"CURRENT ESTHETICS
AND
OCCLUSION CONCEPTS:
MYTHS, SCIENCE AND CLINICAL SOLUTIONS"

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“ESTHETICS, OCCLUSION AND CURRENT SCIENCE: MYTHS, SCIENCE AND CLINICAL SOLUTIONS"

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“ESTHETICS, OCCLUSION AND CURRENT SCIENCE”
REQUIREMENTS:
• Guidelines for "Problem Solving Skills"
• Guidelines for medicine and physical diagnosis
• Guidelines for masticatory function and dysfunction and oral habits.
• Guidelines for developing interdisciplinary treatment plans.
• Guidelines for treatment options in Orthodontics, Periodontics and Surgery.
• Guidelines for treatment options in restorative dentistry and prosthodontics

Common Dental Myths:
• 1. Common dental myths and current science
• 2. How facial morphology and growth an development of the face affects restorative decisions?
• 3. Masticatory function and dysfunction
• 4. How pain affects our ability to diagnose and manage restorative procedures?
• 5. Orthodontics, Esthetics, Restorative & Implant Procedures
• 6. Restorative and Prosthodontic Guidelines
• 7. Splint Therapy: what works, what doesn’t & why?

Common Dental Myths:
1. Are the removal of balancing contacts justified? Answer- NO
   • (1) - 2009 - “Non-working side (balancing side), tooth contacts should not be removed in over 95% of patients.”
   • (2) “Balancing side tooth contacts exist because there is inadequate canine guidance on the working side or the canine guidance is worn. Tanaka 1969 ADA,ACP 1985; Ingervall; Woda A.
   • (3) Therefore, the lingual of the canine on the working side should be restored to contact if necessary by restorative, orthodontic or other means
   • Exception; the lingual plunger cusp of the max. 2nd. molar on the balancing side occasionally requires adjustment.
   *“Balancing side tooth contacts occur in 40% to 67% of the population. (Ingervall B; Helkimo)
   *TMDs that require treatment, make up only 6-7% of the population.”Okeson 4th ed. Text; McNeill et al JADA; Griffith JADA
   *“The balancing side contacts are the result of a problem on the other side and should not be removed.” Tanaka 1969 ADA,1985 ACP, 2006 AARD
   *Do individuals with balancing side contacts have more muscle and joint pain than those without balancing side tooth contacts? “No” (Seligman, Pullinger; Korioth

Common Dental Myths: Myth #2
“Should the transverse occlusal plane (side to side) be made parallel to a line through the pupils of the eyes.” Answer- NO
* The transverse occlusal plane should be parallel to the floor.
- Transverse disorders must be communicated to the laboratory via a wax up or a face-bow mounting. (*Kois facebow by Panadent*)

Common Myth #3
• “Is there a slide from Centric Relation anteriorly to Centric Occlusion.” (*False*)
• “Centric Occlusion is the same occlusal position as Centric Relation.” *Glossary of Prosthodontic Terms* 6
• Centric Relation is the relation between the maxillary and mandibular teeth. GPT 6,7,8.
• Centric Occlusion is an occlusal contact position.

What's New in 2010?
• “The problems are the same, but some of the answers are different.”
• “New information has changed our understanding of muscle & joint pain.” (Protective Muscle Contraction)
• “New information has changed our understanding of tooth “mechanoreception and vibrotaction.” *(Levy)*
• Sensory fibers in the dental pulp are 2X more sensitive than all of the periodontal ligament fibers surrounding the tooth. *(Levy J IADR,2002)*
• “Many important restorative and prosthodontic concepts are interpreted differently.” *Tanaka AARD 2006*

“How are facial form and bite force related to material election and restoration longevity?”
Facial morphology: Brachyfacial facial(square types) can exert 2x the bite force of dolicofacial (long face) types.

Skeletal Growth of the Jaws and Face:
• There is a growth spurt at age 8 and again at age 10 peaking at 12-13 and completing growth at age 15-15 in females. *Woodside DG - (14-15 in other studies)*
• Both height and condylar growth experience a growth spurt from 12-14 and then the rate of growth decreases and is completed by age 18-19 in males. *Woodside DG (15-16 in other studies)*
• *Are there growth (remodeling) changes in adults after 30 years of age? Behrents, RG*

Clinical implications: Permanent implants are not recommended for growing adolescents or children.(The implant will remain at the same level as the maxilla and mandible continue to grow. This will leave the implant submerged below the crest of the ridge when growth is completed.)

Growth changes in adults:
The face continues to grow from age 37 to 77 according to Behrents. Some may describe the changes as the result of "facial remodeling." Changes in male at age 37 (black) to age 77 (red) *Behrents RG, in Contemporary Orthodontics, Proffitt et al.*

• The restorative dentist should be the quarterback for the treatment plan and is ultimately responsible for the final clinical result.”
• This means that the quarterback should have a basic working knowledge of all the other disciplines.
• This means that the restorative dentist is ethically and morally responsible,(and sometimes legally responsible), for the treatments planned for his/her patient.

**Interdisciplinary Treatment Planning**
*“The quarterback cannot say, “but it’s not my job to know …..”*
• The restorative dentist should be the quarterback for the treatment plan and is ultimately responsible for the final clinical result.”
• This means that the quarterback should have a basic working knowledge of all the other disciplines.
• This means that the restorative dentist is ethically and morally responsible (and sometimes legally responsible), for the treatments planned for his/her patient.

