Creating Cultures of Innovation Based on Human-Centered Design

In the field of implant dentistry, we have seen various historical epics where various innovations have been encouraged, promoted, and even hocked. The value of science and reproducibility has been a cornerstone of patient safety, leading to a fervent need for well-performed clinical trials (eg, cohort comparison studies or randomized controlled trials).

In the past, research designs have focused on implant macro- and microdesigns, along with an array of surface modifications designed to accelerate hard and soft tissue healing around the device. The wealth of devices now on the market is a reflection of the idea that the innovation curve on device design may be flattening out, with a shift in clinical innovations toward application "protocols" instead. Often referred to as "workflows" at the podium, I'm often amused to find at the various congresses I attend, the presentations I hear are about one clinical protocol after another. Often branded with the author's name and/or some prestigious institution's name (typically splashed across the slide) and flashing publication citations that may or may not be fully valid, accurate, or relevant, the presenter says that a certain device will perform more predictably following their protocol.

The danger of this line of thinking (aside from researchers falling into the role of social media influencers) is the implication that using the device in question is akin to thinking that any baker can make the best cake—just follow the recipe! To continue with this analogy, many factors go into making a cake—such as the type, quality, and quantity of each component; the order of steps; the amount of mixing, aeration, and baking (time, temperature, oven position); and many other such factors—thus making the wonderful outcome due to multiple undisclosed variables and the expertise of the provider in addition to a prescriptive recipe. Now, it is important to note that some customers may not like the "perfect" cake (based on their own wants and needs), or may even be medically allergic to it. Thus, the outcomes of both a cake and a treatment are due to a combination of its production and implementation, as well as the biologic, emotional, and psychologic reception to it. We hope, in either case, that each part is synergistic to the outcome as a whole.

In implant research, I often note that the research design focuses on an easy-to-identify parameter (say, implant surfaces) when the measured outcomes are due in equal or greater measure to the gift of the provider's surgical and restorative skills in the short term, and a patient's biology, attitudes, and home care in the long term. This is one reason behind the increased interest in the medical literature on patient-centered outcomes measures (see https://www.pcori.org for more information). One tool to pull guidance from is Human-Centered Design Theory. Following this framework, when considering the clinical performance of a medical device, the first step is to determine what the most important outcomes are to the patient. Based on the results from step one, step two is to design or evaluate processes or protocols archiving these outcomes. Then, for step three, the device and its attributes must be chosen in accordance with how it contributes to (or at least does not work against) the clinical protocols. This is an idea that we have mentioned in prior editorials: Things that are easy to measure may not measure what is relevant, and they may drive innovations that are more hype than science. Now, I fully recognize that we live in a social media influencer's world—I hear it all the time from students and residents—where protocols are branded on internet clinical forums, creating potential distortions in thinking. Distorted thinking can misguide the profession if we don't stay focused on what is most relevant: the patient in front of us.

Thank you,

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