The Case for Unlearning

Steven J. Sadowsky, DDS

One cannot step twice into the same river.

—Heraclitus of Ephesus, 6th century BCE

When George Zarb, this Journal's Editor-in-Chief, facilitated the introduction of osseointegration in North America, a seismic disruption in our traditional approach to managing partial and complete edentulism ensued. It provoked two inconvenient concerns: *(1)* Has our embrace of established ways of thinking slowed the diffusion of new applications for implant restorations? *(2)* Have we rejected Joseph Schumpeter's concept of creative destruction, whereby a full adoption of an innovation must be followed by destroying old concepts and replacing them with new ones?[1] I believe both questions can be answered affirmatively.

Robert Zajonc, a social psychologist, first described a phenomenon called cognitive fluency, which is an instinctive preference for the familiar. This concept explains why we process new information as though we have already seen it before. It is an adaptive shortcut that helps us allocate limited mental resources in a world of sensory overload. Information retrieved from memory has been found to be more fluent or familiar than when it was first learned and has been shown to lead to an increase in perceived validity.[2] For example, subjects judged food additives with labels that were difficult to pronounce as being more toxic than those that were easier to pronounce. When the pronunciation seemed facile, the subjects assumed it was safe because they had previously encountered the additive and had already done the mental work of establishing its safety.[3] Familiar was equated with safe.

While working on my new text, *Evidence-Based Implant Treatment Planning and Clinical Protocols*, it was apparent that familiar conventional dental principles dominated the delayed dissemination of implant-specific tenets. A number of examples illustrate this point, such as our imperfect understanding of peri-implant bone loss short-circuited by a blind acceptance of the periodontal model, despite differences in genesis and biology.[4] A critical analysis of the triad of the host, operator, and implant factors has revealed unique precursors and pathways of disease, with an untoward interfacial healing response linked to such variables as genetic or immune host disorders, bone volume deficiencies, inadequate alveolar/basal bone ratios, poor surgical technique/site selection, and imaging error.

Given that dental implants are not inert biomaterials, histologic evidence has demonstrated a series of specific cell lines that are consistent with a foreign body reaction in contradistinction to the presumed cellular cascade in so-called peri-implantitis.[5] A similar intransigent mindset underscores the sad fact that it took 17 years for tilted implants to be embraced as a viable alternative to augmentation.[6] The dentally driven notion that nonaxial forces could lead to marginal bone loss of implants also delayed a better understanding of an induced ankylotic-like interface. A similar mindset protracted the acceptance of short implants after the introduction of implant surface modifications.[7] Moreover, crown-to-root ratio dogmas were transferred to crown-to-implant ratios. It is only recently that researchers have demonstrated that crown-to-implant ratios up to 2.5 do not generate marginal bone loss,[8] while anachronistic maxims continued to be supported by in vitro studies. For more than two decades, splinting of posterior implants in partially edentulous patients was considered preferential to solitary units because it was "safer," as a 2008 finite element analysis demonstrated that splinting reduces the damage evolution in bone tissue.[9] Despite the low level of evidence, this bench study gained traction because it seemed intuitive. It was not until Paolo Vigolo[10,11] conducted 5- and 10-year split-mouth clinical studies revealing virtually no difference in marginal bone loss in the posterior maxilla with splinted and nonsplinted implant restorations that the practice of default splinting was questioned. Likewise, a 2016 finite element analysis assessing three-unit cantilever fixed implant prostheses documented that the cantilever extension can transfer excessive load to the bone around implants, leading to bone resorption.[12] However, this flies in the face of 5-year clinical data establishing the success of posterior implant cantilever prostheses.[13] Once again, the halo effect from the tooth-borne restorative playbook altered the perception of data. It is of note that acceptance of outcome-based implant restorative canons may reduce treatment cost, time, morbidity, and/or risk. The patient becomes the beneficiary as we discard familiar but irrelevant notions. With that hanging in the balance, what would foster a nimble thought process in response to innovation?

