) should be of great importance to every dentist, because everything we do has an effect on our patients' occlusion and everything we do is affected by our patients' occlusion. Every specialty and every procedure in dentistry is affected by occlusion, and yet the profession seems to be reluctant to address OD on a routine basis. In the case of the restorative dentist, the number-one reason why restorations fail or have post-operative sensitivity is occlusion. For this reason it is of great importance to properly adjust occlusion after placing any restorations, but it is equally or even of greater important to diagnose occlusion instability before we start treatment – in particular extensive restorative treatments. As responsible



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clinicians we have to diagnose occlusal problems not just when we plan to do restorations on our patients, but also when there are signs and symptoms of OD. OD is an enemy to our patients' long-term dental health and tooth retention, and some experts have expressed that OD is the number-one reason why patients lose their teeth.<sup>i</sup> It is also one of the three main enemies of teeth along with caries and periodontal disease. These three items as well as medical history are part of the comprehensive diagnosis process. This article discusses OD and the importance of diagnosis and understanding the seven signs and symptoms of OD to assess each of your patients, and how to integrate occlusal diagnosis and occlusal therapy into a busy general practice.

### **If OD Is So Important, Why Not Diagnose Every Patient?**

Although occlusion is important, dentists appear reluctant to diagnose and treat OD.<sup>ii</sup> This might be due in part because dentists feel unprepared to diagnose and treat OD. Dental school curriculums offer little useful training in occlusion. After dental school, many of the continuing education courses available are cumbersome, expensive and are often geared toward extensive oral rehabilitation with little focus on how to treat and implement diagnosis in everyday dentistry. Another obstacle is that most available occlusion courses tend to combine occlusion with joint disorder (JD) or TMD, making the curriculum difficult, large and often discouraging to dentists who do not wish to treat complicated TMD disorders. Separating the treatment of occlusion from the treatment of TMD and facial pain makes learning occlusion more practical and easier to implement into their practices. Clinical dentists should be experts in occlusion and should be able to do a differential diagnosis for TMD and facial pain, but the treatment of TMD can be left to individuals who wish to become experts by further education. Patient education is also key in helping our patients understand their condition, accept treatment and take responsibility for their post-operative care. When we start treating OD we improve the quality of care and overall health of our patients as well as tapping into a huge generator of production and income.

### **The Occlusal Disease Diagnosis System**

OD is a generic term denoting any destructive process evident in any part of the masticatory apparatus (joint, muscles, periodontium or teeth), as a consequence of occlusal disharmony or parafunction.<sup>iii</sup> The "Occlusal Disease Management System" was developed by the authors to simplify and mainstream the diagnostic process using methodic and incremental stages based on severity and patient willingness to accept responsibility and to treat their occlusal/TMD pathology. This allows even a busy dentist to be able to implement occlusal diagnosis and therapy on all patients.<sup>iv</sup>

### **Stage 1 Diagnosis, Using the Occlusal Disease Diagnosis System**

The first stage of the system is a basic occlusal and TMJ screening performed during every comprehensive examination to screen for signs and/or symptoms of OD. Some of the data is gathered by our office team to better manage clinical time and simultaneously educate our patients on dental conditions including occlusion. A brief dental history form is filled out by the patient to allow for self disclosure of conditions which might be related to OD such as headaches or migraines, grinding or clenching, and jaw pain. With the above information the dentist can then

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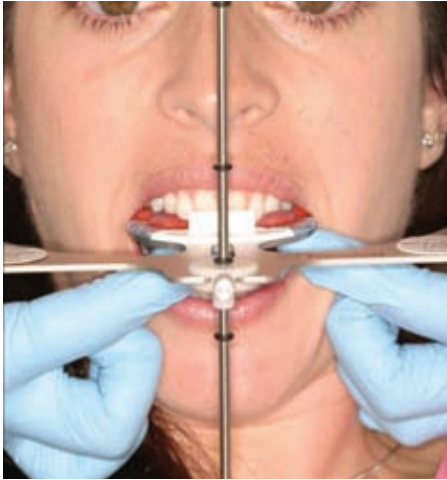


Fig. 1: The easy-to-use Kois face-bow (Panadent)

