

Clinical Case Report, Accreditation Case Type V: Six or More Direct Resin Veneers



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INTRODUCTION

PERSONAL AND SOCIETAL COSTS OF METHAMPHETAMINE USE

Evidence suggests that the illicit use of methamphetamine is on the rise.¹ This highly addictive drug can be made from easily available ingredients, and recipes for its manufacture are widely available on the Internet. The attraction of this drug is its intense and long-lasting effects, which include euphoria, hyper-alertness, and perceived physical abilities. The list of negative health implications is long and can include central nervous system, cardiovascular, lung, liver, and kidney toxicities; as well as rampant tooth decay known as *meth mouth*.²

The oral manifestations of long-term meth use involve rampant deep caries with associated periodontal involvement and tooth fracture.

There is an equally long list of psychiatric symptoms, which include violent behavior, depression, anxiety; and, sometimes, suicide. The social and financial costs of the proliferation of this drug are staggering. They include dropping out of school and the work force, increased robberies, prosecution, and incarceration, child welfare costs, health-related expenses, and the investigation and clean-up costs associated with the proliferation of illegal methamphetamine labs.³

ORAL COSTS OF METH USE

The oral manifestations of long-term meth use involve rampant deep caries with associated periodontal involvement and tooth fracture. One contribut-



Figure 1: Smile, before and after.

ing factor to this is the reduced salivary flow brought on by the drug's use and the loss of saliva's buffering effects. Without this natural buffer to counteract the demineralization of the enamel, the process of decay begins and progresses almost unchecked. Use of meth creates carbohydrate cravings, which are satisfied by increased consumption of sugars (especially soft drinks) and starches. Add to the list the abandonment of oral hygiene, and you have an environment custom-designed for dental devastation.²⁻⁴

The goal of this article is not to provide a detailed review of the history and pharmacology of this drug. Rather, it is to suggest one option available to restore the destruction caused by meth use in the case of a recovering meth user. Due to increased availability of the drug, the profile of meth abusers has been changing to a more mainstream population.¹ This change increases the likelihood that every dental practice will face the challenge of restoring the mouth of a recovering user.

PATIENT HISTORY

The patient was a 19-year-old recovering meth user. He had been drug-free for six months, and sought help in our office (Fig 1). Over the course of several interviews and discussions, we found him to be completely open about his problem and accepting of full responsibility. Other than his past drug use he was in excellent health. At all office visits the patient was lucid, courteous, and grateful that we agreed to treat him. His chief complaint was the condition of his front teeth; his desire was to do something about the damage to the teeth, his smile, and his self-esteem.

The maxillary anterior teeth had extensive and destructive decay, especially on the facial and interproximal surfaces.

CLINICAL DATA

Clinical examination revealed a full complement of teeth in Class I occlusion, with varying degrees of

decay and periodontal involvement. There were no signs or symptoms of temporomandibular disease. The patient reported an occasional vague ache involving tooth #31.

A series of full-mouth radiographs confirmed areas of advanced decay. Despite the visible gingival inflammation, the radiographs revealed sound bone. Three impacted wisdom teeth were present, in addition to the erupted one in the upper left.

The maxillary anterior teeth had extensive and destructive decay, especially on the facial and interproximal surfaces. Other teeth had decay, as well. However, the patient was most concerned about his anterior teeth (Fig 2). Complicating the process was the condition of the gingival tissue; and the fact that several teeth were rotated and tipped in their original position, creating a less-than-ideal situation for recovery of the interdental papillae (Fig 3).

