the

143RD

CHICAGO DENTAL SOCIETY
MIDWINTER MEETING

The respected leader in scientific dental meetings

SCIENTIFIC PROGRAM: FEBRUARY 21 – 24, 2008
EXHIBIT DATES: FEBRUARY 22 – 24, 2008

COURSE C37
TRANSITIONAL BONDING: NON-TRADITIONAL DIRECT RESIN RESTORATIONS FOR MAJOR OCCLUSAL AND ESTHETIC CHANGES

CORKY WILLHITE, DDS

FRIDAY, FEBRUARY 22, 2008

CHICAGO DENTAL SOCIETY **MIDWINTER MEETING COURSE EVALUATION**

SPEAKER: _____ DATE: _____

SUBJECT: _____ NUMBER OF ATTENDEES: _____

PLEASE RATE YOUR SPEAKER AS TO:	**Excellent**	**Good**	**Fair**	**Poor**	**N/A**
SUBJECT SELECTED	4	3	2	1	0
TIMELINESS OF SUBJECT	4	3	2	1	0
COMPREHENSIVENESS	4	3	2	1	0
MEETING YOUR EXPECTATIONS	4	3	2	1	0
CONTENT LEVEL	4	3	2	1	0
DELIVERY	4	3	2	1	0
VOICE QUALITY	4	3	2	1	0
HOLDING YOUR INTEREST	4	3	2	1	0
APPROPRIATE AUDIOVISUALS	4	3	2	1	0
EFFECTIVE AUDIOVISUALS	4	3	2	1	0
OVERALL EVALUATION OF SPEAKERS	4	3	2	1	0
OVERALL EVALUATION OF THE PROGRAM	4	3	2	1	0
SHOULD THIS SPEAKER BE INVITED FOR FUTURE MEETINGS?	YES	NO			

WHAT TOPICS INTEREST YOU FOR THE FUTURE? _____

COMMENTS (use reverse if you need additional space): _____

_____

_____

NAME (REQUESTED BUT NOT REQUIRED—PLEASE PRINT): _____

DO NOT FOLD CARD. FOR CDS PERMANENT FILES.

RETURN EVALUATION CARD TO:
Chicago Dental Society
Aloysius F. Kleszynski, DDS
401 N. Michigan Ave., Suite 200
Chicago, IL 60611-5585

Transitional Bonding:
Non-Traditional Direct Resin Restorations for Major Occlusal and Esthetic Changes

Corky Willhite, DDS

Chicago Dental Society
Midwinter Meeting
February 22, 2008

for major restorative cases, full mouth rehabilitations, and smile makeovers:

- **traditional approach**:

  prepare, temporize, and deliver porcelain restorations

- **non-traditional approach**

  1st: transitional freehand bonding
  - will not provide "Ultimate Esthetics"
  - can expect 70-90% of esthetics
  - should provide virtually 100% of function

  then have following options

  2a. full case preparations for porcelain restorations

  2b. phased preparations

  2c. "upgrade" resin restorations

  2d. monitor and maintain

Traditional concerns with composite:

- wear
- resistance to fracture
- marginal integrity

wear:

"Many practitioners are fearful of restoring the anterior teeth or anterior guidance in young patients. It is the author's belief that restoration of anterior guidance is probably one of the best things that could be done for young horizontal bruxing patients who present with severe wear."

Spear F. Occlusal considerations for complex restorative therapy. In: McNeill c (ed). Science and Practice of Occlusion. Chicago:Quintessence, 1998:451.

in vivo wear

	wear data	(µm per year)	author/year	source
microhybrids	169 µm / 5 years	(34)	Wassell 2000	J Dent
	264 µm / 17 years	(16)	Wilder, et al 1999	J Esthet Dent
	300-400 µm / 10 yrs	(30)	Mair 1998	Quint Int
	106-149 / 3 years	(35-50)	Willems 1993	J Dent
	142 µm / 4 years	(35)	Lundin 1989	Swed Dent J
enamel	30 µm/year		R Christensen 1999	JADA
	16 µm/year (premolars)		Lambrechts 1989	J Dent Res
	28 µm/year (molars)		Lambrechts 1989	J Dent Res

111 Veterans Blvd, Suite 777, Metairie LA, 70005 504-831-1131 corky@SmileDesignCenter.com

resistance to fracture:

"Fracture toughness (K_{IC}) represents an intrinsic material property that characterizes a material's resistance to fracture."
Pilliar R, Smith D, Maric B. Fracture toughness of dental composites using the short-rod fracture toughness test. J Dent Res 1986; 65:1308-1314.