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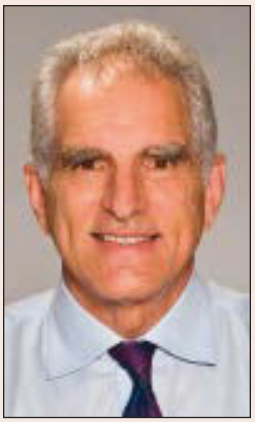
Karen Becker's studies bridged the gap between research and practice. She posited that sustaining change from innovation requires unlearning, a "process by which individuals and organizations acknowledge and release prior knowledge (assumptions and mental frameworks) in order to accommodate new information." Factors that can influence a faculty's unlearning in an academic environment have already been compellingly identified.[14] They involve making a strong case for why a new system is proposed. Individual faculties can lead the way here, and my own dental school has already embarked on an intensive faculty training program in evidence-based implant treatment planning rationales. Learning aids supplement our course and enhance the application of new information while addressing individual staff feelings and expectations during change implementation. It is a given that the emotional component of accepting new systems that inevitably affect established routines must not be overlooked. Finally, participating faculty's responses need to be recruited in the evaluation of the new system after its adoption. Constructive feedback encourages personal investment with suggestions for improvement and future research.

As we enter the Innovation Age, our profession—especially the Prosthodontic discipline—contends with the physics of the new movement by addressing inertia and momentum. When the concept of endosseous implants was embraced, we would only later understand the process of integration.



Dr Steven Sadowsky is professor and director of implant education at the University of the Pacific Arthur A. Dugoni School of Dentistry. He has practiced Prosthodontics full-time for 35 years and is past president of the American Prosthodontic Society and president-elect of the Pacific Coast Society for Prosthodontics. He is a diplomate of the American Board of Prosthodontists, directed the American College of Prosthodontists Annual Review Course for the last 5 years, and is the recipient of the 2016 American College of Prosthodontists Presidential Citation. Dr Sadowsky's *Evidence-Based Implant Treatment Planning and Clinical Protocols* will be published in late 2016.

References

1. Schumpeter, JA. Capitalism, Socialism, and Democracy, ed 3. New York: Harper and Brothers, 1950.
2. Ozubko JD, Fugelsang J. Remembering makes evidence compelling: Retrieval from memory can give rise to the illusion of truth. J Exp Psychol Learn Mem Cogn 2011;37:270–276.
3. Song H, Schwarz N. If it's hard to read, it's hard to do: processing fluency affects effort prediction and motivation. Psychol Sci 2008;19:986–988.
4. Albrektsson T, Brunski J, Wennerberg. 'A requiem for the periodontal ligament' revisited. Int J Prosthodont 2009; 22:120–122.
5. Trindade R, Albrektsson T, Wennerberg A. Current concepts for the biological basis of dental implants: Foreign body equilibrium and osseointegration dynamics. Oral Maxillofac Surg Clin North Am 2015;27:175–183.
6. Mattson T, Kondell PA, Gynther GW, Fredholm U, Bolin A. Implant treatment without bone grafting in severely resorbed maxillae. J Oral Maxillofac Surg 1999; 57:281–287.
7. Deporter D. Short dental implants: what works and what doesn't? A literature interpretation. Int J Periodontics Restorative Dent 2013;33:457–464.
8. Malchiodi L, Cucchi A, Ghensi P, Consonni D, Nocini PF. Influence of crown-implant ratio on implant success rates and crestal bone levels: A 36-month follow-up prospective study. Clin Oral Implants Res 2014;25:240–251.
9. Bergkvist G, Simonsson K, Rydberg K, Johansson F, Derand T. A finite element analysis of stress distribution in bone tissue surrounding uncoupled or splinted implants. Clin Implant Dent Relat Res 2008;10:40–46.
10. Vigolo P, Zaccaria M. Clinical evaluation of marginal bone change of multiple adjacent implants restored with splinted and nonsplinted restorations: A 5-year prospective study. Int J Oral Maxillofac Implants 2010; 25:1189–1194.
11. Vigolo P, Mutinelli S, Zaccaria M, Stellini E. Clinical evaluation of marginal bone change of multiple adjacent implants restored with splinted and nonsplinted restorations: A 10-year randomized controlled trial. Int J Oral Maxillofac Implants 2015;30:411–418.
12. Yoda N, Liao Z, Chen J, Sasaki K, Swain M, Li Q. Role of implant configurations supporting three-unit fixed partial denture on mandibular bone response: Biological-data-based finite element study. J Oral Rehabil 2016;43: 692–701.
13. Romeo E, Storelli S. Systematic review of the survival rate and the biological, technical, and aesthetic complications of fixed dental prostheses on implants reported in longitudinal studies with a mean of 5 years follow-up. Clin Oral Implants Res 2012;23 (suppl 6):39–49.
14. Becker K. Facilitating unlearning during implementation of new technology. J Org Change Manage 2010; 23:251–268.