Recommended articulator Settings for general dentistry:
• Eminentia Angle - unworn teeth Tanaka; Lee ………30°
• Eminentia Angle - worn teeth Tanaka; Lee …………20°
• Progressive side-shift - unworn teeth Clayton..7°-10°
• Progressive side shift - worn teeth Hobo……10°-13°
• Immediate side-shift - unworn teeth Lee; TTT…0.5mm
• Immediate side-shift - worn teeth Lee; Tanaka… 0mm

Orthodontic guidelines for facial morphology and esthetic treatment planning:
* “Facial convexity or concavity is the result of a disproportion in the size of the jaws:” Proffit
(a) Vertical: Class I
(b) Convexity: more Class II
(c) Concavity: more Class III

Facial profile- Naso-labial angle - measured from the base of the nose and the labial surface of the upper lip. Note, the purpose of measuring this facial characteristic is to determine if the maxillary teeth are providing enough support for the upper lip? This angle should be 90° to 102°.
*If the angle is much less than 90°, the problem may be related to the max .incisors being to far labial or the entire maxilla may be to far anterior in the face.
*The inclination of the maxillary teeth act to support the upper lip.

Interdisciplinary treatment planning:
• “When multiple health professionals are treating the same patient, there has to be a quarterback. All treatment protocols, medications and treatments must be passed through this individual in order to avoid redundancy or omissions.
• 1) Identify the problem(s)? Consult with the specialists.
• 2. Determine who is responsible for what?
• 3. Decide on the sequence of treatment. Who does what first, second and……
• 3. Identify the goals of the imaging and lab tests, they may alter the type and course of treatment.
• 4. Follow-up and accountability: someone, you or a staff member must be assigned to each patient when referrals are made.

Tooth size measurements:
Caucasian median tooth width- 8.37mm to 9.3mm
Caucasian median tooth length - 10.4mm to 11.2mm

Gingival Esthetics: the height of cervical margin is at the distal 1/3

The tooth tapers from the interproximal contacts towards the cervical of the tooth. If crown lengthening is considered, there is a greater risk of creating a “black hole” at the interproximal/cervical.

Criteria for restoring worn anterior teeth:
1. Current thinking asks the question, "what material can I use to restore or replace the worn enamel?"
2. The first thought should be, "What did the tooth look like before it wore down?" This will require waxing at least one upper and lower central incisor to its original length. When one encounters worn teeth, the first step in formulating a diagnosis is to understand what the tooth looked like (shape and size), and what the original tooth position was before it wore down.

3. The patient may have worn the tooth down to a level where you may not want to add back to the incisal edges, because the act of adding the former tooth length back may create a step in the anterior-posterior occlusion?

4. Consider adding the anterior-posterior Curve of Spee to the criteria.

5. Will the addition of tooth structure (porcelain or composite) result in a reverse Curve of Spee? This may not be the desired result?

6. Therefore, one may decide to treat the patient at the current incisal level of wear, which will require 1) either crown lengthening, 2) orthodontic intrusion of the incisors, or 3) surgery (segmental osteotomy).

7. The proper anterior tooth length cannot be determined solely by replacing the lost enamel.

8. The most frequently encountered malocclusion related to anterior tooth wear is "Dento-Alveolar Extrusion." (basically a "deep anterior occlusion of 90- to 100% overbite. This can be diagnosed as early as 8-11 years of age. It is rare for an anterior deep bite to resolve into a normal overbite relation at age 16 or 18.

9. These patients are usually seen as adults with severely worn incisal edges but no wear of the posterior teeth.

“A natural lampshade convergence of roots creates the inclination of the anterior and posterior teeth”

* This lingual inclination of the maxillary teeth creates an occlusal plane where the lingual cusps of the maxillary molars are more occlusal than the buccal cusps.

* In addition, the mandibular second molars are inclined 18° to 19° lingually. This results in the buccal cusps of the mandibular molars being more occlusal than the lingual cusps.

* This positioning of the mandibular molars is referred to as "the Curve of Wilson."

* This lingual inclination is critical in treatment planning patients with severe wear of the posterior teeth and in treatment planning dental implants in the posterior mandible.

The inclination and position of the maxillary and mandibular anterior teeth are important in treatment planning because of the effects of increasing age and occlusal and interproximal forces.

“How stable is the anterior tooth position?” “Will it change as the patient ages and why”

Mean dimensional changes in the mandible for males during adult life: from Behrents RG 1984 U. Michigan, A treatise on “The Continuum of Growth in the Aging Craniofacial Skeleton”

“If the overjet is inadequate for the chewing stroke, wear can occur as the result of normal function.”

“Horizontal overlap (overjet), decreases with age and may result in wear of the incisors.”

Mounted study casts are an essential part of the comprehensive dental examination. What you may have missed in the exam will usually be visible on the study casts.

The anterior slide or skid may result in wear of the lingual of the maxillary incisors and labial of the mandibular incisors. If inadequate overbite is present, the incisors will wear and eventually an anterior edge to edge relation may result.
As the max. & mand. incisors wear, the incisors become thin and sharp at the incisal edges & they continue to erupt to maintain contact. As the mandible moves anteriorly, the patient may remain symptom free.

Wear at the incisal edges & away from the closing contacts are related to parafunction & bruxing. This incisal wear is not related to posterior interferences. The posteriors are wide apart as the incisors contact.