fracture toughness

	K_{IC} (MPa $m^{1/2}$)	author/year	source
microhybrids	1.16 - 1.27	Knoblock, et al. 2002	J Prosthet Dent
	1.02 - 1.14	Kim & Okuno 2002	J Oral Rehabil
	1.5 - 1.8	Ferracane & Condon 2000	Dent Mater
	1.35 - 1.37	Fujishima & Ferracane 1996	Dent Mater
	1.6 - 1.9	Kovarik, et al. 1991	Dent Mater
	1.02 - 2.30	Pilliar, et al. 1987	J Dent Res
tooth	dentin = 3.08	Mowaffy & Watts 1986	J Dent Res
	enamel = 0.6 - 0.9	Marshall, et al. 2001	J Biomed Mater Res

fracture resistance of feldspathic porcelain is essentially the same as for microhybrid composite

both materials have the ability to fracture if overstressed

fracture toughness

	K_{IC} (MPa $m^{1/2}$)	author/year	source
feldspathic	1.41 ± 0.18	Kvam 1992	Biomaterials
	1.16 - 1.86	Masayuki, et al. 1990	Dent Mater
	1.5 - 2.1	Taira, et al. 1990	J Oral Rehabil
	0.90 - 1.06	Morena, et al. 1986	Dent Mater
reinforced	**Hi-Ceram**		
	2.14 ± 0.14	Kvam 1992	Biomaterials
	Zirconia		
	1.72 - 2.22	Masayuki, et al. 1990	Dent Mater
	Aluminous		
	1.48 - 1.56	Morena, et al. 1986	Dent Mater

marginal integrity:

long bevel margin on enamel is most resistant of all margin types to secondary decay
minimal prep maintains more enamel for adhesion
"microscopically roughen the tooth"

111 Veterans Blvd, Suite 777, Metairie LA, 70005 504-831-1131 corky@SmileDesignCenter.com

patient priorities when choosing treatment:

- longevity is not every patient's highest priority
- money
- time
- fear
- conserving tooth structure is becoming more important to more patients

material review:

MICROFILL	HYBRID
fracture susceptible	***fracture resistant***
highly polishable	polish fades
highly translucent	less translucent
= ENAMEL (facial layer)	= DENTIN (& lingual layer)

for maximum strength and the simplest technique choose hybrid as ***only*** material

transitional bonding advantages:

- virtually no prep = reversible
- completion possible in one appointment
- diagnostic, even major changes can be tested
- lower introductory cost to high-quality treatment
- wear rate more similar to enamel
- easy to adjust and repair
- improves ability for inter-disciplinary treatment
- allows for phased treatment
- good for improving skills at freehand bonding

111 Veterans Blvd, Suite 777, Metairie LA, 70005 504-831-1131 corky@SmileDesignCenter.com

transitional bonding advantages:

- virtually no prep = reversible
- completion possible in one appointment
- diagnostic, even major changes can be tested
- lower introductory cost to high-quality treatment
- wear rate more similar to enamel
- easy to adjust and repair
- improves ability for inter-disciplinary treatment
- allows for phased treatment
- good for improving skills at freehand bonding

precautions:

stress must be controlled

- night-time appliance
- "don't use teeth as tools"
- low abrasive toothpaste
- Al_2O_2 polishing paste for prophylaxis

111 Veterans Blvd, Suite 777, Metairie LA, 70005 504-831-1131 corky@SmileDesignCenter.com

Step-by-Step Freehand Technique

transitional bonding TECHNIQUE for anterior teeth:

1) minimal prep ("microscopically roughen tooth" including a shallow bevel and rounding off any sharp angles; if desire color change prep longer, deeper bevel on facial)

2) pumice (plain pumice + water; prophy cup)

3) etch & adhesive (don't shortchange adhesion just because called Transitional Bonding)

4) Place & sculpt small amount of hybrid for 1st increment to just barely cover worn surface (Renamel Universal microhybrid adapts very well to prep even if bur marks or other irregularities are present) and cure for 10 seconds

5) Place & sculpt hybrid for 2nd increment to build incisal extension, should be an extension of the bevel with space left for facial increment (Renamel Nano-fil doesn't adapt to prep as well as Universal but won't slump) and cure for 10 seconds

6) Place & sculpt hybrid for 3rd increment to build facial layer (Renamel Universal microhybrid once sculpted will tend to smooth itself out if left alone for about a minute) and cure for 10 seconds

7) Final cure with glycerin gel (to eliminate oxygen-inhibited layer) for 60 seconds. If it is more convenient to do the final cure later, that is OK as long as it is done before the final polish.

