

UNDERSTANDING CORRECT OCCLUSAL ADJUSTMENT: IF NOT NOW, WHEN?

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Introduction

A biomechanically acceptable occlusal plan is one that causes little altered function in the stomatognathic organ, and favours maintenance of an organized occlusion coupled with an organized disclusion to reduce or eradicate destruction to the dentition or its investing tissues. All teeth should close into a nonguided, nondeflective centric occlusion equally, firmly and simultaneously. The incisors should disclude all other teeth in protrusive movements, the canines should disclude all other teeth laterally. This arrangement promotes occlusal passivity.

Opposing parabolic surfaces are requisite for a scissor-like action of the cusps coincident with the curvature of the distal slope of the articular eminence, which determines the topography of the cusp between its tip and the base of the fossa. The angle of the slope determines the angle of the cusp. Convex occlusal surfaces, aided by concave maxillary palatal surfaces anteriorly, provide the greatest freedom of motion with the least amount of faceting. Flattened areas should not appear on occluding teeth, unless imposed by wear, accident or the hand of man.

The teeth should not produce neuromuscular contractual patterns that unconsciously avoid occlusal disharmonies. This produces stress in the masticatory muscles and ultimately will precipitate bruxism. Correct organic occlusion is always the same; identical basic principles are involved for both young and old. Contrary to what some may believe, tooth wear is not a physiological phenomenon desirable with ageing. Cuspal wear is never desirable because the body does not replace shorn enamel and dentin. Wearing of teeth (faceting or bruxofaceting) is a gross symptom of musculoskeletal instability and abnormal function at any age.

Nothing else cripples a dentition so devastatingly – or so hobbles a chewing cycle with dysrhythmia - - as CR/CO disharmonies arising secondary to ill-conceived restorations that promulgate stress-inducing avoidance patterns. Since the occlusion of teeth can ostensibly influence the closing patterns of the mandibular musculature, dentists can easily initiate stress into the gnathic organ. Common dental procedures, which invariably alters the occlusal and incisal surfaces of opposing teeth, manipulate musculoskeletal proprioception in a manner entirely unique to dentistry. Thus, it behooves all dentists to be cognizant of deleterious wear patterns, and to understand, evaluate and be able to properly correct noxious occlusal interferences without further ablation of already-compromized dentate morphology. If not why, how? If not now, when?

The “ABC”s of Occlusal Morphology – A dynamic Alphabet

D.M Shaw, an English anthropologist writing in a dental journal many years ago, made an incisively prophetic statement: “The modern world of dentistry has yet to fully comprehend that “occlusal heiroglyphics”... that is, the occlusal markings...are certainly no random and meaningless scribble. It happens to be a real organic language in which the essential principles of tooth design and function are inscribed. We can succeed in deciphering the-so-called “heiroglyphics” if we first take pains to learn its dynamic alphabet and then master the elements therein.” (Int J Orthod Oral Surg & Radiol: Vol 10, Jan-Dec 1924).

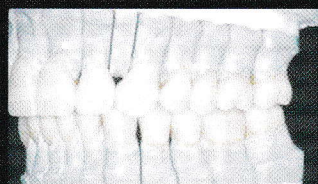
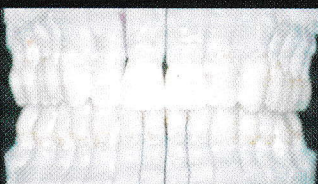
Thus, taking pain to learn the “dynamic alphabet” and then to “master the elements therein”, infers a thorough

knowledge of the morphology of articulation. To wit, posterior teeth are not prehensile teeth. Tooth-to-tooth closure should confer a stability based on axially directed forces only. In the posterior region, this is best developed by crafting subsummit ('rim of the crater') tripod contacts between the cusp tips and the parabolic inclined planes and ridges of the opposing fossae. In this occlusal design, delicate punctate contacts are located on the perimeter of cusp tips as they project into, or are suspended above (but do not contact), the bottom of the opposing fossae.

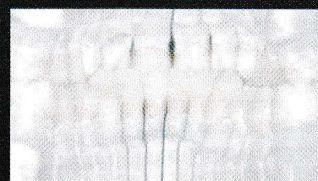
Ingress and egress of the cusps with respect to their coupled fossae should be free of interferences as allowed by developmental (working) grooves and sulci as well as ridge and interproximal embrasure form. Convex, parabolic cuspal surfaces are nature's design and permit the most efficient function.