Actual tooth contact occurs only at the last 1-1.5mm of jaw closure when chewing.
• During normal chewing there is contact of the maxillary and mandibular teeth during almost every chewing stroke during closing and opening cycles.
• Some wear is inevitable.
• “Tooth wear is a normal phenomena of aging.” Woda et al JPD
Incisor display at rest, a function of aging: Vig RG, Brundo GC JPD 39:502-504, 1978; Sackstein M 2008 Int J Prostho

TMJ and muscle disorders are frequently the result of retrusive forces on the mandible as the mandible closes to CR & ICP if a “constricted envelope” is present.
- What clinical signs and symptoms would you expect this patient to have?
  - Bilateral headaches in the masseter & temporalis regions. This patient and will contact these teeth during chewing movements.

When there is inadequate horizontal overlap (overjet), wear may occur during normal functional jaw movements.

How will today’s guidelines affect your approach to the selection of restorative materials?

Aging:
• Skin becomes thinner and more fragile
• Skin begins to sag & develop folds
• Upper lip drapes down over the upper incisors (1mm/decade
  *Lower lip recedes down exposing more of the lower incisal edges

Formula for facial form and function: below

Lip at Rest, Buccal Corridors, Mid-line of Max. Incisors
________________________ = Proper Facial Esthetics and Function
Age of Patient, ”Rest of the face"

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Program 2
FACIAL MORPHOLOGY, FACIAL MEASUREMENTS, AND GUIDELINES FOR DETERMINING ANTERIOR TOOTH LENGTH:
What should we be looking for, in what sequence, and why?
Facial Morphology Photos required:
AP - Facial Thirds
AP - Facial & Dental mid-lines
Tooth display - smiling
Tooth display at rest (ee)
Tooth display - highest/L smile line (gingival display
Retracted lower lip)
Buccal corridors - arch size, shape, position
Tooth Size and Shape
Ethnic differences.

“How will today’s guidelines affect your approach to the selection of restorative materials?”

This is the year 2010.
“Restorative dentistry and occlusion are no longer Religions based upon belief systems.”
“And even though the current esthetic trends in dentistry are tempting, you have stayed the course of quality and excellence, and have persevered.”

“Do not seek perfection, seek excellence.”
“The mental institutions are full of individuals who sought perfection and could not achieve it. (OCD)”

“The “Gold Standard” is Excellence,” not the gold metal, and certainly not what the insurance companies will pay for.

“The key question from today’s program is, how will today’s new evidence affect what you believe and how you practice today?”

Evidence Based Dentistry: How much evidence do we have for the restorative procedures that are being performed today?
“7% to 8% of all dental treatments are evidence based, and that greater than 60% (85%) of general dentists in their study, turn to friends and colleagues for evidence rather than looking in peer-reviewed journals, textbooks and electronic databases.”
Brian Fitzpatrick Int J Pros Vol.21, No.4; 2008:358-363

“When scientific evidence is not available, use the best evidence available.”
Donovan T

“Guidelines for Determining Anterior Tooth Length.”
- Wear of the anterior teeth with no wear of the posterior teeth. How can this occur?
- Rule of Thirds, Highest Smile Line, Retracted Lower Lip: (Gingival Excess)
DVD - “Treatment Planning”
- E-Line - determines the degree of tooth display when the patient is speaking (very close to the habitual rest position).
- Highest Smile Line - ask patient to smile as broadly as possible and to raise the upper lip as high as possible to determine how much gingiva will be seen. (gingival excess)
- Retracted lower lip - to determine the degree of gingival display of the lower incisors

E-LINE
Upper Third
Rule of Thirds: E-Line at habitual rest position: Guidelines for restoration of worn anterior teeth
Splint Therapy in Esthetic Dentistry
(E-Line & Highest Smile Line)
Reverse Curve of anterior alignment

Splint Therapy in Esthetic Dentistry:
Establish the OVD and anterior tooth length first, then fabricate the splint at this OVD and anterior length. Proceed to cut out a window in the incisal and anterior of the splint.

Splint Therapy in Esthetic Dentistry
Bond a flowable composite or tooth colored material to the incisal edge of the splint and trim the splint.

What other Anatomical factors should be considered when we evaluate a smile?

“What can we learn from each other?” (Interdisciplinary Treatment Planning (IDT):
* IDT - (Richard Roblee, Quintessence) Involves the different divisions (specialties) of dentistry working together to develop a comprehensive treatment plan and alternate treatment plans for the patient.
Multi-disciplinary treatment planning involves the different divisions working independently of each other.

Turn to the person next to you and gently say “eee, and determine how many millimeters of the maxillary incisors are showing as he/she says “eee?”
Now “consider” the age of the patient?
Next ask him/her to raise the upper lip as high as they can raise it, and determine the amount of gingival display in mm.?
Next ask him/her to bring the lower lip down as far as they can and determine how much gingiva is showing below the cervical margin?
NCCL Study Use a 1/2 piece of paper and write your age, gender (male/female) and the following:

Actual Age _____
Age 25-35 _____
Age 36-45 _____
Age 46-55 _____
Age 56-65 _____
Age 65+ _____
Check the tooth number if you have a NCCL (notch) at the buccal cervical of the tooth.. that tooth. If the tooth is missing, place an O instead of a check mark.

1. __O__
2. __O__
3. ___
4. __x__
5. __x__

Communication between the general dentist and the orthodontist:
“Most restorative dentists refer their patients to an orthodontist and do not check the occlusion after completion of treatment to determine if the teeth occlude properly.” (esthetics, yes; function, (?) “60-70% of orthodontically treated patients do not have canine guidance 1 year after treatment.” Why?
The maxillary retainer has a wire distal to the canine to support the labial arch wire which contacts the mandibular canine on closure and drives the canine down and out of occlusion. This automatically produces working and non-working side tooth contacts.