8) Contouring of primary anatomy (outline form, line angles, occlusion), then secondary anatomy (contour with carbide finishing burs; extra-coarse and coarse Flexi disks)

9)

BLUE FLEXI DISK (finishes contouring) **no surface defects should be visible after completing blue disk** (repair defects prior to using any finer polishing disks)

10) Polishing (yellow and pink Flexi disks; Enamelize and Flexi buff disks)

after upper centrals are done, step back and evaluate that midline and incisal plane align facially

111 Veterans Blvd, Suite 777, Metairie LA, 70005 504-831-1131 corky@SmileDesignCenter.com

Template technique

- recommended for up to 6 *anterior* teeth only; upper or lower
- can save time *if* careful to avoid bonding teeth together,
- re-using template to build up teeth one at a time increases risk of it not seating fully

1) create template from diagnostic wax-up, use polyvinylsiloxane impression material to make a template (index or stent) of the lingual and incisal surfaces of the teeth to be restored
2) test template for accuracy and amount of "fill" needed with GC Fit Checker; then place appropriate amount of composite into template (goal is to form entire lingual surface and incisal edge but kept thin, so don't overfill), store in the dark
3) prep, pumice, etch and adhesive all teeth to be bonded (max of 6 anterior teeth advised); assure interproximal contacts are light enough for Mylar strip to slide through easily
4) place minimal 1st increment to cover worn incisal edge and any hard-to-reach areas of the tooth (do not cure); use unwaxed floss to remove composite near interproximal contacts
5) seat template with uncured composite, use very thin blade to clear contact areas so teeth don't bond together (a Mylar strip may be used as a very thin instrument)
6) light cure each tooth 10 sec; remove template; examine lingual margin and add to any gaps of rough surfaces (unfilled resin, gentle air to thin, use small increments of composite or flowable)
7) add enough composite to reinforce any very thin areas to minimize risk of accidental fracture; cure
8) build up teeth to full contour (individually or every-other-tooth); contour and polish proximal surfaces prior to completing adjacent teeth (so can use Mylar Pull to create contacts without a matrix)

Contouring

- understanding tooth topography is invaluable when contouring restorations
- contouring is the process of adjusting the contours, it's NOT polishing
  ALL contouring should be complete prior to ANY polishing
- Start with ET and OS burs (Brasseler) or Flexidisks (coarse or extra-coarse; Cosmedent)
  Complete contouring with medium grit Flexidisks (NO surface defects should be evident)
  Proximal surfaces can also be contoured with coarse/medium grit Flexistrips (Cosmedent)

Polishing

- polishing should be much quicker than contouring
  if surface defects are present, polishing will make them MORE evident
- Start with fine grit Flexidisks, then super-fine

Proximal surfaces should be polished with fine/super-fine grit Flexistrips

111 Veterans Blvd, Suite 777, Metairie LA, 70005 504-831-1131 corky@SmileDesignCenter.com

transitional bonding TECHNIQUE for posterior teeth:

mandibular position should be "set" on anterior teeth so when pt bites down the mandible is in the desired position to build posterior centric stops

in Centric Relation this usually requires no manipulation by this time (once anterior teeth are built, the anterior stops create a tripod effect with the condyles that should allow for a predictable closing position) but it is important to check that the pt does close into the desired mandibular position before adding composite to the cusps

LOWER TEETH

if both arches involved, add to buccal cusps of *lower* teeth (functional cusps) before uppers to achieve centric stops

1. microscopically roughen if needed
2. pumice buccal & occlusal surfaces
3. etch (60 seconds if unprepped) & adhesive
4. place microhybrid to build up buccal cusp
5. have pt. occlude into uncured resin and hold

   (asst. suctions first to eliminate excessive saliva)
6. light cure from buccal while pt. is biting
7. pt. opens then cure again with glycerin gel
8. contour to remove excess (maintain centric stop, check for interferences in excursions)
9. polish

once lower B cusps have been built for function, add to buccal cusps of *upper* teeth (non-functional cusps) to blend length with anteriors for desired smile curve

UPPER TEETH

1 – 9 same steps as for lower buccal cusps

check for interferences in excursions, adjust *slopes* of new cusps only (not cusp tips) to avoid losing centric stops

