Ten years of exocad: Interview with the company founders Tillmann Steinbrecher and Maik Gerth

From a project at the Fraunhofer Institute to the leading OEM manufacturer for dental CAD software.

With over 37,000 installations in more than 150 countries, exocad is the world's leading OEM manufacturer for dental CAD software. Every day, dental technicians, and increasingly also dentists, design high-quality CAD/CAM-manufactured restorations for their patients with exocad's robust software solutions. More and more people around the world have access to aesthetic and affordable prosthetics. More than ten years ago, that was exactly the vision of the two young software developers – Tillmann Steinbrecher and Maik Gerth. In 2006, they met during a joint research and development project at the Fraunhofer Institute IGD in Darmstadt. The topic was "CAD/CAM in dental technology". At the time, they didn't even dream of turning the project into a global software company with a market leader position. This year, exocad celebrates its tenth anniversary. On this occasion, CEO Tillmann Steinbrecher and CTO Maik Gerth explain for the first time how they developed *DentalCAD* and founded exocad.

Mr. Steinbrecher, Mr. Gerth, you got to know each other during the doctoral project on "CAD/CAM in Dental Technology". How did the software development of *DentalCAD* come about? What happened to your doctorate?

Maik Gerth (MG): I actually wanted to do a research project with 3D X-ray devices for cancer detection at the Fraunhofer Institute IGD. But then I got the opportunity to work with Till on the exciting topic of CAD/CAM for dental technology. At that time, simple caps and frameworks could be milled as quickly as possible on the basis of 3D data. The development of zirconia had led to this project. So we were also lucky enough to be in the right place at the right time.

Tillmann Steinbrecher (TS): The project was supported by the CAD/CAM industry. Right from the start, we were in constant contact with manufacturers of digital hardware. We quickly found out that they were more interested in a specific software product than in a research and development service. Maik and I noticed at the same time that we enjoyed product development a lot more than writing scientific papers. So one thing led to another and we began to develop a specific software product. Instead of doing a doctorate, we later founded exocad.

How long did it take you to develop the first version of *DentalCAD*?

TS: We were able to build on decades of research and development at the Fraunhofer Institute IGD. Thanks to this background, we were developed our own software platform in a relatively short time. In addition, we were able to work very agile, as a small team. Because in the area of software development, small teams in particular are incredibly powerful.

MG: We developed the basic building block for the *DentalCAD* software in 2008 after we had rejected the first two software approaches.

TS: At the end of the year, we already had an actual software product that could be used to process first patient cases.

How do you go about software development?

TS: We work with rapid prototyping, so we first create a software prototype without large formal specifications.

MG: We may discuss this quickly usable software prototype with the customer and give it to users for testing purposes. Sometimes, such a software approach is rejected and only the third or fourth approach brings the desired success.

TS: In order to achieve the highest product quality, we may even decide to discard development at a relatively advanced stage and start over again. This only happens very rarely because, thanks to our agile approach, we determine at a relatively early stage whether we are on the right track.

MG: Only when the promising approach to prototype development is clear, do we start finalizing the software product. Iterative improvements and tests are carried out again and again until the finished software is launched. Further beta versions and release candidates will be created. This period sometimes extends over several years, depending on the feature.

TS: As a software developer, you need a high tolerance for frustration.

What advantages did this approach have for the development of the *DentalCAD* software?

TS: With rapid prototyping, we got a good sense of the needs of dental technicians relatively early on. For them, software properties such as stability and robustness were particularly important.

MG: Back then, it often happened that software projects crashed while they were being used. That annoyed the users. We knew that *DentalCAD* should therefore run in a fairly robust and stable way so that work that has been started can be safely completed.

In addition to robustness and stability, were there any other important properties that your software should have?

MG: The industrial applications, popular at the time were difficult to understand for IT people. That is why simple and intuitive operation of the software was extremely important to us. We attached great importance to an intuitive user interface with easy-to-understand icons. In the beginning, Tillmann even designed some of these himself.

You have successfully implemented the wishes of the dental technician for a CAD/CAM software with *DentalCAD*. How did you achieve that?

TS: At the very beginning, we went to laboratories to see how they work manually and to fully understand their work requirements, ways of thinking and the needs of a dental technician.