The Worn Dentition: Definitions
Erosion
Abrasion
Attrition
Abfraction

The Worn dentition- Pathognomonic patterns of abrasion and erosion:

Classification of tooth wear:
Erosion - from acid - regurgitation, lemons, fruit mulling, sodas, sport drinks. Sodas and lemons, leave a “sand-blasted” appearance on the enamel and dentinal surfaces.
Abrasion - tooth to tooth contact, (attrition and abfraction are included in this category)
Abfraction: (from tooth to tooth bending forces or toothpaste)
Attrition- tooth to tooth, enamel against porcelain etc.

299 Dental students with mounted casts
1st group of examiners noted the NCCLs, (notched cervical areas, “Abfractions??)
They then covered the cervical areas with rope wax.
The second group of examiners noted which teeth had occlusal “wear facets.”
Results: no significant correlation between the teeth with wear patterns and the cervical.
NCCL = Non-Carious Cervical Lesions

What do the current studies say about the NCCLs? (Non Carious Cervical Lesions)
1. In a study of 700 skulls, 150-300 years old, most with enamel completely worn through into the dentin, none had NCCLs. Tanaka T GNYAP 2004,
There is little correlation between the NCCLs and occlusal wear. Therefore, we have no conclusive evidence that the NCCLs are caused by occlusal loading forces.” Estefan et al JPD 2005
The firmness of tooth brush bristles was not a sig. factor. The abrasiveness of the toothpastes was the most significant etiologic factor (toothbrushing machine study) Dzakovits J JPD 2006

Museum skull collection, 1500 specimens. 700 photographed, mostly maxillas.
Tanaka T. July 2004; 206 Male July 2004, repeated in 2010:
Tanaka,TT, “Abfractions?” What are the bite forces and where are they the greatest?
Bite Force Studies by Nishigawa; Gibbs, Lundeen and Mahan were performed during the day and during sleep.

The Curve of Wilson,
“Note position of cusp tips”

What is the significance of a lingually inclined second molar when treatment planning for dental implants?
Note the significance of the lingually inclined ridges when the teeth are removed:

Alveolar Bone Support: bone types will be a major factor in the success or failure of the implant.
- Alveolar support: do you have bone support?
- How effective are short implants (10mm) in the posterior of the maxilla? Type I and Type II, (and Type III bone?)
- Hounsfield units of bone at the sites are higher than larger vertical height ridges? Yes
- Volume of bone at the implant site is greater.
- Trabeculations of bone are closer and more concentrated in the maxilla and in the anterior regions.
- As the bone decreases in size, there is a greater chance for bi-cortical fixation
- Does the type of implant prosthesis affect outcomes in the partially edentulous patient?

Prosthesis success rates between screw-retained (83.4%) and cemented restorations (93.2%) show no differences. Weber HP, Sukutio C, Int J oral Maxillofac Implants, 2007;22 suppl: 140-72
Re. type of support: 97.1% for single-implant supported FPDs and 89.2% success for implant-tooth-supported FPDs.

Evidence-Based Dentistry- Subdivided:

Accepted Truths, Once Divided, May Lack Validity
By Brian Fitzpatrick, BDS Int J Pros Vol 21, Number 4,2008 pages 358-363
This is an excellent must read article. I will discuss his comments next week.

The Maxilla:
How valuable are the new imaging techniques and how will they affect your clinical decisions?
Will current imaging help you to determine the position and size of the implant?
How will current imaging help you with your surgical decisions?

Patient rounds: Lov.Sn.
Class II, Div I: after 3 years of splint therapy with an anterior repositioning splint
15 mm of interocclusal space at start of orthodontic treatment
After orthodontic treatment: Severe Skeletal Class II and decreased OVD
Diagnostic wax-up: note Class II wax-up and alignment of the max. and mand. canines for protrusive guidance

Diagnostic wax-up
Skeletal Class II completed
Protrusive guidance: #6 and #28; #12, #21
Canine Guidance: #6, #27; #13, #27
New Splint made after rehabilitation

This patient chipped the incisal porcelain of the upper right canine which was placed 2 months ago and wants you to make him another one.

Guidelines for increasing the OVD:
Open the incisal pin 2mm.
The mand. goes back and down when the OVD is increased.
Observe the new occlusal plane.
Position the new anteriors more labial for anterior guidance
Diagnostic wax-up of the OVD:
"It is the responsibility of the general dentist to determine the length of the maxillary and mandibular incisors. The quarterback must wax at least one max. and mand. incisor into function."

Crown lengthening option will depend upon the length of the upper lip at the “highest smile line” and the age of the patient.

Growth and Development of the human face:
Skeletal Growth of the Jaws and Face:
* There is a growth spurt at age 8 and again at age 10 peaking at 12-13 and completing growth at age 15-16 in females. Woodside DG
* Both height and condylar growth experience a growth spurt from 12-14 and then the rate of growth decreases and is completed by age 18-19 in males. Woodside DG
* Are ther growth changes in adults after 30 years of age? Behrent, RG

Growth and Development of the Human Face:
- Females - growth of the face complete by age 15-16 Woodside
- Males - growth of the face complete by 18-19 Woodside
- Males and Females - growth continues through age 77. Behrents R. Restorative significance, TTT

* Ethnic differences - variations in arch size and shape and tooth size and shape.

Orthodontic Classification: Angle
Class I (Molar relation)
Class II (Dental, tooth-size discrepancies and eruption problems, other)
Class II (Skeletal, arch-size discrepancies and other)
Class III (Skeletal arch size, growth factors, genetic, ethnic,)

** Occlusal equilibration is clearly not indicated for skeletal Class IIs. “Equilibration of the teeth will not achieve coupling of the anterior teeth & is not indicated.”

