

# Designed for the user

Medical device design is commonly influenced more by aesthetics and engineering principles than basic usability. Raimund Erdmann, founder and president of **Erdmann Design**, talks to *Medical Device Developments* about how his design consulting firm is transforming the way manufacturers conceive end-user requirements.

**S**haping a product to accomplish a particular task is often only half the battle for a designer; the rest of his time is absorbed in mediating that function against anything life might throw at it. A kettle, for example, is deceptively easy to build if you're only concerned with getting water to 100°C. Ensuring that the vessel does not melt or warp during the boil, that the plug wire is short, that the water is easy to pour: these elements of design may be all that stand between a work of art and a horrible accident.

The medical device sector is no stranger to these conundrums. Although patient safety is usually the leading consideration in the design of medical implements, tussles between manufacturer, designer and physician can often lead to the creation of a muddled-looking product that is difficult to use. It's a state of affairs that Raimund Erdmann, founder and owner of design consultancy Erdmann Design, avoids studiously whenever his firm is contracted to advise on a new project. Improving how patients use these devices leads to a better outcome.

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A perfect example of this lies in the firm's collaboration with Stryker Group in the development of the QuikDrive Mini, a battery-powered screwdriver used in Cranio-maxillofacial surgery. Erdmann Design was cognisant that any such device would have to be ergonomically superior to previous models and retain the ability to drill a variety of screw sizes for the entire surgical period. To facilitate these requirements, the firm connected Stryker with the renowned Swiss motor manufacturer maxon motor, and recruited surgeons to test the device's propulsion and battery life under realistic conditions.

“For 37 years, our approach within the design field has always been to consider the user first,” Erdmann says. “In that sense, design has to incorporate not only the engineering factors but the marketing and business side as well. Whenever we start on a project at Erdmann Design, we do a lot of research on where to find common ground between the user and the market through technical development.”



Using its 37 years' experiences in the field, Erdmann Design has always ensured it keeps the user experience at the forefront of product design.

## Design and development

Erdmann Design specialises in design input across medical systems, dental products and other industrial devices sectors. In each of these areas, the starting point of its research remains the same. “You need to talk to the user and understand the journey they go through with the product,” explains Erdmann. “Within that, you can begin to explore the psychological, technological, and industrial perspectives that arrive with the product.”

Practically, this has to start with mapping the personal network the patient interacts with during their illness. “Firstly, you have to think about why the individual is ill and what treatment is necessary to alleviate their condition,” says Erdmann. “That patient, in turn, is surrounded by others who impact on the level of care they receive. Sometimes it's a family member, a colleague, or a pharmacist. The whole network the patient resides in and the journey they undergo during treatment are things we address in our research.”

Essential to this is bringing the necessary talents involved in product development into one team. “Once that is accepted by our partners, we can organise workshops where the right questions are asked about the product's usability,” Erdmann explains. “That means moving away from aesthetic issues, like ‘Is the green syringe nicer to look at than the blue one?’ to understanding where to push, where to pull, where you can store it and where you can inject.”

## Corporate forethought

Cedric Gysel is a staff device engineer at Janssen, a subsidiary of the pharmaceutical giant Johnson & Johnson. His role is to provide technical support for those using Janssen products that are about to enter or are currently in the market. Gysel has collaborated with Erdmann Design for almost two and a half years on product design, although he has been familiar with its founder since attending a lecture on human-centred design at university.

"Since then, the whole notion stuck with me," he says.

"Raimund and I started to have a lot of discussions after that. We started working together, because focusing on patient experience is one of the things that's crucially important for organisations like ours. If you do that well, you're creating products that are actually making a difference in patients' lives."

According to Gysel, that means cutting through the thicket of institutional egos and participating in a design process that is truly collaborative. "Design is too important to be left to designers," he says emphatically. "To be successful with human-centred design, you need a whole lot of other competencies to be involved in that process. Thinking that way gives you a framework that allows you to consider all of those viewpoints and make the best of them, to ensure a successful development period."