MG: For example, the long-standing collaboration with Enrico Steger and Wilfried Tratter from Zirkonzahn, with Andreas Geier from ZFX and with Falko Noack and his team from Amann Girrbach gave me an understanding of dental technology. Enrico explained to me how CAD/CAM could be used in dental technology. I learned from Wilfried Tratter what is important in dental technology and how dental technicians think. Especially in the early days,

the intensive collaboration with Amann Girrbach and Zirkonzahn brought us forward significantly.

In exchanging ideas with these industry experts, you are sure to come across different approaches. Was that really always effective?

MG: It was extremely important to find out about the dental technology requirements from different sources. On the one hand, based on the different opinions, we have found compromises for a broad user base. On the other hand, configuration options have been created with which individual working methods can be implemented. Our software gives users enormous freedom of design. That too has led to the success of *DentalCAD*.

Why did you opt for an open software architecture from the start?

MG: When we started developing *DentalCAD* at the Fraunhofer Institute IGD, we were in contact with several industrial customers. We needed a concept to process the data from various 3D scanners, CAM software and milling machines in just one application. Over time, more and more 3D scanners were added, some with their own file formats and their own milling machines. That is why we defined open standard formats ourselves in 2008. As a result, various manufacturers of 3D scanners contacted us relatively quickly and opened their hardware for our software. Today, our programs are the de facto standard for open dental CAD/CAM systems. In this context, the backward compatibility of our software is also important to us. Even a CAD/CAM system from 2009 with the corresponding open interfaces still runs with the latest *DentalCAD* version.

TS: Our hearts beat for open systems and this is reflected in our motto "Your freedom is our passion". Nevertheless, we basically leave it up to our customers to decide whether they want a closed or open system. We also developed from the beginning software designed for closed systems, although in my opinion the future lies in openness.

What was and is the greatest challenge in the development of *DentalCAD*?

MG: We have to process large and complex 3D data in such a way that it can run high speed on common PCs. In addition, we often have to resolve conflicting requirements. For example, material, milling service or milling system providers must enforce certain minimum thicknesses or crown margins so that the milling process works without problems and the stability of the restorations can be guaranteed. On the other hand, dental technicians and patients want a restoration that is as aesthetic as possible. Implementing opposite requirements in software is still one of the greatest challenges today.

First, there was the software product *DentalCAD*. How did the company start?

TS: The breakthrough came with IDS 2009 because companies like Amann Girrbach and Zirkonzahn presented their new CAD/CAM systems based on our software, which we had developed as employees of the Fraunhofer Institute IGD. The industrial customers had successfully accepted our software. The spin-off from the Fraunhofer Institute IGD to an independent company was the next logical step in 2010. For us, the entrepreneurial risk was manageable because we were able to sell a marketable product immediately with internationally oriented partner companies.

Where did the name "exocad" come from?

TS: We systematically looked for a name that could be pronounced well in all languages. The “CAD” should be part of the name. One evening Maik and I were sitting together, and I suggested x-o-cad. Maik thought I had said "exocad". We both liked that and that's how it became exocad.

Do you remember your first day as an entrepreneur?

TS: Yes, of course, the first thing we did was set up our desks, which we bought in the furniture store and picked up ourselves with my father's car. Then we set up our computers and off we went.

Did you already imagine exocad as a global company back then?

MG: Of course, we were also internationally oriented from the start. But it wasn't until around 2015 that we realized the extent to which our software was actually being used - even in areas where CAD/CAM installations were not expected at all. Today our software solutions are used in 150 countries – and that's a great feeling.

And how did the company develop?

TS: At IDS 2011, we presented ourselves for the first time as exocad with our own booth. We registered for the fair very late and therefore received a booth in the farthest corner of the hall. Nevertheless, the fair was a success for us. We realized that the exocad brand was already better known than we thought, and we met new sales partners. The same year, I flew to a dental fair in Shanghai to find local partners in Asia. With my laptop in my pocket, I headed for the stands of companies that did something with CAD/CAM and presented our software to them. This has led to successful sales partnerships that still exist today. Some partner companies were small and unknown when we started working together. Over time, they have developed into major global players. We grew together. This year, over 40 partner companies joined our event exocad Insights 2020 on site in Darmstadt, Germany.

“exocad Insights 2020” is a good keyword. There you presented the new Galway release for *exoplan* and *DentalCAD*. What's new?