** Occlusal Equilibration may be indicated in some dental Class IIs.

McLaughlin Classification of Malocclusions: (three types of malocclusions)
(1) Vertical Disorders - (anterior, posterior, unilateral open-bite, anterior deep-bite)
(2) Horizontal Disorders - (cross-bite, edge to edge occlusion, Class III occlusion, anterior skids from CR to ICP, retrusive forces on closure eg “constricted envelope”)

(3) Transverse Disorders - side to side canted occlusal plane.
This classification does not consider why the specific type of occlusion exists. Eg. a unilateral

How are Esthetics and Occlusion Related?
- “The question of whether the patient could tolerate an increase in the OVD was solved by the referring dentist with his splint.”
- Increasing the vertical dimension also makes the crown to root ratio worse, depending on how much one intends to increase the OVD
- “Increasing the OVD also helps to correct a cross-bite because the emergence profile is not as acute.”
- Guideline for correcting a cross-bite: the functional cusp should remain within the perimeter of the root
** Orthodontics is the first choice.”
Panadent CR Record with ZnOE Paste:
3 points of contact only. Can use four point contact also, (molars and anterior contact

* "Patients drool from the corners of the mouth because the OVD is decreased"
(False) Patients drool from the corners of the mouth because of increasing age, (60-80), and increased weight.

How valid are the following statements in 2008?
Complete equilibration is indicated when:
____ The patient has an anterior slide of 2mm or more?
____ The slide is anterior and lateral?
____ You are going to make a lower 3 unit bridge involving the distal abutement?
____ You are going to perform a complete rehabilitation in segments?
____ Can identify malocclusion as the etiologic factor? List them…

What are the goals of Occlusal Equilibration?
* “To remove the slide from the initial point of contact on closing to ICP.” Is this indicated even if the patient has no clinical signs or symptoms?
* “To establish simultaneous and equal contact of the teeth on closure.” What if the patient has simultaneous and equal contact at ICP?
* “To establish contact, (‘coupling” for anterior guidance) of the maxillary and mandibular anterior teeth at the CR position.” What if the anterior teeth still do not contact after the posterior teeth have been adjusted to CR?
* How many of these problems are related to occlusion?
* “If you don’t parafunction (clench or grind your teeth), you most likely won’t experience

"Muscle and or joint problems."
*“Muscle spasm” will rarely be seen by the general dentist.” (muscle soreness and TTH)
   A stabilizing splint
   and analgesics or NSAIDs will be effective for over 90% of these patients.”
* Wait until the patient is comfortable for 4-8 weeks before attempting any extensive restorative or prosthodontic treatment involving the anterior guidance.
* Is the slide from CR to ICP the primary cause of disc derangements? (TMDs)

STRETCH AND SPRAY:
Use of Ethyl-chloride made by Gebauer co.
precaution:"do not spray in the eyes or ears. Protect the eyes and ears.
"Indicated for referred pain to the face from the cervical structures (dermatomes)
Technique: Cervical
“Rotate the head to the opposite side and stretch.Then spray the vapocoolant spray from the shoulder up & behind the ear, at least three times, stretch the other side and spray both sides.”
“Keep the bottle approx.12” away from the skin.”

Technique: facial muscle pain and soreness,
- stretch by opening to maximal opening,
- spray from mid-neck upward slowly over the masseters and temporalis 1/4" apart in three passes
- Repeat this procedure on the other side of the face, even if only one side was uncomfortable.
PROGRAM 3:
"ABCs of Splint Therapy: What Works, What Doesn't, And Why?"

What should dentists know about the splint therapy literature?


   Differences between day time and night time bite forces.

3. Williamson E et al JPD Both temporalis & masseter are active when the patient bites on the posterior teeth. Masseter much less active with anterior splint. “This study was done when the patients were awake.”

*How effective are splints for the treatment of myofascial pain of the jaw muscles?
Dao TT, Lavigne, Feine, Lund, Pain 56 (1994) 85-94
63 subjects were assigned to 1 of 3 groups
Group A wore an occlusal stabilizing splint 30 min at each appointment
Group B wore a palatal splint with no occlusal contact 24 hrs/day
Group C wore an occlusal stabilizing splint 24 hours a day
Conclusions: “All groups had similar pain reduction ratings”

What does this mean?
“Do palatal splints have a “placebo effect,” or is there another reason why they are effective?
Answer: alteration of the sensory input from Cr.V. sensory input alters the proprioception.

Conclusion of the study: “If your primary objective is to relieve pain, almost any type splint will be effective.” (anterior or posterior)

“Splints may be effective for reasons other than having Centric Relation and Maximum Intercuspalation in the same position.”

“The type of occlusal scheme (CR, MI or Long Centric) is not the only factor that should be considered.”

“If you are using an anterior jig type splint, remember, the peripheral system, (Central Pattern generator) is relatively inactive during sleep and is unable to prevent the patient from biting with great force.”

Day time bite force = 185 lbs
During sleep = Nishigawa 2.3X greater during sleep, Gibbs et al 5X greater force during sleep. 900-1000 lbs

When are splints indicated?
- For TMD patients, (muscle and or joint disorders)
- Patients with occlusal instability due to local or systemic disorders, (RA) of the TMJs
- Patient’s with CR to ICP (MI) discrepancies who parafunction or brux.
- Patient’s who parafunction or brux before and or after restoration of the teeth.