PATIENT NAME		DATE
Please answer by checking, circling and/or describing all that apply:		
YES	NO	PLEASE CIRCLE
1	2	1-101
3	4	1-102
5	6	Left
7	8	Right
When did you first notice the jaw pain?		
When is the pain worse? Mornings Evenings At Night		
Do you have tooth sensitivity to: Cold? Air? Chewing? Toothbrush?		
Do you have clicking, popping, or grating noises in your jaw joint? Which side? Left Right		
When did you first notice the noise?		
Does your jaw problem interfere with your normal activities?		
Are you taking any medications or any medication that may affect muscle activity or cause dry mouth?		
Have you ever had a severe blow or trauma to the head, neck or jaw?		
Do you have difficulty chewing? This is a result of: Pain in joint Pain in teeth Limited opening Other (specify)		
Has your mouth ever locked open so you were unable to close it? When?		
Are you aware of clenching and/or grinding your teeth? (Please circle)		
Do you think nervous tension seems to affect this problem?		
Have there been recent changes in your lifestyle or other stressful events?		
Have you had problems with other joints? Feet?		
Have you had orthodontic treatment? When?		
What are your main goals for "Occlusal" & TMJ treatment?		
CLINICAL EVALUATION		DATE
1. Lead Tret Pain	2. Initial Contact (Months)	3. Occlusal Slide
4. Ant. Guidance	Carine Guide: R: L:	
5. Max Opening	Lat. R: L: Pain On: Opening: R: L:	
6. Fremitus (Mobility) 2+	7. CDHypersensitivity (CDH)	
8. TMJ Noise R: L:	Envelope Violation	Ant: Post:
9. Cross Bite:	Open Bite:	Class: I II III IV
10. Perforator Bias:	Class: I II III IV	Envelope Violation: Ant: Post:
MOUNTED CAST EVALUATION / Specify Tooth, Surface, Location		
CR Interference:	Lat. Interference:	Protrusive:
Severe Near:	Attraction:	
TRIAL OCCLUSAL EQUILIBRATION (Specify tooth, surface, location)		
Initial Incisal Pin Setting:	Final Pin Setting:	Site Closed?
Teeth Needing Plasty:		
Teeth Needing Restoration:		
DIAGNOSIS: Occlusion Class: I II III IV	TREATMENT	

Fig. 2: Occlusion and TMJ Examination form, part of the Occlusal Disease Diagnosis System.

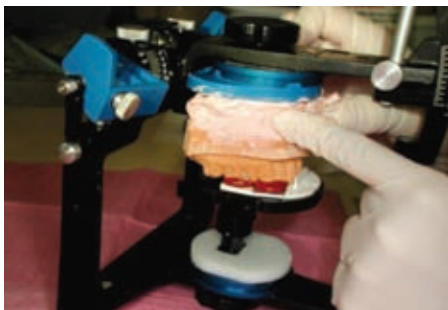


Fig. 3: Cast being mounted on the Panadent Articulator.

complete a thorough examination which includes the diagnosis of caries, periodontal health and should now include the diagnosis of OD for every patient, without adding more than three-to-five minutes to the normal protocol.

Diagnosing OD requires the knowledge of the seven signs and symptoms of OD, and can be assessed in minutes during Stage 1 diagnosis. If the patient is diagnosed with OD Stage 2, occlusion and TMJ exams will be recommended. The seven signs and symptoms of OD are pathological occlusal wear and fractures of teeth/restorations, cervical dentin hypersensitivity<sup>vi</sup>, tooth hypermobility<sup>vii</sup>, fremitus, abfractions<sup>viii</sup>, vertical bone loss or localized bone destruction (secondary to periodontal disease), and masticatory muscle or TMJ pain<sup>ix</sup>. After any of these signs and symptoms are identified, the dentist will do well to try to connect the patient's initial complaints with the signs and symptoms discovered. This will help patients acknowledge their disease. Patients are often surprised when there is a discussion about OD in that only a few clinicians have the background or inclination to share this information with patients. Proper education and motivation is a crucial part of Stage 1 diagnosis and a primary factor toward attaining treatment acceptance and clinical success for both restorative and aesthetic treatment. After a presentation of initial findings, the patient then chooses to accept Stage 2 diagnosis with additional records or choose to not treat their OD and continue with only non-elective procedures.

If a patient with OD refuses the more advanced evaluation of occlusion and TMJ health, Stage 2, the fabrication of a night guard is recommended. A nightguard is the most basic preventive measure we can provide to patients with OD. It is constructed in MIP, or natural bite, free of lateral posterior interferences with anterior guidance and cuspid rise. The patient must be informed that night guards are not a treatment for pain and will not treat OD, but it is a preventive appliance.