TS: Galway is a particularly big release. We are once again improving functionality, speed and automation. The user interface will be extensively revised and will then be based on Google's material design. We want our software to be as easy to use as a mobile phone app.

MG: The upcoming *DentalCAD Release 3.0 Galway* will contain the first A.I. functionalities. In the Smile Creator module, the eye and lip lines are automatically marked.

TS: However, A.I.is still far from replacing human intelligence and creativity. The ability of dental technicians to find creative solutions for aesthetic and functional restorations will continue to be essential.

What does the sale of exocad (acquired by Align Technology earlier this year) mean for the company?

TS: The sale to Align Technology opens up enormous opportunities for exocad. Dentistry is moving towards holistic treatment approaches. That is why we see great growth potential in the combination of our software solutions with Align's resources in the orthodontic area. Thanks to this synergy, we will certainly be able to have a pioneering influence on some developments in digital dentistry.

A personal question: what drives you every day?

MG: Positive feedback from our customers and users, definitely. We follow the very active exocad social media groups, for example the “exocad Experts” with over 40,000 members on Facebook, where users engage to discuss their experience in using exocad technology. They give us and our development team direct user feedback, which is very valuable to us. I am always impressed by how deeply the users are familiar with the *DentalCAD* software. We also appreciate constructive critical feedback in order to recognize where important features are still missing and where there is potential for optimization.

TS: I feel the same way. When I see in the "exocad Experts" group that users have problems with our software, I want to help them solve those. In such cases I answer a post personally. Interacting with our users means a lot to us.

It also makes us feel good when millions of people around the world have access to affordable CAD/CAM-based dentures. The printed denture is a good example of this. German dental technicians will rightly say that their manually manufactured full dentures are qualitatively superior to the printed alternative. But if we look at the topic globally, then the printed full denture will be an alternative to no dentures at all for millions of people. We see great progress in this. This fills us with satisfaction and motivates us.

In which direction is there still development potential for the exocad software?

MG: The requirements for exocad software solutions are becoming more complex. The number of supported restorations, applications and workflows keep increasing. The interdisciplinary treatment teams are growing. For example, a patient case is solved with *DentalCAD* and the implant planning software *exoplan*. So, the goal is a workflow that is simple and intuitive for everyone involved.

TS: The interface to the dentist is becoming more important, as well as tools for connecting to the digital hardware in the dental practice and for interdisciplinary communication. *dentalshare* is already a cool communication tool that *DentalCAD* users can use to share their 3D views with team partners. The 3D planning can even be called up on a tablet without having to load the software beforehand.

MG: In the future you will work more on tablet computers; the computing power is then provided in a cloud. Cloud-based work can reduce hardware and IT costs in dental laboratories, clinics and practices and accelerate automation processes. There is potential in even faster and more efficient work processes.

Where do you see exocad in ten years?

TS: I see us as a provider of a globally unique, comprehensive open software platform on which software solutions for the entire digital dentistry are located.

MG: Dental technicians and dentists from all disciplines will communicate with each other via such a software platform in order to jointly plan patient cases using the exocad 3D CAD/CAM technology and efficiently implement them using different digital hardware.

Thank you very much for the very interesting conversation.

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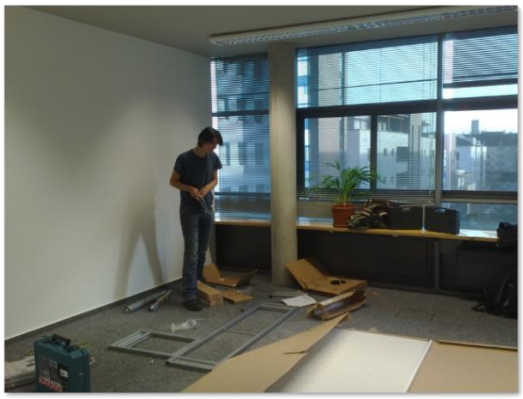
Images (source: exocad) and captions

Maik Gerth, CTO exocad, was ten years old when his parents gave him his first computer. It was shortly afterwards that he began to write simple computer programs - initially together with his father, who is also a software developer. During his mathematics studies in Dresden, he worked for 3D game projects and began to write 3D software with animations and simulations: "Everything about 3D is my passion."

