An orthodontic assistant trained by OraMetrix staff performs the scan. From this 3-D model, the occlusion is treated in the virtual world (on the computer).

While the setup of the occlusion is performed in conjunction with the company’s digital lab technicians, the orthodontist has total control over the final result. The teeth are moved in the virtual world on the computer screen to completion. This information drives the SureSmile robot located in Richardson, Texas. This robot bends wires made of CuNiTi shape memory alloy to a level of precision well beyond human abilities.

The robotically-bent wire is sent back to the orthodontist’s office for placement in the patient’s mouth as in a standard archwire change appointment. The gentle forces of the CuNiTi wire move the teeth precisely into the desired final position. This precision adds efficiency to the treatment, which, in most cases, results in shorter treatment time — typically by 30–40 percent.

Here is a closer look at two cases treated with SureSmile.

**Case 1, by Dr. Adam Weiss**

An adult female presented with a Class III skeletal pattern with a Class III malocclusion requiring surgically assisted orthodontic correction (Fig. 1a–1h).

The patient began treatment on Oct. 23, 2006, had her SureSmile scan on Nov. 30, 2006, and had her surgery in March 2007. Her braces were removed July 18, 2007. Total treatment time from banding to debanding was nine months, whereas a conventional treatment time estimate would have been 18–24 months. Figures 2a–2h show the patient pre-surgery, and figures 3a–3h are the final.

**From left, Fig. 2c: Progress lateral view; Fig. 2d: Progress upper occlusal.**

**Fig. 1c: Initial lateral view.**

**Fig. 1d: Initial upper occlusal.**

**Fig. 1e: Initial lower occlusal.**

**Fig. 1f: Initial right occlusion.**

**Fig. 1g: Initial anterior occlusion.**

**Fig. 1h: Initial left occlusion.**

**Figs. 2a, 2b: Progress front view; Fig. 2c: Progress lateral view; Fig. 2d: Progress upper occlusal.**

**Fig. 1i: Initial lateral view.**

**Fig. 1j: Initial upper occlusal.**

**Fig. 1k: Initial lower occlusal.**

**Fig. 1l: Initial right occlusion.**

**Fig. 1m: Initial anterior occlusion.**

**Fig. 1n: Initial left occlusion.**

**Figs. 2a, 2b: Progress front view; Fig. 2c: Progress lateral view; Fig. 2d: Progress upper occlusal.**

**From left, Fig. 2c: Progress lower occlusal; Fig. 2d: Progress right occlusion; Fig. 2e: Progress anterior occlusion; Fig. 2f: Progress left occlusion.**
The Economy Has Changed, Your Market Has Changed

So What Have You Changed?

OrthoSynetics’ wants to help you change the impact the current economy is having on your practice.

For a limited time we are offering a Free Practice Assessment to put you on the right track and have your practice challenges solved by one of our industry experts.

Our Free Practice Assessment Includes:

- Market Analysis
- Financial Review
- Practice Consulting
- Marketing Program Assessment
- Search Engine Optimization Evaluation

Sign up today at www.orthosynetics.com/nofeeassistanceoffer/

Or Call Us at 888.622.7645
Case 2, by Dr. Mark Feinberg

- Fig. 4: An adult female presented with a mild bimaxillary protrusion, minimal overbite and overjet with a partial anterior crossbite, mild open bite in the right canine area and mild-moderate upper and lower dental crowding.

The smile line characteristics were acceptable, and buccal occlusion was Class I with posterior dentition well-interdigitated and acceptable.

The patient’s main complaint was, “I don’t like my crooked teeth, and can you correct my smile?”

The original treatment plan involved a non-extraction, comprehensive approach involving both upper and lower arch treatment, aligning the upper and lower anterior segments and idealizing the posterior occlusion but limiting potential side effects through pre-treatment tooth planning strategy and precision wire-bending therapies.

The patient’s records were scanned into the SureSmile system, and diagnostic software toolsets were employed to plan treatment. The most critical objectives were to maintain and enhance the overbite and overjet while aligning the dentition and correcting the right canine open bite.

In terms of soft tissues, pre-treatment structures would be maintained as they were deemed acceptable and regional focus would be on smile line improvements through dental alignment.

- Fig. 5: Class I bimaxillary protrusive with minimal overjet and partial anterior crossbite.

- Fig. 6: Initial cephalometric radiograph and tracing.

- Fig. 7: At the appointment for appliance placement, the patient inquired if she could change the treatment plan and treat the upper arch only.