In the anterior region, the group-type contact which during any movement should include at least two matched pairs and should permit a smooth protrusive movement from the intercuspal position to the (posteriorly discluding) edge-to-edge positions of the incisors. Anterior teeth are particularly sensitive proprioceptively and hence serve to direct (and contain) mandibular movement. Laterally, the canines are ideally suited to compel the disclusion of all other teeth. The primary function of the anterior teeth (as they specifically relate to the occlusion) is to prevent the collectivization of the posterior teeth. In short, "Group Function" ultimately begets "Group Destruction".

IT'S ONE THING TO VIEW THE OCCLUSION THIS WAY...



AND QUITE ANOTHER TO VIEW THE OCCLUSION THIS WAY!



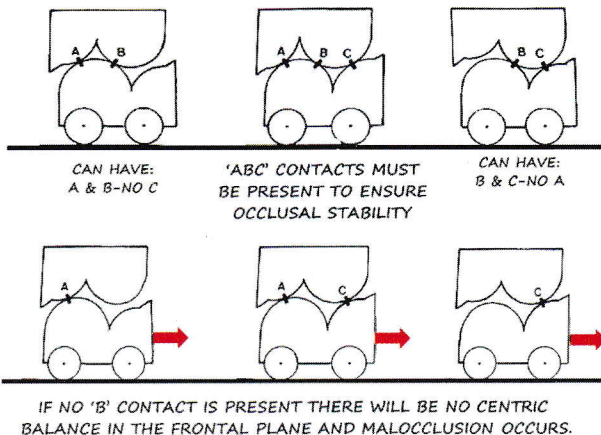
LINGUOVISION!
VIA
THE CL I "CORPS D'ELITE"



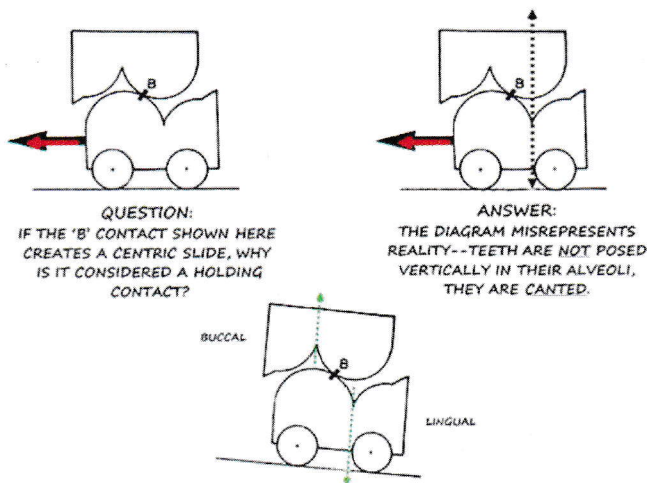
THE MAXILLARY MESIOLINGUAL CUSP TIPS ENGAGE THE CENTRAL FOSSAE OF THE MANDIBULAR MOLARS, AND THE MAXILLARY PREMOLAR LINGUAL CUSP TIPS ENGAGE THE DISTAL FOSSAE OF THE MANDIBULAR PREMOLARS.

UNDERSTANDING THE OCCLUSION "ABC's"

THE "ABC's" OF OCCLUSION—A DIAGRAMMATIC PRIMER



EXPLAINING THE VALIDITY OF THE INDISPENSABLE "B" HOLDING CONTACT

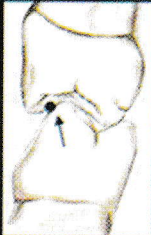


IN THE CORRECTED ILLUSTRATION, THE MAXILLARY TEETH ARE SHOWN PROPERLY
CANTED TO THE BUCCAL, AND THE MANDIBULAR TEETH CANTED TO THE LINGUAL.
THUS POTENTIAL SLIDING FORCES ARE NEGATED, THE 'B' CONTACT BECOMES
STABILIZING, AND THE RESULTING APICAL DIRECTIONAL FORCES ARE WITHIN THE
LONG AXIS OF THE TEETH.

THE 'B' CONTACT IS THE MOST DIFFICULT TO OBTAIN
AND THE MOST DIFFICULT TO MAINTAIN. WITHOUT
THE 'B' CONTACT YOU HAVE **MALOCCLUSION**.