DIAGNOSIS

My diagnosis was advanced decay of the upper anterior teeth, with se-

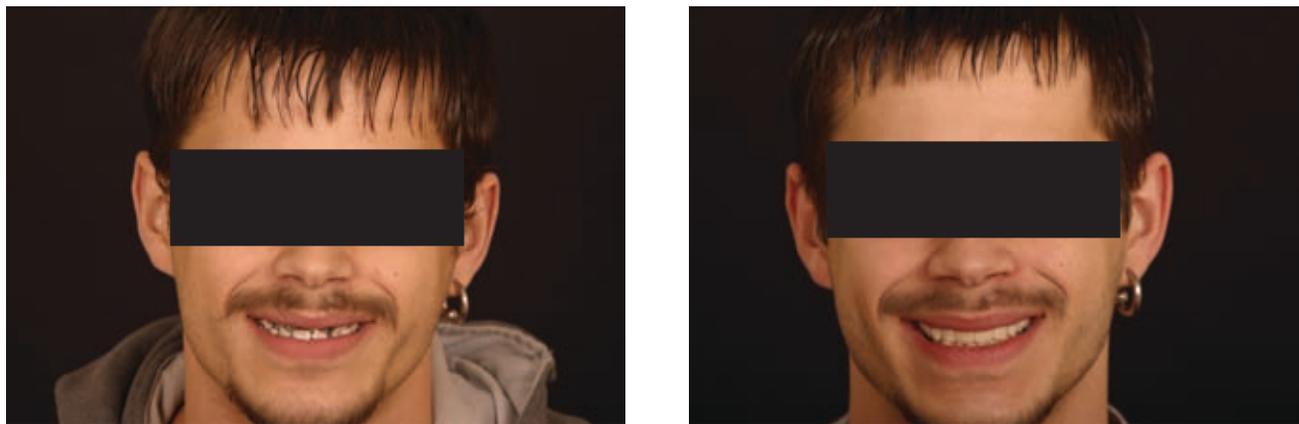


Figure 2: Full face, before and after.

vere gingival disease. There also was moderate to severe decay in other teeth, with a carious pulp exposure involving the lower right second molar.

TREATMENT PLAN

The goals of this treatment were to educate the patient, arrest the decay process, and restore this young man's smile while rebuilding his self-esteem and self-respect.

Due to the condition of the teeth and soft tissue, the planning process involved many considerations. These included how to deal with the condition of the gingiva, and whether the case should be restored with direct or indirect restorations. To help develop the plan, study models and a diagnostic wax-up were completed, as well as digital photographs.

The treatment choices seemed to be limited to full-coverage crowns, less invasive porcelain veneers, or even less invasive direct resins.

While requiring a different level of skill and patience, the use of direct resins in cases of advanced destruction of the teeth is a more conserva-

tive approach, calling for less removal of remaining tooth structure than with indirect restorations. This is an especially important consideration in young patients.

Large direct resin cases... require the dentist to think like a ceramist.

Composite resins and their versatility have evolved to the point where they enjoy broad applications for the skilled dentist. The newer, stronger and more natural-looking resins can be used for the smallest of restorations or to recreate an entire smile. Techniques can be employed to closely mimic nature and the characteristics of adjacent teeth.⁵

Large direct resin cases can test the skill and creativity of a dentist beyond what is required for indirect restorations, for they require the dentist to think like a ceramist. They require planning and visualization; and, usually, advanced hands-on training.⁶⁻⁹

All the elements of smile design must be in harmony, beginning with soft tissue. Only after biologi-

cal health is achieved can the dentist begin the process of shaping the tissue with the laser and establishing correct margin placement of the restoration.^{10,11}

ARMAMENTARIUM

- D60 digital intraoral camera system (Canon; Tokyo, Japan)
- Jeltrate alginate (Dentsply Caulk; Milford, DE)
- white stone for diagnostic models (Kerr; Orange, CA)
- Sil-Tech putty (Ivoclar Vivadent; Amherst, NY)
- Vitapan Classic Shade System (Vident; Brea, CA)
- Ivory rubber dam clamp, size 8A (Heraeus Kulzer, South Bend, IN)
- Hygenic rubber dam, medium thickness (Coltene/Whaledent; Mahwah, NJ)
- 3.25x magnification system (Orascoptic Research; Middleton, WI)
- Odyssey laser (Ivoclar Vivadent)
- retraction cord (Ultradent; South Jordan, UT)



Figure 3: Retracted, 1:2, before and after.