111 Veterans Blvd, Suite 777, Metairie LA, 70005 504-831-1131 corky@SmileDesignCenter.com

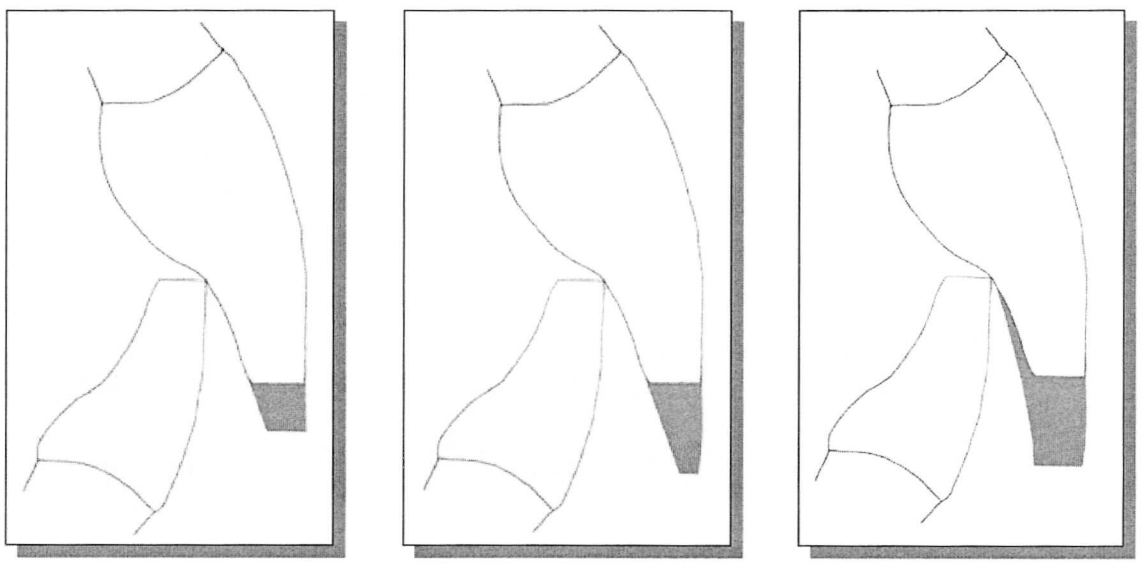
Occlusal Considerations

building anterior guidance (lengthening anterior teeth):

- guidance path may be lengthened without *occlusal* restrictions (esthetics and phonetics do restrict)
- steeper guidance path requires a transitional phase
- develop two-point contact in protrusive (can eliminate deviation if develop with pt watching in mirror)
- posterior disclusion desired (may need to equilibrate posterior teeth to eliminate interferences, but less with add'l anterior length)

must control hyper-stress to expect longevity

building anterior guidance while *maintaining* V.D. in a Class I patient:



guidance path not steepened

steepened path

111 Veterans Blvd, Suite 777, Metairie LA, 70005 504-831-1131 corky@SmileDesignCenter.com

<u>increasing Vertical Dimension</u> VD is not inviolate

3 reasons to open VD (from Dr. David Hornbrook notes)

1. obtain better anatomy of posterior teeth
2. improve overjet and/or overbite after smile design
3. facial esthetics

regarding muscle lengthening:

"If the condyle is left in a fixed position and the anterior is opened, for each 3 mm of opening (measured on anterior teeth) there is approx 1mm increase in masseter length."

"If the anteriors are left fixed and the condyle is seated, for each 1mm of condylar seating there is appox 0.7 mm of muscle shortening."

"KEY: determine the amount of condylar seating from MIP to CR. For each 1mm of seating, the anterior can be opened 2mm without any change in contracted muscle length."

stability:

"Will teeth intrude? Possible but no way to predict it. Studies show 20-50% of pt's will intrude (but never all the way, and maximum intrusion is reached by 6 mo's)"

(from Dr. Frank Spear handout)

Is a removable appliance needed to test a change in V.D.?

"An occlusal appliance ... is not an effective method of assessing vertical dimension alterations. When an acrylic occlusal appliance is placed in a patient's mouth, vertical dimension is just one of the many variables the appliance is changing; other variables include the ICP contact points, the angle of tooth contact, the excursive contact points, and whether the patient can tolerate a large piece of acrylic in the mouth for an extended period of time. The use of provisional restorations, be they composite bonded on teeth or acrylic provisional restorations on prepared teeth, is a much better method of assessing the occlusal changes in vertical dimension and speech."