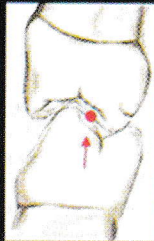
THE OCCLUSAL MORPHOLOGY 'ABC'S'

'A' CONTACT



UPPER SHEARING,
LOWER STAMP

'B' CONTACT

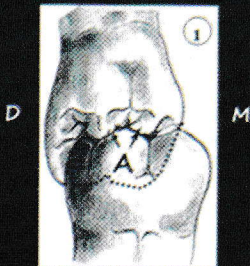


UPPER STAMP, LOWER STAMP
NO 'B' = MALOCCLUSION!

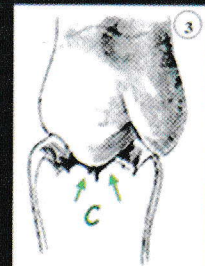
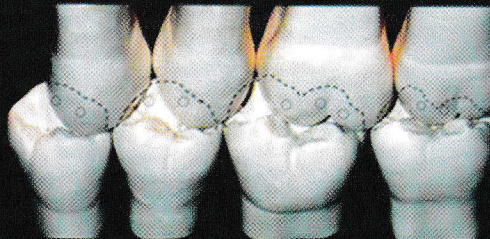
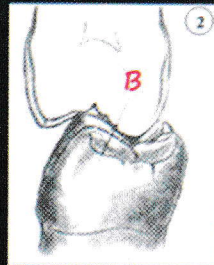
'C' CONTACT



UPPER STAMP,
LOWER SHEARING

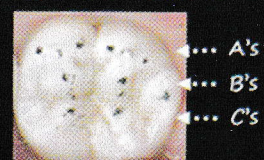
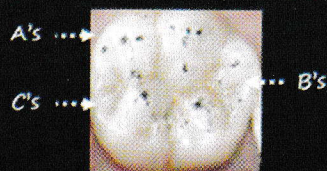
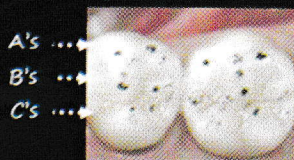


CL 1 "SEE-THRU"
NORMOCCLUSION



"VISUALIZING" THE
'B' CONTACTS

'A' CONTACTS ARE LOCATED ON THE MAND. BUCCAL INCLINED PLANES, 'B' CONTACTS ARE ON THE LINGUAL INCLINED PLANES OF THE MAND. BUCCAL CUSPS, & 'C' CONTACTS ARE ON THE BUCCAL INCLINED PLANES OF THE MAND. LINGUAL CUSPS; MAX. MOLAR PALATAL CUSPS PROJECT INTO, BUT DO NOT CONTACT, THE BASE OF THE MAND. FOSSAE.



(1, 2, & 3 GRAPHICS AFTER ROMEROWSKI & BRESSON)

THE ABC'S OF OCCLUSAL MORPHOLOGY

THE HIGHEST EXCELLENCE IN OCCLUSION IS ACHIEVING AND MAINTAINING SYNCHRONOUS POSTERIOR INTERCUSPATION – AS WELL AS SALUTARY ANTERIOR GUIDANCE COUPLED WITH MORPHOLOGIC INTEGRITY AND AESTHETIC HARMONY.



TOOTH-TO-TWO-TOOTH CLASS 1 NORMOCCLUSION SEEN VIA LINGUOVISION:



**MAX. PREMOLARS AND DISTOLINGUAL MOLAR CUSPS ARE CUSP TIP TO MARGINAL RIDGE:
MESIOLINGUAL MAX. MOLAR CUSPAL RELATIONSHIPS REMAIN CUSP-TO-FOSSA.**

CUSPIDS ARE THE GUIDEPOSTS WHICH HERD THE CLOSURE OF REAR TEETH AND PREVENT THE LATERAL ENMESHMENTS OF BUCCAL CUSPS. A MUTUALLY PROTECTIVE OCCLUSION PRESERVES MORPHOLOGIC INTEGRITY.



CUSP-TO-FOSSA SUBSUMMIT 'RIM OF THE CRATER' INTERCUSPATION ESTABLISHES THE 'LOCK OF OCCLUSION.' GROUP FUNCTION INEVITABLY BEGETS GROUP DESTRUCTION.