“Initially, splints used at night may appear effective, however 10-15% of patients may start to clench and brux again on the splint.”“Why?”
"Answer:" consider CNS disorder?

**Anterior Deprogrammer type splints**

“Do not use them if the patient is grinding or clenching and scratches are seen on the appliances.”
“This will cause injury to the TMJs because there is no posterior occlusal support.”

“If a patient continues to clench on an anterior bite plane, the biting forces will be directed onto the disc causing injury.”

*Remember, if you notice that there are scratches on the deprogrammer from the patient clenching or grinding, immediately replace it with a full arch stabilizing splint.*

**Anterior deprogrammer splints:**

“The contacting surface should also be flat. An angled contact will tend to drive the condyle posteriorly as the patient clenches, causing pain from the retrodiscal tissues.”

**Other Prefabricated Anterior Deprogrammers:**
1. Purchase from Pankey Institute bookstore (25 per bag of deprogrammers)
2. Great Lakes Dental products (smaller size, but just as good)
3. Line the deprogrammers with “Futar” or other bite registration material.

Patient #10. Is a bruxer and grinds both day and night. You made him an anterior deprogrammer type splint. *He returns with deep wear patterns on the splint.*

**Question #10.** What do you do now?
A) adjust it to make it thinner?
B) replace it with a full arch hard occlusal stabilizing splint?
C) replace it with a soft rubber splint?

Patient #10a. A bruxer grinds both day and night and you made him an Anterior deprogrammer type splint, and he returns with *no* wear patterns on the splint two weeks later.

**Question #10.** What do you do now?

“Anterior deprogrammer type splints are not recommended for bruxers but they may be used as long as the patient is not clenching or grinding on the splint.”

Does this mean that you shouldn’t use an anterior deprogrammer? Yes and No!

“It is OK to use them during the day and during sleep, if the patient does not clench or grind on the appliance. “

“If scratches are seen on the appliance, it must be removed and replaced with a full arch stabilizing splint.”

What types are indicated?

Stabilizing splint
Repositioning splint
When should they be used?
(Night or day or both night and day??)

Type A and B Stabilizing Splints

*(ABCs of Splint Therapy, DVD)*

Type A - Stabilizing Splints: Minimal thickness; wear part or full-time
Type B - Stabilizing Splints are made slightly thicker for decreased OVD; wear full time
Type C - repositioning splints for acute disc displacement, (3 weeks only)
Type C - Anterior Repositioning Splints: snoring appliance type orthotics

Anterior repositioning splints (type C) are used for acute disc displacement only. Use for only 3 weeks, and then adjust the splint back to the initial occlusal position (ICP)

“If the disc has been displaced for 6-9 months, there is a 1% chance of repositioning the disc to its normal position with a splint.”

“If you move the condyle forward and under the disc, this does not mean that you have “recaptured the disc.”
“Do not orthodontically move the teeth to the anteriorized position.” Okeson, Tanaka

Splints serve two purposes:
Day use- splints act as a biofeedback device or as a reminder to not touch the teeth together. (Biofeedback is effective only when the individual is awake.)
Night use - splints act to protect the teeth and crowns from wear and fracture when worn during sleep.

Splint Therapy in Esthetic Dentistry:
How can splints be used to facilitate esthetic procedures and to protect tooth colored restorations? (see "Treatment Planning" (4 hours) DVD for complete technique and rehabilitation. “Treatment Planning” DVD website.
Procedure:
- establish the OVD and anterior tooth length first,
- then fabricate the splint at this OVD and anterior length,
- proceed to cut out a window in the incisal and anterior of the splint,
- add adhesive to acrylic splint and vaseline to the natural teeth,
- Bond a flowable composite or tooth colored material to the labial, incisal edge of the splint and trim the splint.

Restorative tips with splints:
How to make an acrylic provisional crown fit an existing splint:
1. Make the acrylic template over the splint and crowns in the mouth.
2. Remove the crowns, prepare the teeth and make the impression
3. Lubricate the splint and teeth with Vaseline to keep it from sticking to the provisional material
4. Place the splint back into the template and inject the provisional material into the template, and…
5. Place the template with the splint back into the mouth and ask the patient to bite down on the splint
6. Wait the allotted time for the provisional material to set and remove the splint with the template.
7. Remove the provisional from the splint and trim and polish. The provisional should fit perfectly and should not require any adjusting to fit the splint.

Because the provisional is made inside of the splint, it should fit the splint perfectly, resulting in minimal effort in polishing.

How to fit a new crown to an existing splint?
“Fit Checker” by GC America.
1. Place the crown on the study cast and try the splint on the cast. Next remove the splint and,
2. Place some Vaseline over the crown with cotton pellets & put "fit-checker" inside of the splint and attempt to seat the splint over the crown on the cast. When the "Fit-Checker" sets, remove the splint and mark the inside of the splint where the "show through's "are noted with a felt tip marking pen.
3. Remove the "Fit-checker" and grind off the red or black marks inside of the splint with a large acrylic bur (Brasseler), and repeat this until the splint seats "fairly closely," (adjust the rest in the mouth). (2 minutes)
4. Repeat this process in the mouth and when the splint seats completely and the occlusion is the same as without the crown in place, proceed to cement or lute the crown. (2 minutes)
5. When the cement has hardened, (can wait until next week if desired), lubricate the crown and adjacent teeth and place a mix of soft acrylic (Great Lakes Biocryl) into the dry splint where the crown was made.(add the new acrylic only on the occlusal 2mm thick)(2 minutes)
6. Insert the splint & ask the patient to bite down with a"close and swallow pressure."
7. Remove the splint just as you feel the acrylic become slightly warm and place the splint in warm water. Do not allow the acrylic to set hard on the crown in the mouth, or ......
8. Trim the splint with the Brasseler burs and polish only the margins of the splint. (the rest of the acrylic will be inside the occlusal of the splint and will not require polishing).