- ELECTROtorque/INTRAmatic electric handpiece system (KaVo America; Lake Zurich, IL)
- Concepsis disinfectant (Ultradent)
- Microbrush Plus (Microbrush; Grafton, WI)
- Ultra-Etch 35% phosphoric acid (Ultradent)
- Optibond Solo Plus adhesive (Kerr)
- Tetric Flow flowable resin (Ivoclar Vivadent)
- 4 Seasons enamel and dentin composite resin system (Ivoclar Vivadent)
- composite placement instruments (8AL long-bladed, IPCL long-bladed extra-thin, IPCT short-bladed extra-thin) (Cosmedent; Chicago, IL)
- divider (Miltex; York, PA)
- Cen-Tech digital caliper (Harbor Freight Tools; Camarillo, CA)
- Creative Color tints and opaque shades, (Cosmedent)
- LED Demetron II curing light (Kerr)

- ET carbide bur finishing kit (Brasseler; Savannah, GA)
- #12 Bard-Parker blade (BD Medical Systems; Franklin Lakes, NJ)
- Top finisher system (Cosmedent)
- Astropol polishing cups and points (Ivoclar Vivadent)
- Enamelize polishing paste (Cosmedent)
- Ardent articulating paper (Whipmix; Louisville, KY)
- waxed dental floss (Johnson & Johnson; New Brunswick, NJ)

TREATMENT SEQUENCE

The treatment sequence for this case was planned as follows:

1. Diagnostic digital photographs and study models to be used for treatment planning and the mock-up, and determination of optimal tooth and smile design. The mock-up would be used for the fabrication of a putty stent to guide the placement of the incisal edges.
2. Endodontic treatment of #31.
3. A soft tissue program with hygiene instructions to return the soft tissues to an optimal level of health prior to the beginning of the restorative phase. This program was also undertaken to prove to us that the patient was willing and able to take the responsibility needed to protect the finished dentistry.
4. Gingival shaping with a soft tissue laser to create access and correct margin placement, and to achieve an improved soft tissue outline.
5. Direct resin veneers on teeth #6–11.
6. Additional direct resin restorations, teeth #2, #5, #15, #22, and #27.
7. Indirect restorations on teeth #14 and #31.
8. Continuing reinforcement of home care and support against a relapse into drug use.
9. Referral to an oral surgeon for removal of the third molars.



Figure 4: Retracted, 1:1, before and after.

TREATMENT

Because of the onset of a toothache related to the carious exposure, endodontic treatment and an indirect restoration were done on tooth #31 prior to any other treatment.

Next, the patient was enrolled in a soft tissue program and instructed on home care. It was vital to the successful completion of this case to establish optimal gingival health prior to beginning restorative care. He was scheduled to begin restorations once he achieved gingival health and demonstrated the ability to maintain it.

At each appointment it was confirmed with the patient that he had not returned to use of any recreational drugs that would jeopardize our agreement (or possibly result in a cardiac event if he were given local anesthetics containing epinephrine).

A diagnostic wax-up was made on mounted study models to identify the optimal functional placement of the incisal edges and lingual surfaces of the teeth. From this, a putty matrix was made to be used as a guide during resin placement.

At each appointment, 2% Lidocaine with 1:100,000 epinephrine was administered and a split rubber dam was placed. A laser was used for gingival shaping and the decay was carefully removed. No carious exposures occurred in any of the anterior teeth. Care was taken to shape the tissue to allow for the correct gingival zenith and interdental papillae.

After the decay was removed, disinfectant was applied with a brush syringe and the teeth were lightly scrubbed and rinsed off. The teeth were dried, total-etched the suggested time with 35% phosphoric acid, and washed thoroughly and left damp. Several layers of adhesive from a Unidose dispenser were applied; and, after 20 seconds, air-thinned, then cured with the LED curing light. A thin layer of flowable resin was applied to all dentinal surfaces and cured.

The previously made putty matrix was used to aid placement of the lingual and incisal edge positions of the teeth.¹² Shade A2 dentin was used to build the lingual aspects and the facial cervical third of the prepared teeth. This was followed by

dentin shade A1 for the remaining buildup, with some overlap in a gradient fashion to blend. Each increment was cured for 20 seconds and the completed restoration was cured from all angles for an additional amount of time.

White opaquer was applied with a fine brush in random patterns before placement of the enamel layer, in an effort to mimic the adjacent and opposing arbitrary tooth characteristics. Each application of resin and modifiers was cured with the curing light. A1 enamel was applied over the entire facial and interproximal surfaces of the teeth, light-cured, and roughly contoured. The amount of opaquer used was greater in the posterior than in the anterior, to transition from the heavier characteristics of the posterior to the less-affected anterior teeth.