Understanding and appreciating the power of SureSmile technology to titrate and control tooth movement to an unprecedented degree, the plan was seamlessly and efficiently modified. 0.022” pre-adjusted brackets were placed at that time, and a scan was performed.

- Fig. 8: Seven weeks after placement of the first wire, a 017” x .025” CuNiTi wires upper arch wire, the patient elected comprehensive orthodontic treatment involving upper and lower fixed appliances. At this time, lower brackets were placed and a therapeutic scan of the teeth with brackets was performed.

- Fig. 9: In this instance, at the bracket placement appointment, the patient’s brackets also were scanned, and subsequently, two treatment plans were designed involving 3-D simulation software and 3-D diagnostic toolsets.

Based on minimal posterior tooth movements and focused strictly on anterior arch length dynamics, the first plan involved 3.9 mm of interproximal reduction (IPR) as a function of more retraction of the upper central incisor teeth.

- Fig. 10: The second plan involved more lateral incisor and left central incisor advancement and consequently less IPR as the arch length deficiency using this method was 0.2 mm. This would be more of a typical “straight wire” effect.

- Fig. 11: A comparison of plan 1 vs. plan 2 with respect to buccal/lingual movement of upper anterior teeth.
• Fig. 12: The occlusal contacts depicted in the final plan 2. Contacts are depicted by color coding—green, yellow, and red, based on degree of contact.

• Fig. 13: Virtual setup based on clinician’s prescription and detailing.

• Fig. 14: Computerized ABO-style score for quality check.

• Fig. 15: Based on the plan 2 setup and the clinician’s therapeutic prescription, the lab manufactured a robotically-bent upper 0.017” x 0.025” CuNiTi archwire with passivity (no tooth movement bends) in the buccal segments and tooth movement bends limited to the upper incisor area only. The ability to titrate and optimize tooth movement in specific areas, as deemed appropriate based on individual circumstances, is one of the many core strengths of this therapeutic technology.

• Fig. 16: Comparison superimposition performed based on tooth movement, which occurred over a seven-week interval. The green teeth represent tooth position after the first archwire placement and the white teeth present tooth movement prior to the first archwire placement. The top right image shows the initial wire insertion, and the bottom right image shows six weeks post-wire insertion.

• Fig. 17: A comparative superimposition was performed, which revealed the fidelity of the tooth movement desired in plan 2 to the clinical reality of what occurred. The green modeled teeth represent our clinical tooth movement goals vs. the white modeled teeth, which reveal what occurred in clinical actuality.

An additional 15-minute therapeutic scan was performed after placement of lower fixed appliances, and additional treatment strategizing was undertaken. This would not only involve lower arch treatment/mechanics strategy but upper arch modifications as well. The flexibility and robust nature of SureSmile technology in this regard was critically valuable.

• Fig. 18: 100 percent activation.

• Fig. 19: Six weeks into treatment, the patient was so impressed with the rapid improvement in tooth appearance that she re-elected to treat both upper and lower arches.

A copper nickel wire in the lower arch. Seven months into treatment, additional .019” x .025” CuNiTi upper and lower arch wires were placed. Triangular elastics were worn from month 4.5 through month 8.

• Fig. 20: Comprehensive treatment/lower movements.

• Fig. 21: Diagnostic software revealed 1.8 mm of lower arch length deficiency based on the treatment parameters established, and the requisite degree of IPR was performed in the lower arch.

Four and a half months into treatment, a .019” x .025” fully active CuNiTi wires was placed in the upper arch and a .017” x .025” nickel titanium wire to enhance the upper right canine and upper left central incisor position. This necessitated 0.5 mm of upper right canine extrusion and -3 degrees mesial out rotation of the upper left central incisor tooth. All wire bending was performed virtually first on the computer screen and than implemented robotically.

• Fig. 22: Final treatment was completed in 11 months.

About the authors

Adam J. Weiss, DMD, is a 1988 graduate of Temple University School of Dentistry and received his certificate in orthodontics in 1990 from the University of Medicine and Dentistry of New Jersey. He is a diplomate of the American Board of Orthodontics and a member of the AAO and NESO. He maintains a full-time private practice in Stratford, Conn. Contact him by e-mail at drdmd123@gmail.com or at www.feinsmiles.com.

Mark Feinberg, DMD, graduated from the University of Connecticut School of Dental Medicine in 1982 and completed his orthodontic residency at Columbia University in 1984. He is a diplomate of the American Board of Orthodontics and a member of the AAO and NESO. He maintains a full-time private practice in Stratford, Conn. Contact him by e-mail at drdmd123@gmail.com or at www.feinsmiles.com.