CONVERGENT DENTAL AND TISCHLER RESOURCES

INNOVATING AN AWARD-WINNING DENTAL LASER WITH SOLIDWORKS SOLUTIONS

Using SOLIDWORKS design and product data management solutions, Convergent Dental and Tischler Resources developed the Solea CO_2 dental laser—the first device of its kind to receive approval from the U.S. Food and Drug Administration (FDA) for use on hard and soft tissue ablation—in less than two years, which is extremely fast for a medical device.

SOLEA

Challenge:
Support a collaborative team effort to develop the first dental laser to be approved by the U.S. Food and Drug Administration (FDA) for use on hard and soft tissues in just two years.

Solution:
Utilize SOLIDWORKS design and SOLIDWORKS Enterprise PDM product data management software solutions to facilitate collaboration and accelerate development.

Benefits:
• Delivered first FDA-approved dental laser in just two years
• Won 2014 Medical Design Excellence Gold Award
• Facilitated collaboration across five-person team
• Accelerated ECO process with automated workflow

If there's one thing on which dental patients agree, it's that they don't like going under the drill. That's why start-up company Convergent Dental turned to engineering consulting company Tischler Resources to join their development team with the mission of delivering the Solea CO_2 dental laser—the first device of its kind to receive approval from the U.S. Food and Drug Administration (FDA) for use on hard and soft tissue ablation—in less than two years.

The Solea dental laser—which won the 2014 Medical Design Excellence Gold Award in the Dental Instruments, Equipment, and Supplies category—is revolutionizing common dental procedures such as filling cavities and shaving teeth for crowns because the laser's analgesic effect eliminates the need for anesthesia and is virtually pain-free in nearly 100 percent of the cases for which it is used. Patients, who once dreaded the noise, vibration, numbness, and pain associated with the drill, will now have needle-free, and virtually pain-free experiences during most dental procedures performed with the Solea.

According to Neil Tischler, owner of Tischler Resources, the project presented design and engineering challenges, especially because Convergent Dental sought to fast-track the project and the overall development team included both in-house engineers and outside consultants.

"The development team included company founder Nathan Monty who specified the laser and the optics; Hern Kim of Hernetics, who did the industrial design; Bill Groves, originally of Sachem Consulting and now with Convergent Dental, who did the electrical design with the assistance of Leo Bafitos of Convergent Dental; Charles Dresser of Convergent Dental, who did the handpiece and pneumatics design; and Chris Dancewicz of Convergent Dental, who handled PDM [product data management], drawing generation, and ECOs [engineering change orders]," Tischler explains. "My role was to oversee the mechanical design of the cart itself, creating

its structure, integrating all of the purchased and custom-designed components into a manufacturable module serving as the glue on the team. To collaborate effectively, we needed a robust, integrated development platform."

Tischler Resources and the Convergent Dental team selected SOLIDWORKS® design and SOLIDWORKS Enterprise PDM (EPDM) product data management solutions because the software is easy to use, provides robust surfacing design capabilities, and includes effective design visualization and communication tools. "We chose SOLIDWORKS software because it provides the best, simplest, and most straightforward integration of any design environment," Tischler says. "I also value the Subscription Service for the education it provides on timesaving software features and for the quality reseller support if I run into modeling problems."

DELIVERING BREAKTHROUGH PRODUCT IN RECORD TIME

Working in SOLIDWORKS, Tischler Resources and the Convergent Dental team completed the design of the Solea dental laser and secured FDA approval in less than two years, which is rare for a new medical device. While Tischler used SOLIDWORKS to develop the mechanical design for the laser cart, Kim leveraged SOLIDWORKS surfacing tools to create an aesthetically pleasing design for the exterior panels, Dresser utilized SOLIDWORKS to integrate the handpiece design and pneumatic system, and Groves used SOLIDWORKS Solution Partner Altium® Designer software to complete the electrical design.

"This project shows the power of the SOLIDWORKS Community," Tischler stresses. "We brought together a team of specialists to address critical development needs and used SOLIDWORKS as our common language. We were under pressure to complete development quickly, and SOLIDWORKS helped us achieve our goal."

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FACILITATING COLLABORATION

SOLIDWORKS facilitated collaboration during Solea dental laser development not only by serving as the common design environment, but also by providing the design visualization and communication tools that the team needed to interact efficiently. For example, the team used SOLIDWORKS eDrawings® files to share designs. This enabled the team to complete a design that met FDA testing requirements with the first prototype.

"SOLIDWORKS allowed us to pass designs back and forth, and definitely accelerated the rate of our collaboration," Tischler stresses. "Incorporating Kim's complex surfacing, Dresser's handpiece models, and Groves' electrical designs was quite easy. By collaborating closely in SOLIDWORKS, we were able to develop a complete, highly functional design."

STREAMLINING HANDLING OF ECOS

While the other members of the team designed and engineered the product, Dancewicz used SOLIDWORKS EPDM software to manage all of the development data, control revisions, and streamline the handling of ECOs. "EPDM really helped on this project because of the number of vendors on the team," Dancewicz notes. "It allowed me to manage all the models and drawings, so we kept everything straight, which also facilitated FDA approvals due to the completeness of our design history.

"We leveraged the automated workflow feature in EPDM to streamline our ECO process and issue new revisions of drawings to support engineering changes," Dancewicz adds. "From what I understand, bringing a product like this to market in two years is very ambitious, and SOLIDWORKS design and PDM tools helped make it happen."
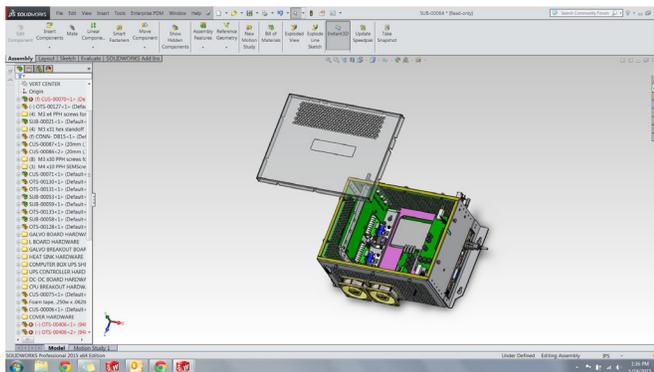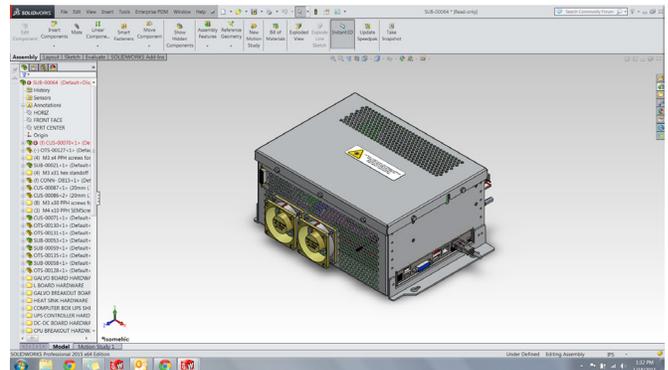
Using SOLIDWORKS design and product data management solutions, the Convergent Dental-Tischler Resources team fast-tracked development of the Solea dental laser—winner of the 2014 Medical Design Excellence Gold Award in the Dental Instruments, Equipment, and Supplies category—which is revolutionizing common dental procedures.

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