Gysel has frequently called upon Erdmann Design's services to tap into the reservoir of contacts it possesses across the medical devices sector – a factor that has been instrumental in the firm's collaboration with Janssen across multiple product avenues. One area its influence has been particularly felt is in Janssen's drug-administration programme. "In one project, we asked ourselves, 'What motivates patients to effectively administer drugs, particularly those who are chronically ill?'" Gysel says. "It's crucially important that you keep them motivated in the long-term to stick to their drug regimen. We're using human-centred design principles to understand what drives their behaviour, so we can design around it."

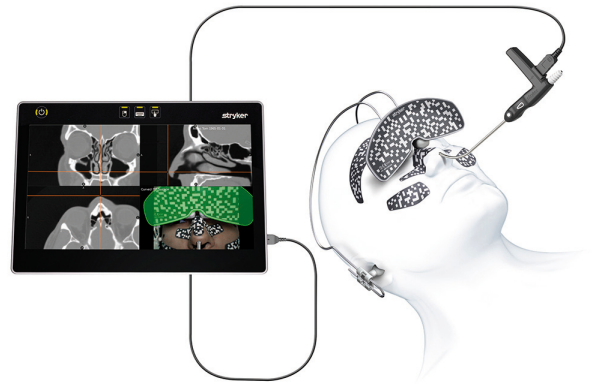
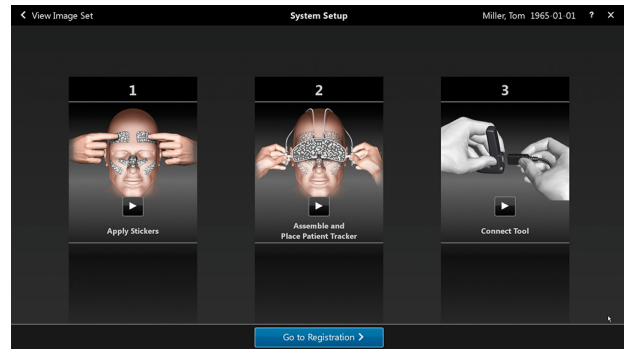
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### Personal healthcare

Enhancing the end-user experience is becoming ever more important with the proliferation of wearables and health apps. As excitement grows within the medical community about the practical benefits that might be provided by these new technologies, Gysel fears that the usability of such devices may suffer as a result. "The more personal a medical device gets, the more important it is that those devices are being used correctly," says Gysel. "Enhancing technology alone is not the answer if you cannot bring it to a point where it actually creates value for the user. Alone, it is relatively meaningless."

Despite this, Erdmann believes the shift towards a more personal way of treating patients through digital healthcare is inevitable. "Our own research suggests that data collection from apps and new devices will enhance care at the early stages of illness," he explains. "Even before you get sick, it will be possible to ascertain the state of your own health. This has the potential to change the way patients medicate themselves, since now you can be reminded by the technology at your fingertips to, say, take another walk or do some extra climbing."

Beyond piquing the personal curiosity of the patient, the raw data generated by these technologies could potentially be a



The increasing trend towards medical wearables and apps calls for design innovation without losing sight of the human element of use.

valuable resource for medical practitioners. "Doctors and pharmacists will ask for that information, and judge when you may have had your ups and downs," says Erdmann. Nevertheless, their widespread adoption remains dependent on building trust between the user, the device's developers and the physician.

"We don't go in for large numbers or trends," says Erdmann. "Our focus in the research and design processes of a product is to get an honest result for an individual patient. We ask, for example, in the diabetes field, who has that health issue and what do they personally do about it? If you have that individual story, then I think that is more valuable. Addressing a concept in this personal way allows a narrative to be crafted around the patient that can be useful for training pharmacists, nurses or doctors how best to use the device. There is also a need to improve the training for patients to ensure they receive the full benefits of these medications."

Enabling this is the great challenge that Erdmann has to confront behind the scenes. Fundamentally, the success of human-centred design comes back to one thing: interdisciplinary collaboration. "It's a service-driven process, and I think you can never do it perfectly. But you can try to achieve certain results," he says. "For that to work, the engineer has his engineering hat on and the designer has his designing hat on. We should step out of those silos and be able to understand the flow of the idea at play." ■

### Further information

Erdmann Design  
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