CASE STUDY

LightForce Orthodontics Brings to Market Fully-Custom Dental Braces

LightForce Orthodontics leveraged the design automation capabilities of nTopology to reduce dental brace design time by a 60-fold. Their patient-specific braces result in better patient outcomes, 33% faster installation, and increased comfort.

With nTopology, the engineers of LightForce reduced pre-installation time on several fronts by automating design processes, reusing traceable design workflows, and onboarding and training new users with ease.

Contact us

Background

LightForce Orthodontics is a design and manufacturing company of **dental devices** founded in Cambridge, Massachusetts, in 2015. Their mission is to revolutionize dentistry with their **patient-specific braces**.

LightForce offers an online portal where orthodontists can upload **3D scans** of patients' mouths and determine the position of each individual bracket of a wire brace. When a new order is in, LightForce first **generates the custom designs** of the brackets and installation trays, then 3D prints all components, and finally ships them to the clinic for application to the patient.

However, the time it took to complete the design step quickly became the bottleneck preventing LightForce from **scaling its operations and business**.

The models are better, we save a tremendous amount of time on the design process, and we're able to bring new people up to speed very quickly.

— **Amos Benninga**
VP of Engineering at
LightForce Orthodontics

Manual design time	Automated design time	Installation time	Brackets per patient	Productivity	Material
From 10 hours to 3 hours	From 3 hours to 10 minutes	From 1.5 hours to 30 minutes	20 custom designs	100+ dental braces shipped every day	Ceramic polycrystalline alumina

nTopology

Industry
Medical Devices

Application
Additive Manufacturing
Design Automation

Tracking & reusing design workflows

A challenge that LightForce faced with their legacy CAD software was the inability to track the progress of the multi-step design workflow. nTopology provides visibility into each step of the design process, allowing users to repeat workflows quickly and error-free. By shifting from their legacy software to nTopology, LightForce reduced the time to manually design their patient-specific braces from 10 hours to 3 hours.

Automating design workflows

To bring down this design time even further, the engineers of LightForce leveraged design automation. Using nTopCL, nTopology's Command Line Interface, LightForce can now execute the whole design workflow programmatically using scripts, bringing the total design down to a mere 10 minutes.

Intuitive & trainee-friendly onboarding

Training new employees in new and advanced software can often prove tricky, tedious, and time-consuming. Yet, the prescriptive and intuitive nature of nTopology makes it possible for inexperienced team members to swiftly pick up the nuances of the software and use it to its full potential. nTopology's reusable workflows allow any technician to execute a process that an engineer designed comfortably and error-free.

Closeup of LightForce's 3D printed custom dental braces and tray.
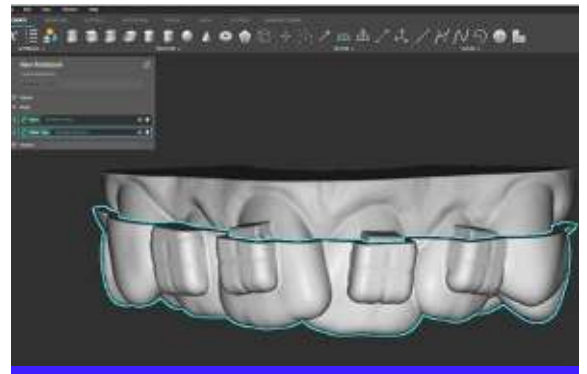
Preliminary design of LightForce's custom tray in nTopology.

Business Value

- ✓ **Custom medical devices:** Generate patient-specific product designs without increasing the engineering time.

- ✓ **Train your workforce:** Leverage trainee-friendly prescriptive and intuitive features to train your workforce quickly.

- ✓ **Scale your operations:** Overcome design bottlenecks in patient-specific solutions using robust and automated processes.

Request a demo

About nTopology

nTopology was founded in 2015 to enable engineers and designers to create any geometry — no matter how complex — and meet the requirements of high-performance products. Our software is used from research through production to create breakthrough processes and products for the aerospace, automotive, medical, and consumer industries. Our customers depend on nTopology's generative design capabilities to take full advantage of new hardware, optimize parts where performance is critical, overcome design bottlenecks, and augment their traditional CAD, simulation, and engineering software stack.