Care was taken while placing the interdental contacts, to be sure they were tight enough and correctly positioned incisal-lingually in proximity to the osseous crest, to create an opportunity for healthy and esthetic interdental papillae to exist.¹³

Digital photographs were made as the case progressed and were analyzed as to what changes were needed to bring the case to the AACD's Accreditation standards. With the photographs, it was possible to evaluate how the dental and gingival esthetics blended with the smile and lip line. A digital caliper and divider were used to ensure overall symmetry, ideal length-to-width ratio, and Golden Proportion.¹⁴ Magne's principles of natural oral esthetics were referred to often during completion of the case.¹⁵

Shaping and finishing were done with a combination of a bur finishing system, cups and points, and a top finisher system. Polishing paste on a felt wheel with a slow-speed handpiece brought out the final shine.¹⁶ Occlusion was checked with articulating paper and adjusted as needed (Fig 3).

Class V direct resins using similar techniques were completed on teeth #5, #22, and #27 (Fig 4). Teeth #2 and #15 also were restored with direct resins. Tooth #14 did not require endodontic treatment and was restored with an indirect CEREC Paradigm restoration (Sirona Dental Systems; Charlotte, NC).

At each appointment, the importance of oral hygiene was continually and compellingly reinforced with the patient.

At the completion of treatment, the patient was referred to an oral surgeon for evaluation of his third molars.

SUMMARY AND CONCLUSION

Some composite resins available today nearly rival porcelain in their clinical and esthetic capabilities. The successful use of resins in a case such

as this requires planning, time, and patience. In this case, direct resin seemed a reasonable choice in that it required less removal of remaining tooth structure, an especially important consideration in a young patient. In patients at risk of returning to such a destructive addiction as methamphetamine abuse, it makes economic sense to forgo the extra expense of indirect restorations. In addition, direct composite veneers may be more easily maintained at the margins should the patient relapse.

After this case was completed, our young patient found a job and got his own apartment. Unlike when he first came to see us, he was no longer hesitant to stay and have a conversation. Although it was difficult to get this young man to smile before treatment, he now smiles all the time! Clearly, this dentistry has significantly enhanced and improved his life (Figs 1 & 2).

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Examiners' Perspective for Ted Murray, D.D.S., M.A.G.D.



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As I begin to write my first column for Examiners' Perspective, I can't help but get the same feeling of anticipation that I experience each time I go to the AACD Executive Office to examine Accreditation cases. It is so gratifying to see someone's hard work and dedication pay off with a case that passes Accreditation standards. Don't forget that all examiners have been down the same path, so we understand that feeling of accomplishment and we take pride in seeing you do well. We want you to achieve your Accreditation!

Accreditation Case Type V, Six or More Direct Resin Veneers, is considered by many candidates to be the most difficult of the five Accreditation case types. It evaluates a candidate's ability not only to handle composite resin, but also to master smile design principles. Almost all of the Accreditation criteria apply to this case type. With direct resin veneers, you have complete control and you can let your artistic ability shine.

Demonstrating great skill, Dr. Murray tackled a case that was difficult because of the serious decay issues and generalized gingivitis. He achieved a very dramatic result. It is important to note, however, that Accreditation success has nothing to do with how dramatic and improved the difference is between the "before" and "after." Rather, it is based entirely on the final results meeting the Accreditation criteria.

Smile design principles were well demonstrated by Dr. Murray. He recognized the necessity of doing some gingival reshaping so that he could achieve ideal width-to-height relationships. His handling of composite resin shows his command of the material. Dr. Murray was able to achieve a very convincing shade match with the upper and lower natural teeth. In addition, the internal characteristics using white opaque had a very lifelike appearance. The finish and polish, even though this material is a microhybrid, matched the surface luster of the natural teeth beautifully.

The examiners passed this case unanimously. Several examiners noted some gingival inflammation and blunted papillae; it was serious enough for one examiner to assign it a major fault. Lack of development of line angles was a minor fault cited by some examiners. This is a very common fault seen in Case Type V, which often is noticed in the occlusal view. Nevertheless, the case passed easily.

Dr. Murray deserves to be very proud of the superb job he did with Case Type V. *AF*

