



Dental Implants and "The Great Vortex of Dentistry"

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A few years ago I was riding in a taxicab with some other people attending a dental implant meeting. One fellow—who worked for an implant company that shall remain nameless—had helped me significantly in my research and was also supportive of research in general. But then, during a lively discussion in the cab on dental implants and what we do and do not know, he turned and said: "You know, you guys in basic research just don't get it. You'll still be trying to answer all of these questions about dental implants long after they've been sucked into *the great vortex of dentistry!*"

I stopped short, looked at him dumbfounded, and said, "The great *what* of dentistry?" And he repeated, "You know, the great vortex of dentistry! A vortex, like the swirling vortex in the toilet bowl!" He went on, "What I'm talking about is that some day, when dentists want to use an implant, they'll just open up a dental materials catalog and pick out their favorite dental implant just like they're picking out their favorite toothpaste, high-speed handpiece, or periodontal probe. There won't be all this fuss about whose implant system has the best research. Implants will just be part of *the great vortex of dentistry!*"

I can't remember the rest of the conversation, but this analogy has stayed with me. Why bring it up here? Because I think that my friend's comments trigger some key questions about what's going on in the world of implants these days and what we—researchers, clinicians, manufacturers, implant journals, etc—should be doing to help.

First, we have to ask ourselves whether an era when dental implants are used as routinely as toothpaste or periodontal probes would be desirable. Second, what about this "great vortex of dentistry"; does it really exist, spinning uncontrolled, collecting all dental implants equally, without regard to relative merits, and then delivering them under one generic label to dentists' hands and patients' jaws? Might there be a better analogy: *the great black hole of dentistry!* In other words, as matter (your favorite dental implant) is attracted toward the black hole (clinical dentistry), it spirals toward it faster and faster, gets very hot, and emits gases (marketing hype) until it finally crosses the event horizon (clinical trials/FDA) and is lost forever in the black hole, whose density is so large that not even light (reliable data on the implant's performance) can ever escape. (Dr Stephen W. Hawking, please excuse!)

Some would discard the analogies and urge that we just get dental implants "out there" so everyone can benefit. Probably a lot of us feel this way when we see patients who are so much better off after treatment, whose entire lives have been improved through implants. On the other hand, there are those of us who may have

glimpsed the "dark side" of the vortex, perhaps by a visit to the courtroom as an expert witness. Here the scenario might be that a well-meaning dentist/entrepreneur produced a "terrific" new implant design, secured venture capital, took the FDA "510K route" to the marketplace (based on showing "substantial equivalence" to previously marketed implants), proceeded to clinically place implants, and then started the lucrative joy ride into the great vortex ... except that suddenly the ride was cut short by an unpleasant detour to the courtroom because of some critical flaw in the implant's design, a flaw that could have been caught early if some simple tests had been performed.

The point of all this is that from what I've seen (in and out of the courtroom), my friend in the taxicab was right: a great vortex of dentistry exists. I believe this is both good and bad. It is good because it means that there is a viable industry out there, in which researchers, clinicians, industries, and regulators are working together to serve the public so that everyone wins. But it is bad because the vortex seems to be very powerful and therefore tends to indiscriminately absorb a lot of trash along with the good material. Our collective problem is to get some control over the great vortex of dentistry, which brings me to the role of the oft-bashed FDA as well as that of this journal.

I don't agree with those who say that the dental implant industry is overregulated. If you've ever paused to look back over the array of different implants that have been used in human jaws over the years, it's really a chilling picture, with little evidence of thwarted creativity or strangled commercialization. It would seem that one could find an almost infinite variety of implants in human jaws. For those implants that failed to remain in the vortex, perhaps this was because they were poor implants, not because they were regulated out of existence. When I show slides of the history of implants to an uninitiated audience of engineering students, they sometimes blanch or shake their heads in wonderment that (a) some of these devices actually were placed in humans, and (b) people actually got rich from selling and implanting them. Then we sometimes get into discussions about the modern era, when there is a tendency for companies to claim that they are being "regulated out of business." I suggest that one's reaction to regulation tends to depend on one's point of view. For instance, as a researcher who looks for research that is needed, I say to myself that the FDA is good, since it is now merely asking the implant industry to supply information that any self-respecting company should have been gathering from the start—perhaps through support of research in academia—to ensure that their products are safe and efficacious. I also suggest that the dental implant industry hasn't invested a whole lot in basic research over the years; how much industrial money has actually been spent on basic research in the last decade? Who's supposed to be paying for what needs to be done? It has been estimated that the "endosseous implant market" was about \$39.1 million in 1990 (see P. Worthington's article in the proceedings of the 1988 Consensus Meeting on Dental Implants, *J Dent Educ* 1988;52:692); even 1% of this (\$391,000) would still be a very large pool of

research money, and perhaps much could have been accomplished. Regarding federal support, I suspect that NIH would be hard pressed to routinely put up this kind of money per year for dental implant research. Industry, government, and academia should do more to support research that will answer the many questions about implant systems and spawn new product ideas. Meanwhile, journals such as this should provide a tough but fair forum for presentation of good science.

I thank my friend for alerting me to the "great vortex of dentistry"; he had a lot of insight into what's going on "out there." Let's continue to do our part in surveillance of the literature and implant held to oversee the great vortex and keep it spinning without picking up too much trash.