Spear F. Fundamental occlusal therapy considerations. In: McNeill C (ed). Science and Practice of Occlusion. Chicago:Quintessence, 1997:432.

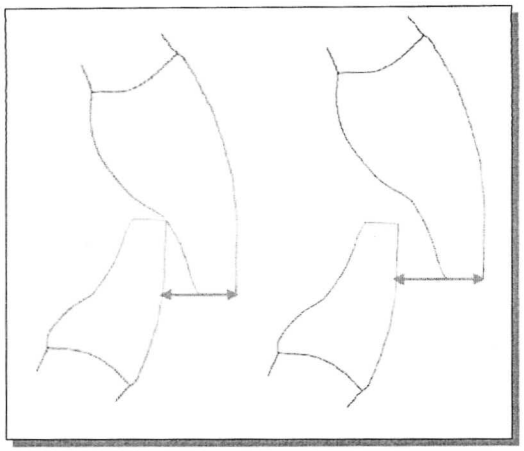
Only one centric stop per tooth is needed for stability:

"A SIMPLIFIED OCCLUSAL SCHEME: CLINICAL GUIDELINES
...The buccal cusps of the mandibular posterior teeth occlude in the central fossa of the maxillary posterior teeth. There must be at least one occlusal contact per tooth to ensure axial stability by neutralizing the eruptive forces of the periodontium."

Wiskott H, Belser U. A rationale for a simplified occlusal design in restorative dentistry: Historical review and clinical guidelines. J Prosthet Dent 1995;73:169-183.

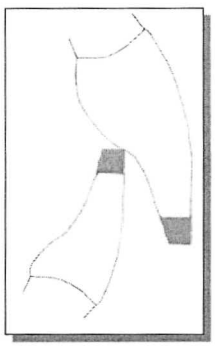
111 Veterans Blvd, Suite 777, Metairie LA, 70005 504-831-1131 corky@SmileDesignCenter.com

building anterior guidance while *increasing* V.D. in a Class I pt:



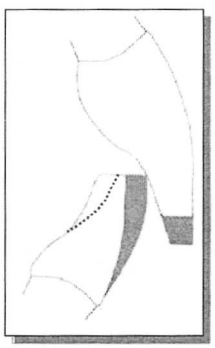
increasing V.D. also increases overjet

there are 3 basic options to gain anterior centric stops when increasing V.D.:

1. 

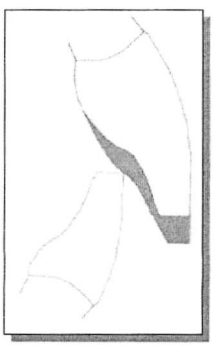
this option may seem simplest, but in many cases will cause lower incisal edges that are too long for a level occlusal plane

least used option

2. 

this option can also be used to improve alignment of lower incisors

consider reducing linguals of lowers to avoid thick incisal edges

3. 

this option avoids need to treat lower incisors

guidance path may actually be made less steep (which is advantageous with horizontal bruxers)

111 Veterans Blvd, Suite 777, Metairie LA, 70005 504-831-1131 corky@SmileDesignCenter.com

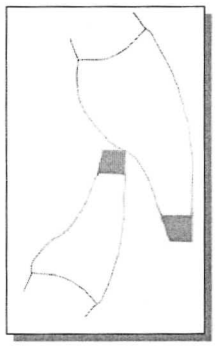
building anterior guidance while *maintaining* V.D. in a Class II patient:

same as Class I

building anterior guidance while *increasing* V.D. in a Class II pt:

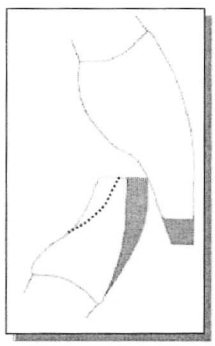
increasing V.D. also increases overjet so Class II pt's become *more* Class II

there are 3 basic options to gain anterior centric stops when increasing V.D.:

1. 

same as Class I

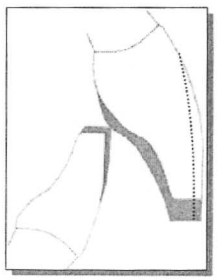
least used option since will often cause lower incisal edges to appear longer than occlusal plane

2. 

same as Class I

this option can also be used to improve alignment of lower incisors

consider reducing linguals of lowers to avoid thick incisal edges

3. 