ATTRITIONAL OCCLUSION SHOULD NEVER BE REGARDED AS A TREATMENT MODEL FOR CONTEMPORARY DENTISTRY. ALWAYS BEGIN WITH THE END IN MIND.

Worth repeating: The basic principles of correct organic occlusion are always the same and apply equally to young and old. Tooth wear is not a physiological phenomenon desirable with aging. Tooth wear is NEVER desirable because tooth structure is the one element in the human body that cannot regenerate. Occlusal wear is a gross symptom of skeletal instability and abnormal function at any age.

Are our dental morphological shapes and forms speaking to us in a silent language we have not yet deciphered? Are morphology (art) and occlusion such disparate disciplines that they act as stumbling blocks for one another, or may they be possibly conjoined so that each separately derives something of the other, such that when melded together they coalesce to form a higher entity far more comprehensive than each could achieve singly? Occlusion without morphology is refractory and lame. Morphology without occlusion is graceful but static. Morphology and occlusion, occlusion and morphology---they are two words which are (seemingly) different. In spelling only! Morphology is the pedigree of occlusion. The ancestor of every good occlusion is good morphology, and malocclusion is the tax morphology pays to indifference. You can't have good occlusion without good morphology, and poor morphology will only beget poor occlusion. Structural beauty must be a determining criterion if we are ever to achieve successful function.

DEFINITIONS

Premature Contact

A general term referring to any occlusal contact that causes an untimely, slight mandibular deflection during attempted closure to an unstrained occlusal intercuspation.

Occlusal Interference

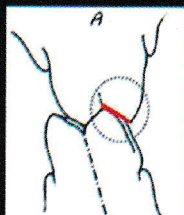
An occlusal contact relationship that substantially interferes in a deleterious way during normal occlusal intercuspation function and / or parafunction.

Occlusal Adjustment

"Occlusal adjustment" - - A term which means different thing to different people - - is actually a non specific, expedient nom de plume for fecklessly grinding teeth. In the truest sense occlusal adjustment involves the recognition of, and the appropriate correction for, occlusal interferences which exist as facets on the parabolic cuspal surfaces of teeth. The judicious spheroidal recontouring of these facets to punctuate "ABC" holding contact areas in order to maintain long-axis forces, preserve cuspal morphology, and allow non-deflective (and non manipulated) mandibular closure will result in a repetitive, musculoskeletally benign, centrically related intercuspation every time. Caveat: morphological occlusal adjustment (Coronoplasty) is significantly more than than a handpiece and a bur. It is NOT a license to heedlessly and needlessly grind teeth out of stable occlusal contact! When evaluating occlusal markings the Force, Intensity, Direction, Duration, and Distribution of those markings must be keenly evaluated (The 'FIDDD' Rule).

PERFORMING PROPER OCCLUSAL CORONOPLASTY

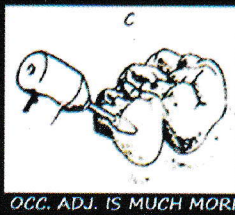
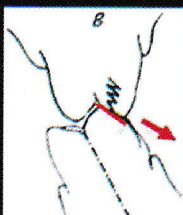
A-DIAGRAMMATIC, LOWER LEFT QUADRANT



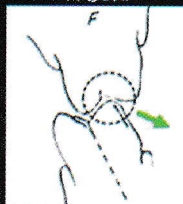
PARABOLIC FORM HAS BEEN OBLITERATED AS A RESULT OF GROUP FUNCTION. OBSERVE THAT AS THE MANDIBLE MOVES TO LEFT LATERAL, HEAVY, PERIODONATALLY DE-STABILIZING FACETING OCCURS.



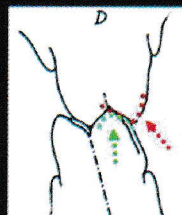
THE CANINES ARE HIGHLY SPECIALIZED, AND ARE REGARDED AS PROTRUSIVE AND LATERAL DETERMINANTS OF CUSP HEIGHTS AND FOSSA DEPTHS.



OCC. ADJ. IS MUCH MORE THAN A HANDPIECE AND A BUR!



DURING LATERAL MANDIBULAR TRANSITION, CUSP TIPS CAN NOW PASS WITHOUT OCCLUSAL CONFLICT. REMEMBER: EVERY SPECIFIC CHANGE IN MORPHOLOGY VIA ODONTOPLASTY WILL GIVE RISE TO A REFLEXIVE NEUROMUSCULAR CHANGE IN THE OCCLUSION.