### Stage 2 Diagnosis, Using the Occlusal Disease Diagnosis System

Once OD has been diagnosed and the patient has accepted further records or when the patient has interest in extensive restorative treatment, Stage 2 of the OD management system must be implemented. Stage 2 is an advanced occlusal diagnosis and TMJ evaluation. It includes a team-driven record-taking visit where highly trained dental assistants take quality impressions of the patient's dentition as well as oral photographs, a panorex, face bow record (Kois face-bow, Panadent) which will be confirmed by the dentist (Fig. 1). This is followed by additional clinical records which include inter-occlusal CR record where a lucia jig is placed for about 20 minutes to deprogram the joint muscles and allow manipulation of the joint for a CR bite, while patients fill out a questionnaire on their TMJ history. The dentist will perform an 11-step clinical evaluation to fully assess the occlusal and TMJ condition of the patient, using the Occlusion and TMJ Examination Form (Fig. 2). With all the collected data we can now begin to understand what is the etiology of the signs and symptoms we observed, develop and diagnose a treatment for OD independently or as a part of the restorative plan, and assess TMJ health and stability before any treatment is begun. The study cast mounting allows for an evaluation of CR deflections and a trial equilibration to gain a deeper understanding for possible therapy.



Fig. 4: Patient 1 showing severe wear due to lack of anterior guidance and posterior interferences.



Fig. 5: Patient 1 after equilibration and Venus Ceram porcelain veneers.



Fig. 6: Patient 2 showing severe wear due to lack of anterior guidance and posterior interferences.



Fig. 7: Patient 2 after equilibration and direct Venus composite veneers.

After mounting the cast using the CR bite on a Panadent semi-precision articulator, using the CR bite previously taken, the clinician can perform a mounted cast evaluation (Fig. 3, page 46). Here we can evaluate any teeth in interference of full centric closure and/or lateral movements, assess tooth anatomy and apparent wear, and check the occlusal plane. Having a properly mounted cast makes it easy to see if the occlusion has only small discrepancies to ideal, and small adjustments are needed to be made by subtractive or additive equilibration, or if more severe discrepancies to ideal are present, where orthodontics or restorative rehabilitation are needed. The goal of the cast evaluation and trial equilibration is to allow us to preemptively correct our patient's bite in plaster, giving us a glimpse of what it will take to fulfill the three golden rules of occlusion in the mouth, thus avoiding surprises or guess work.

### The Three Golden Rules of Occlusion

The three golden rules of occlusion are bilateral even contacts, posterior disclusion (anterior guidance and canine rise), and an unobstructed envelope of function. Bilateral even contact is mechanically sound as it allows for proper load distribution and it is very important to a stable occlusion. When a tooth interferes with a full closure it will trigger signs of occlusal trauma such as hypersensitivity, abfractions, mobility, or fractures. Also, in order for muscles to function properly, teeth need to contact evenly when the condyle is seated in its ideal place.<sup>x</sup> The second golden rule of occlusion is anterior and canine guidance, which allows immediate disclusion of molars when making lateral or protrusive movements such as in chewing. This provides mechanical benefits in that muscles deactivate and significantly decrease the amount of force applied to the anterior guiding teeth.<sup>xi</sup> Further the jaw works as a class three lever where the further a tooth is from the fulcrum (joint) the less force is applied to it. The third golden rule is an unobstructed envelope of function.<sup>xii</sup> Interferences in the anterior path of closure cause a scraping of the anterior teeth which may cause mobility, fractures or a very typical wear pattern or thinning of the buccals of mandibular anterior teeth and the linguals of the maxillary anteriors. Restoring a patient without correcting this problem will result in fractured restorations and overall patient discomfort.

Equipped with the data, it becomes more predictable to treat patients with severe wear of the anterior teeth and feel comfortable that the restorations, regardless of the material chosen, will have good longevity. Before any treatment is performed, we will always assess the etiology of the patient's OD, assess TMJ health, and develop a treatment plan for ideal occlusal harmony, using a diagnostic trial equilibrations or wax-up, which are often part of an overall treatment plan. Figures 4 through 7 show two cases of patients with severe anterior wear. Patient 1 was treated with VenusCeram veneers (Heraeus) and Patient 2 was treated with Venus composite (Heraeus) veneers. Both patients present with severe anterior wear and are looking to improve their aesthetics and function. After mounting their casts in CR we discovered both had no anterior guidance and a posterior interference. During the clinical occlusal evaluation and using the occlusal and TMJ forms we learned that both patients grind their teeth and suffer frequent muscle pain, information indispensable to know before starting treatment. During the examination we discerned that both patients' TMJ were healthy, which allow us to treat the patients occlusion safely. Taking into consideration their occlusal trauma and parafunction along with their aesthetic goals, we can then wax up

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## Authors' Bio

**Dr. Jose-Luis Ruiz** is Clinical Instructor & Course Director of the "University of Southern California's Esthetic Dentistry Continuum." He is an Associate Instructor at Dr. Gordon Christensen PCC in Utah & The Scottsdale Center, and an independent evaluator of dental products for CRA. He is Fellow of the Academy of General Dentistry.