** If you recommend a splint to relieve the muscle pain, how do you determine the anterior guidance on a splint?
Answer- "exactly as you would in determining the anterior guidance with natural teeth."

"THANK YOU FOR YOUR KIND ATTENTION."

Terry T. Tanaka, DDS
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** If you have any further questions, please email them to me at  ttanaka@usc.edu
** To view the Quicktime DVD movie clips, log on to the website
 www. TerryTanakaDDS.Com
** For more information about Dr. Tanaka’s DVDs that were shown in the program
 Log on to the website, www.TerryTanakaDDS.Com
Occlusion and TMD: Problem Solving For The Restorative Dentist

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Important information that dentists should be aware of when evaluating patients with temporomandibular disorders.

1. What is TMD?
2. What is Pain?
3. Is there a decision tree that can be applied to differentiate TMDs from other pain disorders? (“The Medical Model,” Tanaka 1976)
4. “The 3 minute TMD examination”
5. Why is TMD important for the restorative dentist?
6. What should the dentist know about Masticatory Function?
7. Do teeth touch during mastication (chewing)?
8. What is the significance of the “chewing stroke?”
9. Does the chewing stroke change as tooth wear proceeds and what are the restorative implications?
10. How frequently is canine guidance seen in a population with a Class I molar relation?
11. How are canine guidance and non-working side tooth (balancing side) contacts related?
12. Canine guidance is not used during normal chewing, so why is it a requirement for restoring dentitions?
13. Why is it important to understand why non-working (balancing side), side tooth contacts should not be adjusted in 90% of patients?
14. What is the role of occlusion in patients with Temporomandibular Disorders?
15. “Evidence-based science” and current misconceptions about occlusion and TMDs. “What is the relation?”
16. What is the difference between “parafunction” and “bruxing” in 2005 and why is this important?
17. How are the CNS and Centrally Mediated Disorders related to occlusion decisions?
18. Does malocclusion cause TMDs?
19. Does the slide from Centric Relation to Intercuspal Position? cause muscle and joint disorders,(TMDs)?
20. If an individual has a slide from CR to ICP, should they be equilibrated to CR in order to prevent a TMD from occurring?
21. If the entire dentition has been restored to the CR position, will the CR position remain stable throughout the life of the patient?
22. If a change in the CR position is noted at the 2 year recall, what is the most likely explanation?
23. Should you re-equilibrate the occlusion?
24. What if the patient returns 2 years later and there is another slide, what do you do, re-equilibrate?
25. How many re-equilibrations will you perform before you understand that it wasn’t an improper remount procedure that resulted in the new slide, it was remodeling of the joint structures?
26. If you have located the hinge axis and you have placed a tattoo on the axis point, why is the tattoo mark 2mm different 40 years later? Explain.
27. Centric Relation and Centric Occlusion are the same position, True or False?
28. Why do some patients feel like “they are resisting or tightening up” when you attempt to make centric relation records?
29. How can you relax the muscles in 30 seconds before making CR records?
30. What is a “vapo-coolant spray” and how can it be used in making CR records?
31. What is the most accurate method of registering the centric relation position? (Wax, wax and metal, metal tray with ZnOE paste, leaf gauge)
32. The leaf gauge will most likely provide the most seated condyle position against the disc in the fossa. Is this really what you want to achieve?
33. What would one anticipate would happen to the disc and joint structures when the patient clenches and bruxes? (consider why are you doing the rehabilitation in the first place, because the patient has already worn the teeth down as the result of parafunction or bruxing)?
34. Is there an ideal condylar position for rehabilitation procedures?
35. How are TMDs managed?
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Program 2: “Guidelines for the Diagnosis and Management of the Worn Dentition”

DVD 2: Program 3: “Guidelines for Treatment Planning Esthetic Procedures”

DVD 005: “CURRENT CONTROVERSIES IN OCCLUSION: WHERE IS THE SCIENCE?” $79.00 Amt. $

It does not surprise me to acknowledge that controversies still exist within the dental profession regarding which occlusal position to use as a treatment position. When personalities become entangled with techniques which are not firmly based in science,

TEXTBOOK: “TMD AND RESTORATIVE DENTISTRY”$25.00 Amt. $

“TMD AND RESTORATIVE DENTISTRY” 6th Ed. TEXTBOOK (July,1998) by T. Tanaka,DDS
The new 6th Edition TEXTBOOK, has been revised and edited, and contains the updated material and references from Dr. Tanaka’s study group lectures and research. New Restorative and Prosthodontic sections.

“RESTORATIVE AND OCCLUSAL THERAPY, PART 1” VHS $39 CD $49 DVD $69.00 Amt $

Demonstrations of the Denar slidematic, ‘30-Second’ face-bow transfer and articulator mounting, making centric records using the Dawson bimanual manipulation technique with a Panadent metal tray, complete step-by-step occlusal adjustment procedure. These techniques must be mastered before advanced restorative procedures are attempted.

“MANAGEMENT OF THE WORN DENTITION - R/O, PART 2” VHS $39 CD $49 DVD $69.00 Amt $

Restorative guidelines for the selection of tooth-colored restorative materials for anterior teeth. Lecture/demonstration of the “Two-Step Occlusion” and why teeth wear. The Rule of Thirds is explained to help the restorative dentist treatment plan the worn dentition.