CAREFUL, ARTFUL, SPHEROIDAL CORONOPLASTY OF OPPOSING CUSP TIPS PRESERVES CUSPAL PARABOLISM. ALWAYS BE MINDFUL TO PRESERVE THE OCCLUSALLY ESSENTIAL AND STABILIZING "B" CONTACT.



POSTERIORLY, CANINE GUIDANCE (PROPRIOCEPTIVE GUARDING) PROVIDES WHAT MAY BE CALLED THE "GREAT ESCAPE", I.E., LATERAL DISCLUSION

GRAPHICS MODIFIED AFTER ROMEROWSKI & BRESSON

PERFORMING PROPER 'SPHEROIDAL' OCCLUSAL ADJUSTMENT

A-1 DIAGRAMMATIC, LRQ



WHEN CANINE DISCLUSION (L) IS NOT PRESENT, GROUP FUNCTION (R) WILL INFLICT WEAR FACETS. SPHEROIDAL RECONTOURING WITH A FINE WHITE BULLET-SHAPED STONE REMODELS FLATTENED AREAS BY USING LIGHT, ARTISTIC, CIRCULAR MOTIONS (NO ABLATIVE "GRINDING") THEREBY RESHAPING FACETS TO PINPOINT HOLDING CONTACTS WHILE ALSO RESTORING CUSPAL PARABOLISM. (EXAMPLE a-d, BELOW)



a



b



c



d

A-2 SPHEROIDALLY ADJUSTING COMPLETED ALLOY CROWN CARVING "UBERMORPHING"



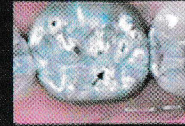
COMPLETED CN AT 1 WK.-PT. ORIG. CAME WITH FUNCTIONAL DISTAL & MESIAL ALLOYS, WHICH REMAINED.



ACCUFILM: NOTE 'A'-'B' POINT CONTACTS, AND BALANCING SIDE 'B' FACETTED INTERFERENCE.



SPHEROIDAL ADJ. BEGINS: 'B' CONTACTS IMPROVING-NOTE SLIGHT 'A' (WORKING) PREMATURITY CONTACT IN RED.



FURTHER ADJUSTMENTS IMPROVE 'A'-'B' CONTACTS. NOTE BEG. APPEARANCE OF PROPER 'C' CONTACT.



'A', 'B', + 'C' CENTRIC CONTACTS FULLY DEVELOPED (ALL EXCURSIONS).



POLISHING REFINEMENT BEGINS WITH NUPRO GOLD & BLACK BRISTLE BRUSH



FINAL POLISH WITH TIN OXIDE SLURRY: OCC. ADJ. HAS MAINTAINED MORPHOLOGY!

THE STRAIGHT LINE IS THE LINE OF MAN, THE CURVED LINE IS THE LINE OF NATURE.

MODIFIED GRAPHICS AFTER ROMEROWSKI & BRESSON

Since few natural dentitions erupt into either a pure canine disclusion, or at least in to an innocuous functional relation ship, wear (facet) patterns do appear that signify the presence of occlusal disharmony. Subsequently, as the need for restorative dentistry arises, these disharmonies are perpetuated while new imbalances are introduced. This is especially apparent in dentistry performed without regard to preoperative occlusal adjustments wherein centric relation-centric occlusion (CR-CO) is rendered harmonious before restorative dentistry is undertaken. This is unfortunate, as the ordinary function of mastication ought not to be a self-destructive activity—which it is when the anterior teeth do not protect the posterior teeth from lateral interferences, or when the intended neuromuscular closing pattern of the mandible is mechanically deflected. Form follows function. When the function is in any way distorted, the form is similarly affected.

PERFORMING PROPER 'SPHEROIDAL' OCCLUSAL ADJUSTMENT

B-LOWER RIGHT PORCELAIN QUADRANT

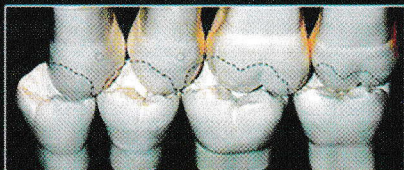
MALOCCLUDED MANDIBULAR RIGHT QUADRANT DISPLAYS HEAVY WORKING AND BALANCING SIDE INTERFERENCES, CAUSING SIGNIFICANT DELETERIOUS LATERAL FORCES TO BE APPLIED.