Tillmann Steinbrecher, CEO exocad, discovered his passion for software development on an Apple 2 computer with a tiny black and white monitor. His father bought the computer in the 1980s. The computers changed over the years. The passion for programming has remained and has since run through his entire life: "Developing and programming software is just fun."

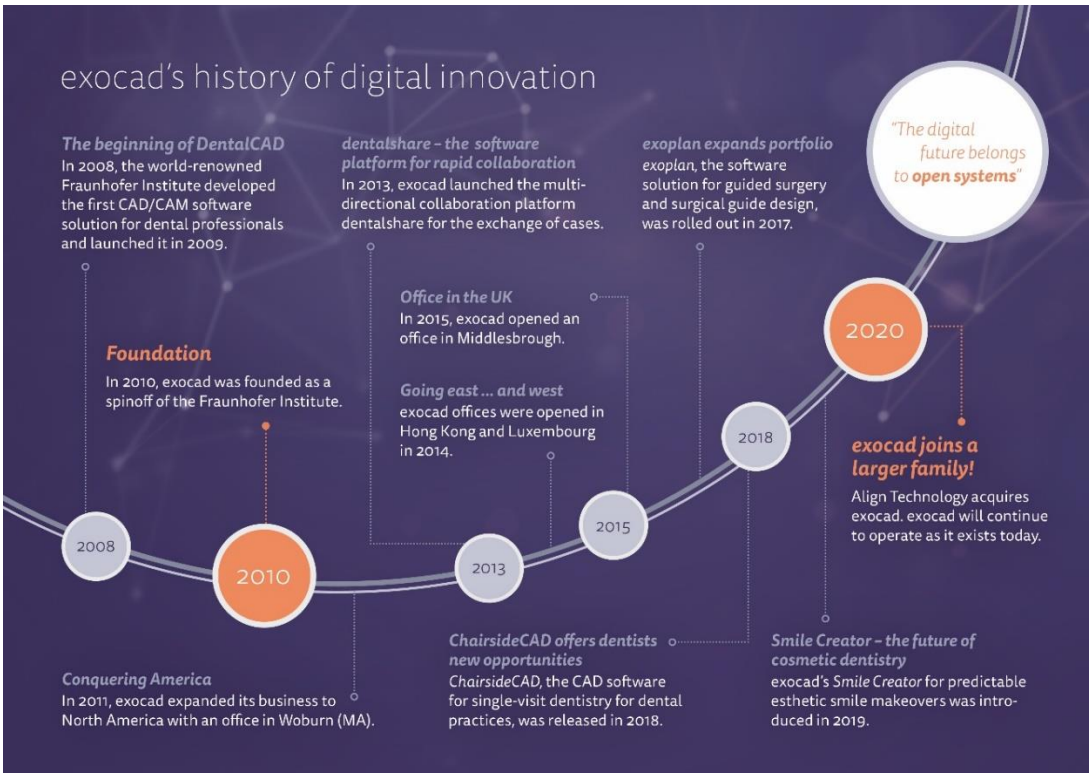
In 2010, Tillmann Steinbrecher, CEO, and Maik Gerth (pictured), CTO founded exocad. They bought the first desks, chairs and cupboards themselves from a Swedish furniture store.



“Self-made” was the name of the game for young entrepreneurs when exocad started in 2010: Maik Gerth, CTO (pictured), and Tillmann Steinbrecher, CEO (behind the camera), put together the first desks and cabinets themselves.

In 2011, excoad presented itself for the first time at IDS. Tillmann Steinbrecher, CEO (second from left), explained the open software architecture of excoad to interested customers. He and Maik Gerth, CTO, were surprised at how well known the exocad brand was at the time.

Tillmann Steinbrecher, CEO exocad, explains the company's step towards the sale of exocad to Align Technology: “We see great growth potential in the combination of our software solutions with Align's resources in the orthodontic area. Thanks to this synergy, we will certainly have a pioneering influence on some developments in digital dentistry."



For more than a decade, the dedicated team of engineers at exocad has consistently provided the dental industry with the latest innovations. exocad remains close to its customers and cutting edge: the company knows what dental technicians need and does not compromise on development. Only when exocad considers the software to be perfect is it approved. This is the basis of exocad's work, because the dental technicians' trust in the software is of the highest value for the company.