difficult to accomplish centric stops on Class II pt's by only adding to linguals of upper anteriors

consider contouring enamel on facial of uppers to reduce protrusion (only able to gain slight improvement)

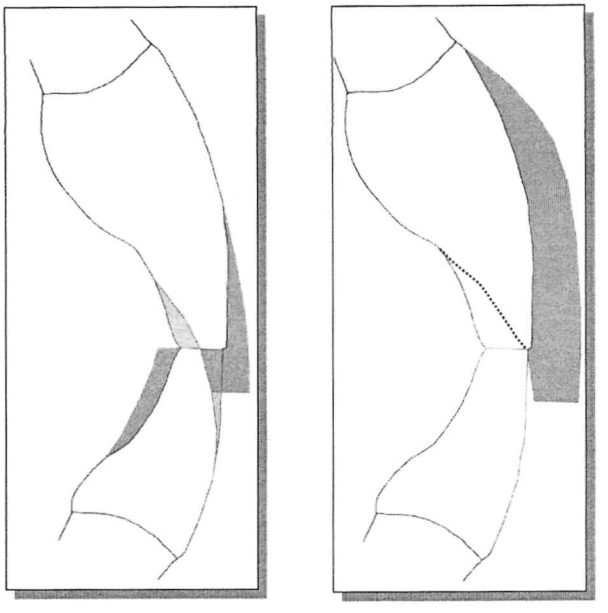
111 Veterans Blvd, Suite 777, Metairie LA, 70005 504-831-1131 corky@SmileDesignCenter.com

building anterior guidance while maintaining V.D. in a Class III pt:

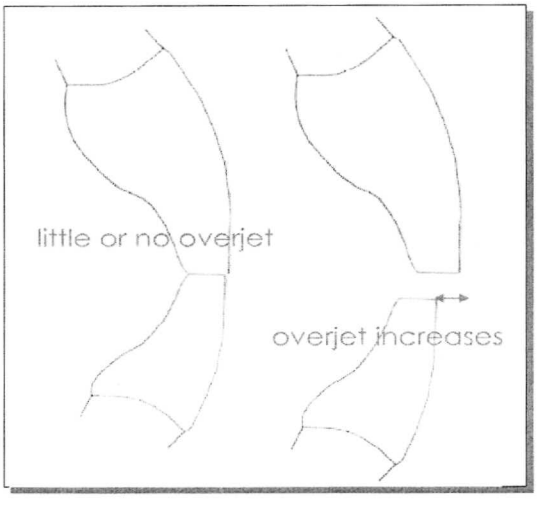
if end-to-end occlusion with no anterior guidance, may be able to create guidance

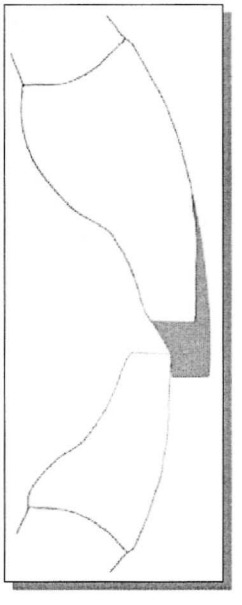
consider building out facial of uppers for more lip support, also reducing lingual for smoother lingual contour

consider reducing facial of lowers to decrease protrusion, also adding to linguals so incisal edge doesn't appear too thin



building anterior guidance while increasing V.D. in a Class III patient:





most common option to gain anterior centric stops when increasing V.D. for Class III patients

increasing V.D. also increases overjet; so can potentially turn a Class III pt into a Class I

Corky Willhite, DDS
111 Veterans Blvd., Suite 777
Metairie, LA 70005-3035
USA

phone: 1-504-831-1131
fax: 1-504-831-1179

corky@SmileDesignCenter.com

To the printer:

Don't print this page, but keep the next page on its own sheet (*not the back of the previous page*).

Thank you

Would you like more information?

Please check the items you would like to receive: (Chicago Midwinter 2/22/08)

- ❑ Office brochure
- ❑ Charting page & pt. history form
- ❑ Model release
- ❑ Information on additional courses

Please tell me how this course could be improved:

Please tell me what you liked the best about this course:

Please print your shipping information:

Name (print): _____

Address: _____

City, State, Zip: _____

Phone: _____

email: _____

Please fax or send to:

Corky Willhite, DDS 111 Veterans Blvd., Suite 777 Metairie, LA 70005-3035 USA	phone: 1-504-831-1131 fax: 1-504-831-1179 corky@SmileDesignCenter.com