Dr. Ruiz has been practicing in the studio district of Los Angeles for more than 18 years and enjoys a clientele of many stars and entertainers. Dr. Ruiz has made numerous television appearances highlighting his aesthetic dental makeovers, including NBC Channel 4 News, ABC's *Vista La* and Channel 52's *Telemundo*. His focus is on treating complex cosmetic, rehabilitation, and implant cases and he lectures nationally and internationally and has published many research and clinical articles on aesthetic & adhesive dentistry.

**Dr. Renee Paul** is a Clinical Assistant Professor at the University of Southern California School of Dentistry. She graduated from Tufts University Dental School in 2001 and completed an internship with Dr. Gordon Christensen in Provo, Utah. She practices general dentistry in Burbank, California.

*Disclosure: Dr. Ruiz declares that neither he nor any member of his family have a financial arrangement or affiliation with any corporate organization offering financial support or grant monies for this continuing dental education program, nor does he have a financial interest in any commercial product(s) or service(s) he will discuss in the presentation.*

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their cases and establish ideal canine rise and anterior guidance, bilateral even contacts, and an unobstructed envelope of function. Financial considerations played a part in the final decision to treat the patient with porcelain or direct composite veneers and the extent of the rehabilitation, nevertheless we must fulfill the three golden rules of occlusion for a healthy occlusion and give the patient the aesthetic improvement desired. At the completion of their cases, both patients felt their bite was comfortable, and the muscle pain diminished dramatically. After several years of having their restorations, there is no sign of severe wear on teeth, or damage to the restorations, and the tissues look healthy. ■

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**Heraeus**

*This CE activity is supported by an unrestricted grant from Panadent and Heraeus.*

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1. Which is not a reason occlusal disease (OD) goes undiagnosed and untreated?
  - a. Treatment is always too expensive.
  - b. "JD or TMD" & occlusion mixed together
  - c. It is made to be too complicated
  - d. Population not educated about OD
2. Which is not a rule for proper occlusion?
  - a. Bilateral even contacts
  - b. Posterior disclusion (anterior guidance & canine rise)
  - c. Insical contact
  - d. Unobstructed envelope of function
3. Which is not one of the seven signs of occlusal disease?
  - a. Pathological tooth wear, chipping or fractures
  - b. Tooth hypersensitivity
  - c. Tooth hyper-mobility
  - d. Halitosis
4. Which is not a concern in the comprehensive diagnosis process?
  - a. Caries
  - b. Periodontal disease
  - c. Medical history
  - d. Financial obligation
5. Which is not a goal of cast evaluations & trial equilibration?
  - a. Locate bilateral even contacts
  - b. Identify posterior disclusion (anterior guidance & canine rise)
  - c. Identify extreme discrepancies requiring restorations
  - d. Identify gingival recession
6. During the Stage 2 record taking visit, which step will not be performed by the dental assistant?
  - a. Panadent's Kois Face bow (needing dentist confirmation)
  - b. Photographic series
  - c. CR bite
  - d. Alginate impressions
7. Which is not a purpose for Stage 2 occlusal disease record and diagnosis?
  - a. Understand the etiology of the signs and symptoms we observed
  - b. Assess gingival recession and interference
  - c. Develop a diagnosis & treatment for OD independently or as a part of restorative plan
8. On mounted cast evaluation, which is not an important factor for the doctor?
  - a. Tooth anatomy & wear
  - b. Evaluation of occlusal plane
  - c. Evaluation to see if occlusion is close enough to ideal, or if subtractive or additive equilibration, orthodontics or rehabilitation are needed
  - d. Enamel color and opacity
9. What is the number one reason why restorations fail?
  - a. Recurrent caries
  - b. Post-operative sensitivity
  - c. Incorrect use of bonding systems
  - d. Occlusal disease
10. Which is not one of the three main enemies of the dentition?
  - a. Oral cancer
  - b. Caries
  - c. Periodontal disease
  - d. Occlusal disease

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