INITIATING ARTFUL SPHEROIDAL CORONOPLASTY WITH SMOOTH WHITE BULLET-SHAPED SHOFU STONE. CENTRIC MANDIBULAR CLOSURE IS UNGUIDED. ARTICULATING REGISTRATION MEDIUM IS ACCUFILM (12 MICRONS). PUNCTATE CENTRIC CONTACTS ARE NOW BEGINNING TO APPEAR.

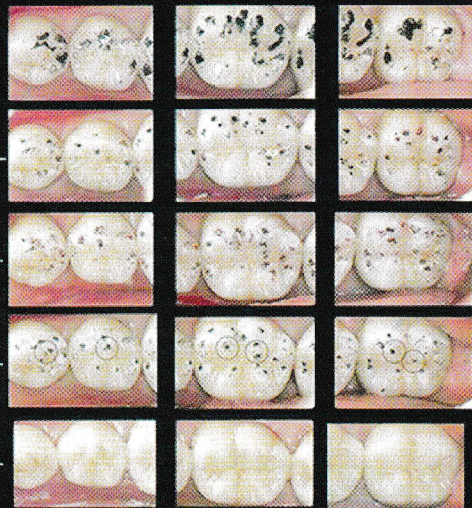
OCCLUSAL CHOREOGRAPHY CONTINUES. CENTRIC CONTACTS ARE BLACK. RIGHT WORKING AND LEFT BALANCING CONTACTS ARE IN RED. MANDIBULAR CENTRAL FOSSAE STILL MISSING PROPER MAXILLARY INTERCUSPATION.

CORONOPLASTY COMPLETED. ACCUFILM CONTACTS REMAIN PUNCTATE DURING ALL LATERAL AND PROTRUSIVE EXCURSIONS. MAXILLARY CUSP TIPS PROJECT INTO, BUT DO NOT CONTACT, THE BASE OF MANDIBULAR FOSSAE. NOTE THAT THE ALL-IMPORTANT "B" STABILIZING CONTACTS HAVE NOW EMERGED.

FINAL PORCELAIN POLISHING WAS GREATLY SIMPLIFIED BY HAVING USED ONLY THE SMOOTH WHITE SHOFU STONE. ALL LATERAL INTERFERENCES HAVE BEEN REMOVED WITHOUT ABLATING EXTANT MORPHOLOGY!



NOTE: IN A CLASS I NORMOCCLUSION ALL MANDIBULAR MESIAL FOSSAE ARE VACANT (AS WELL AS THE DISTAL FOSSAE OF MAXILLARY PREMOLARS).