“TOOTH PREPARATIONS FOR THE RESTORATIVE DENTIST” VHS $55 CD $75 DVD $69.00 Amt $

(Part 3 of the Restorative and Occlusal Therapy Series) by Terry T. Tanaka, DDS
A concise review of tooth preparation procedures and how to save valuable chair time and effort for the restorative dentist. Step-by-step demonstrations of the tooth preparations. Great for State Board Examinations. Preparations for full and partial coverage crowns, MOD onlays, Porcelain fused to metal crowns on molars, pre-molars and maxillary incisors.
“ANTERIOR GUIDANCE AND CONDYLAR GUIDANCE” (Restorative -Occlusal Therapy, Part 4)

Anterior Guidance: How much is necessary and Why? When is it not necessary? Are Anterior Guidance and Condylar Guidance related? There are over 30 eminentia angles - Which one is the right one? How is Anterior Guidance developed? Fabrication of a custom guide and criteria for the selection of an articulator.

“TMJ MICROANATOMY: AN ANATOMICAL APPROACH TO”

“Fresh, perfused, cadaver dissections demonstrating TMJ anatomy and the blood supply to the condyle. Addresses possible avascular necrosis and the structural relationship of disc dysfunction and arthroscopic surgery and ligamentous attachments to the disc. Special section on ligamentous attachments connecting the retrodiscal tissues to the middle ear.

“ANATOMY FOR IMPLANT DENTISTS”

“Fresh cadaver dissections demonstrating the sinus membrane, tenting procedures, and the osseous configuration of the maxilla and mandible. Made for the surgeon and restorative dentist.

“ADVANCED DISSECTIONS OF THE TMJ”

“Fresh cadaver dissections starting from the skin surface, exposing the nerves directly over the TMJ, and continuing down into the TMJ. This is the view seen by surgeons during surgery. Tape also demonstrates facial muscles and a new medial disc attachment, cross-sections through the TMJ and the dynamic movements of the condyle-disc assembly.

“DISSECTIONS OF THE HEAD, NECK AND TMJ”

“Fresh cadaver dissections of the gross anatomy of the head and neck demonstrating the muscles of mastication, vascular and nerve supply of the face, anatomy of the submandibular triangle and cervical anatomy. Special section demonstrating adhesions and perforations of the articular disc.

“ABC’s OF SPLINT THERAPY” (NEW REVISED ED Aug. 2000)

New revised edition shows how to adjust the splint at the insertion appointment. Tips on what burs to use and how to use them, along with follow-up instructions on what to do if the initial splint design does not produce the desired results. New product list of materials is also included.

“TMJ RADIOGRAPHY”

The complete instruction video on TMJ imaging. How to read and interpret Transcranials, APs, Tomograms, Arthrograms, CTs and MRIs of the TMJ. Learn which type of imaging produces the best image for soft tissue, bone, the disc and for disc displacement.

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TERRY T. TANAKA, DDS
QUESTIONNAIRE: FACEBOW AND ARTICULATORS

*** "Don't sign the questionnaire. Just answer the questions and turn it in." "Thank You."

1. ______ Male/ Female
2. ______ Age of doctor answering the questionnaire?
3. ______ What year did you graduate from dental school?
4. ______ Y/N Are you in general practice?
5. ______ Y/N Are you in a specialty practice? What specialty __________________?
6. ______ How many years have you been practicing clinical dentistry?
7. ______ Y/N Did you purchase a facebow and articulator in dental school?
8. ______ Y/N Did you purchase a facebow and articulator after you graduated from dental school?
9. ______ Y/ N Do you routinely use a facebow and a semi-adjustable articulator for your restorative and prosthetic procedures?
10. If you answered NO to the previous question, check why you don't use the facebow and semi-adjustable articulator?
    ______ (a) “waste of time,”
    ______ (b) “takes too much time”
    ______ (c) “can’t see the value in using it,”
    ______ (d) “too complicated to use regularly”
    ______ (e) "Other reason" ._____________________________________________
11. ______ Y/N Do you find that it is easy to use your current semi-adjustable articulator?
12. ______ Y/N Do you make study casts for your new patients as part of your exam records?
13. ______ DDS/ Assistant/ Lab Tech. -Who makes the study cast impressions and pours them up?
14. ______ DDS/ Assistant -Who makes the final tooth prep impressions in your office?
15. ______ DDS/Assistant/Lab Tech. Who pours the stone in the tooth prep impressions?
16. ______ DDS/ Assistant/Lab Tech. - Who mounts the study casts on the articulator in your office?
17. ______ Y/N Did you obtain a Fox Occlusal Plane in dental school?
18. ______ Y/N Did you purchase a Fox Occlusal Plane after you graduated from dental school?
19. ______ How do you communicate to the Lab Tech that the transverse plane(side to side) is canted?
    ______ a) I use a Kois facebow
    ______ b) I use a "bite stick" with wax or a "tongue blade with wax"
    ______ c) Other methods:_____________________________________________
20. ______ Y/N Do you make the transverse plane parallel to a line through the pupils of the eyes?
21. ______ How frequently do you make a Centric Relation Record for your patients?
    ______ 0% to 25% of the patients
    ______ 26%-50% of the patients
    ______ 51%-75% of the patients
    ______ 75%+% of the patients
22. ______ Y/N Do you routinely check to see if the initial contact on closure in the mouth is the same as the initial contact on the mounted study casts in centric relation?

** Log on to www.TerryTanakaDDS.com for the results of this questionnaire on Dec.1, 2010

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