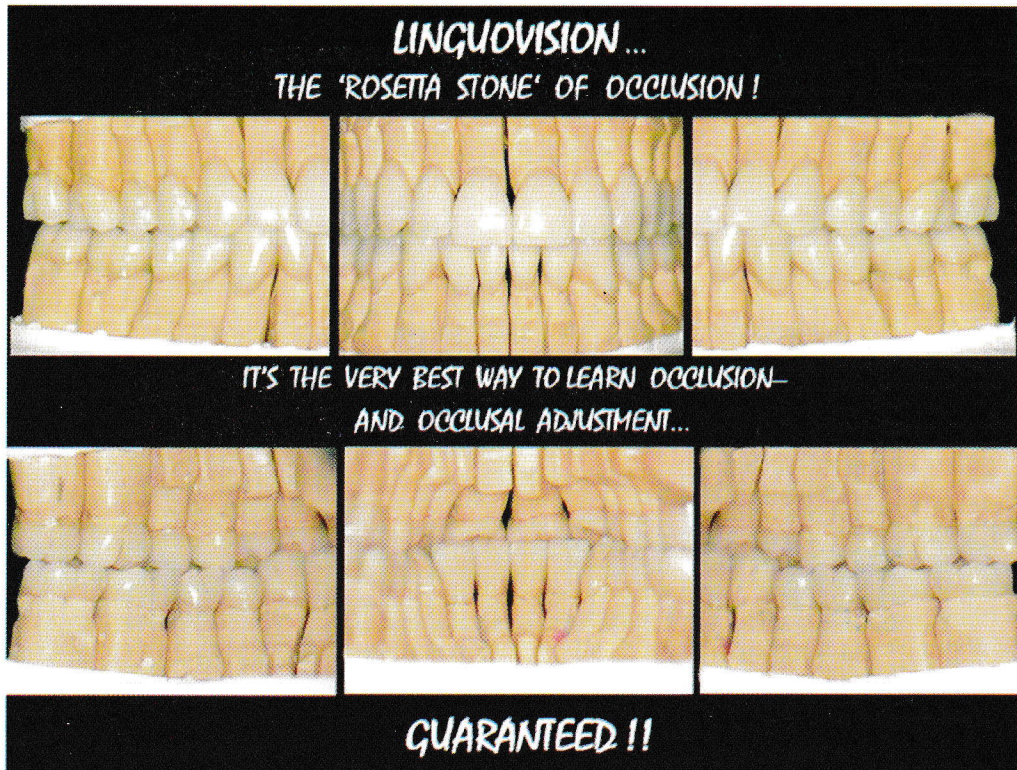


COMPARE NORMOCCLUSION INTERCUSPATING MODELS AT LEFT, AND CLINICAL CL 1 ALLOY SCULPTURE BELOW (UNTOUCHED!) TO PUNCTATE OCCLUSAL MARKINGS OF COMPLETED OCCLUSAL ADJUSTMENT ABOVE.



◀..... 'A' CONTACTS
◀..... 'B' CONTACTS
◀..... 'C' CONTACTS

"It ain't what we don't know that's the problem. It's what we think we know, but ain't." (Mark Twain). "Occlusal adjustment" for many clinicians unfortunately is a route of many road leading from nowhere to nothing. There are always occlusal interferences (facets) for those who want to see them. No operative dentistry should be performed in the presence of joint pathosis, or which perpetuates existing occlusal disharmonies. A concept of occlusion must be practiced by every dentist that permits nondeflective simultaneous contact with opposing teeth upon unstrained centric intercuspation. The search for a single, fixed, immutable condylar position is an hypothetical undertaking akin to extrapolating infinity. It is then reasonable to assume that periodic neuromuscular variations may occur that could appreciably affect occlusal morphology. Hence, intraoral occlusal adjustments (spheroidal in nature) must ultimately be performed periodically on natural, provisional, or restored teeth ---adjustments that neither ablate nor uglify human dentate morphology and that seek to maintain parabolic form commensurate with (sporadically) changing neuromuscular patterns. Convex occlusal surfaces are the most efficient, and provide the greatest freedom of motion with the least amount of facetting. Maintaining these parabolic surfaces during artful coronoplasty is accomplished best via spheroidal occlusal adjustment, as described.



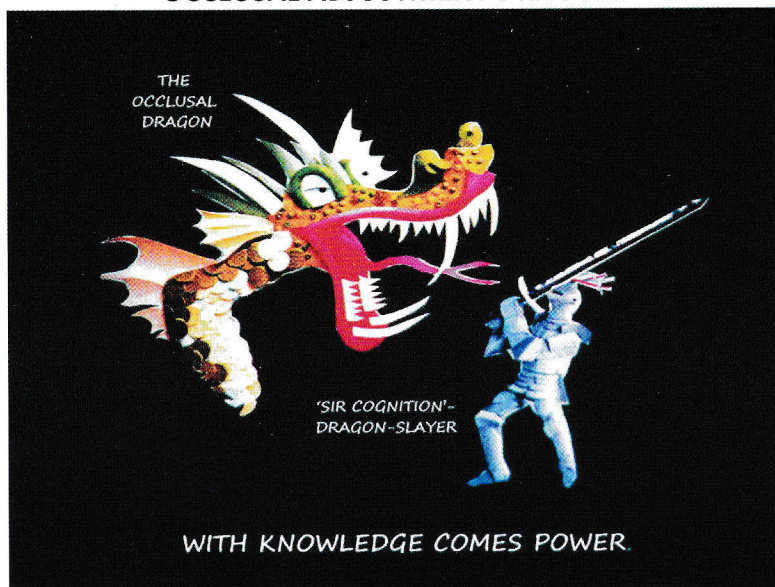
CONCLUSION

The significance of occlusion in clinical reality has not received attention commensurate with its importance... especially as virtually all people have occlusal interferences. Occlusal adjustment is the least used, most misunderstood, and most abused form of treatment available for occlusally related disorders. Anyone who proposes to adjust the occlusion in whole or in part, should have some guiding hypothesis regarding the interactive relationships between the various parts of the masticatory system, especially as dentists are the putative specialist of the occlusion. With little knowledge of form and function the natural progression of things is for morphology to yield to cuspal faceting and wear, enabling malocclusion to gain ground. Time, alas, is the thief of morphology. Nothing remains unviolated by time; there is an inexorability of change.

Since tooth wear is never desirable because tooth structure cannot regenerate. Hence, the appearance of facets on the parabolic occlusal surfaces must be recognized for the dysfunction that they represent. Every act of seeing is an act of judgment. Being able to perform an **ARTISTIC**, minimally invasive, correct **SPHEROIDAL OCCLUSAL ADJUSTMENT** which delicately re-contours (rather than "grinds") already-shorn enamel requires a knowledge of, and a facility with, the dynamics of articulation, occlusion (intercuspatation), and morphology. As dentists, we seek to classically protect an organ system ever on the brink of disintegration through (abnormal) wear.

Morphology is the common denominator of all occlusion--its precursor--and inimical occlusal interferences are its plague. You must realize that morphology and occlusion are two sides of the same coin. Morphology is the handmaiden to occlusion; it is the dress of occlusion. Ignorance of morphology becomes occlusion's misfortune. It may be concluded that understanding and learning to perform a correct occlusal adjustment can be likened to an adventure. To begin with, it is struggle with perfunctory necessity. Then it becomes a mistress. Then it becomes a master. Then it becomes a tyrant. Then it becomes a monster. And in the last, phase, when you are just about reconciled to your servitude, an epiphany occurs: **COGNITION** emerges and you are able to slay the...

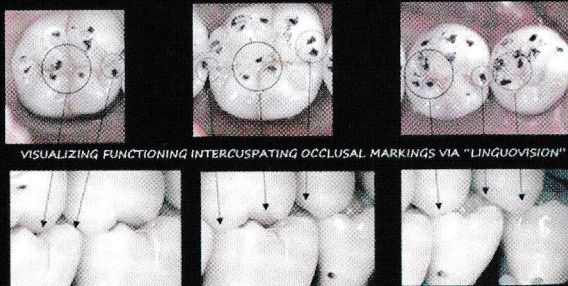
OCCLUSAL ADJUSTMENT DRAGON!



If most dentists cannot conceptually visualize and draw the teeth they attempt to repair, if they cannot mentally pictorialize morphologic form and draw teeth, how then are they able to properly sculpt restorations, fabricate provisional restorations, critically analyze work returned from the laboratory, or correctly intercusate and properly—artistically—adjust an occlusion? Dostoevsky has said, “No man or nation can exist without a sublime ideal.” As dentists, our ‘sublime ideal’ is our innate ability to successfully conceptualize, visualize, and then creatively perform excellent clinical dentistry. It is our collective manifest imperative.

ADDENDUM

THE ART AND SCIENCE OF OCCLUSION



VISUALIZING FUNCTIONING INTERCUSPATING OCCLUSAL MARKINGS VIA “LINGUOVISION”

NOTE THAT MAXILLARY CUSP TIPS DO NOT ENTER THE BOTTOM OF MANDIBULAR SULCI. THE PRIMARY FUNCTION OF THE ANTERIOR TEETH IS TO PREVENT COLLECTIVIZATION OF THE POSTERIOR TEETH. THUS, INGRESS AND EGRESS OF CUSPS WITH RESPECT TO THEIR RESPECTIVE FOSSAE ARE FREE OF LATERAL INTERFERENCES. GROUP FUNCTION ULTIMATELY PRODUCES GROUP DESTRUCTION. CONVEX, PARABOLIC CUSPAL SURFACES ARE NATURE'S DESIGN, AND PERMIT THE MOST EFFICIENT, SCISSOR-LIKE OCCLUSAL FUNCTION.

WITH LITTLE KNOWLEDGE OF FORM & FUNCTION, THE NATURAL PROGRESSION OF INNATE OCCLUSAL SURFACES IS FOR MORPHOLOGY TO YIELD AND MALOCCLUSION TO GAIN GROUND! ALL OCCLUSION IS PREDICATED ON MORPHOLOGY. IN REALITY, MORPHOLOGY IS ACTUALLY THE PEDIGREE OF OCCLUSION, AND MALOCCLUSION IS THE TAX MORPHOLOGY PAYS TO APATHY AND INDIFFERENCE!