Guest Editorial

Floundering in Fluoride Fog

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In the last century, fluoride, like penicillin, was heralded as a major public health advance in mankind's battle against disease and its effects. Today, fluoride, like antibiotics, is under attack, a victim of its success, popularity, and ubiquity. When it comes to fluoride in dental practice, today's clinician often has difficulty separating fact from fiction, solid from junk science, professional organization paranoia from pathophysiology.

I, for one, am floundering in a fluoride fog, fostered by frequent fears and fed by fragmented factual and fictitious factoids! I'm no longer sure about how fluoride fits into the health of my patients.

The recent "interim statement" by the American Dental Association (ADA)[1] about mixing baby formula with non-fluoridated water is the latest illustration of the confusing information confronting clinicians. The ADA has just recommended that formula that requires mixing be constituted with fluoride-free water, to reduce the likelihood of fluorosis in teeth forming during this period of life. Systemic fluoride is recommended for all people, beginning at six months of age[2] yet, this recent recommendation says not. Further confusing me is the ADA's support of the Food and Drug Administration's acknowledgement of the anti-caries benefit of fluoridated bottled water.[3] So, why not put fluoridated water in formula?

I am not the only one in a quandary. This past summer, in different settings, I overheard two general dentists, with over 50 years of dental practice between them, reveal their fluoride knowledge. One touted fluoride given to mothers during pregnancy as the solution for early childhood caries. The other said she tried to avoid fluorosis by always trying to keep topical fluorides on the posterior teeth when giving of fice treatments! Today, I cannot speak to pediatricians about any aspect of pediatric dentistry without the conversation eventually shifting to fluoride and their puzzlement about prescribing for today's Perrier-ed and PUR-ified patients!

When it comes to fluoride, I fear we have become a profession of paranoia. In spite of the fact that the early childhood caries juggernaut just keeps rolling along, fluorosis now has center stage as dentistry's chief pediatric concern. Michael Crichton, MD, the well-known author of science-based fiction, aptly describes what is happening in dentistry in his recent book, "State of Fear," which describes the emergence of the global warming movement driven by human fear of the unknown.[4] He maintains that in today's society, fear drives much of what we do. Ubiquitous and often baseless factoids, the media, and politicized advocacy all contribute to an overwhelming sense of fear —often of things with little or even conflicting scientific basis. Now, I am not arguing global warming, but simply pointing out that recent scares about a relationship between osteosarcoma and fluoride[5] in the popular media and the emphasis of fluorosis as a major public health problem by both mainstream public health and professional organizations have pushed fluoride ever closer to the dark side. Antibiotics, which are still overwhelmingly a modern medical miracle, are now blamed for ever-increasing numbers of resistant organisms. Is fluoride the next victim?

An additional element of my confusion comes from the impending head on collision in health care between risk-based therapies and standard of care. Simply stated, in our time of decreasing resources and the growing percentage of gross domestic product occupied by health care, clinicians are being asked to base care on risk. Unfortunately, risk-based therapy today has the same probability as winning big in Vegas. We in pediatric dentistry are placed in jeopardy trying to assign care resources —in this case fluoride— efficiently and effectively, and to find that happy medium between preventing early childhood caries and permanent tooth fluorosis. So, what is the standard of care now for systemic fluoride and what is risk —a caries-free primary dentition or perfect pearly permanent incisors?

I, for one, now am not really sure.

Our Academy has chosen the side of reason and compassion on the issue of water and baby formula. We, more than any other professional organization in dentistry, see the ravages of early childhood caries and see fluoride as one of the few useful tools in preventing this costly, painful, and often debilitating condition. We are also more realistic when it comes to compliance and the difficulty of adding still another parental decision to the complexities of preventing both early childhood caries and dental fluorosis. We can't get families

to comply with taking fluoride for a present disease, so who's to believe that we can get them to eliminate it to prevent a condition that hasn't occurred yet!

The ADA's guidance on water and baby formula spells the demise of the last of the two great commandments of fluoride therapy --- systemic water fluoridation for all beginning at 6 months of age, and use of fluoride dentifrice by everyone. We saw the latter die a slow death as fear of fluorosis raised the age of children who should use toothpaste and took the amount from pea-size to practically none. Now, adequate exposure to fluoride is further threatened, leaving those most vulnerable without our most reliable and trusted therapy. Maybe it's the 20-tooth primary extraction cases I see all too often, the endless list of preschoolers waiting for general anesthesia in our community, or the weekly admission of a child with facial cellulitis that make me worry that dentistry is spiraling back toward the barbershop of yore in placing fluorosis ahead of early childhood caries.

Hopefully, there isn't as much confusion in cosmetology!

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Letter to the Editor

The Art and Science of Pediatric Dentistry

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The title of a classic textbook of dentistry reads: *The Art and Science of Operative Dentistry*.[1] Art did not precede science by coincidence. Yet our Academy may be forgetting the Art component of our profession while emphasizing the Science.

There has been much discussion of evidence based dentistry. Decades-proven policies and procedures may be removed from our guidelines due to lack of "evidence based" science. Perhaps in some instances the baby has been thrown out with the bath water. Perhaps a clarification of just what is "evidence based medicine" (EBM) is timely and relevant to this new trend in the Academy.

In an introduction to a symposium on EBM, Liberati and Vineis[2] explain that the term EBM was introduced in 1992 by the same group of people that, years before, started the discipline called "Clinical Epidemiology" (CE).[3] CE stemmed essentially from the idea of adapting and expanding epidemiological methods to medical and health care decision making. CE positioned itself around the notion of "critical appraisal skills" as yet another essential ability that – in addition to the interpersonal, diagnostic and prognostic ones – a good doctor should master. Liberati and Vineis stated that an important CE by-product was the documentation that much of the available evidence on diagnosis, prognosis and treatment of diseases was of poor methodological quality and quite often of dubious transferability to everyday clinical practice. This led to a strong call for improving the scientific basis of clinical practice that was seen as too often dominated by practices of unproven effectiveness. This was the background for the 1992 Journal of American Medical Association article that first used the term "Evidence based Medicine."[4] In essence, proponents of EBM said that "all medical action of diagnosis, prognosis and therapy should rely on solid quantitative evidence based on the best of clinical epidemiological research." They also stated that "we should be

cautious about actions that are only based on experience or extrapolation from basic science."

Following in the footsteps of our medical colleagues, a movement in dentistry toward an evidenced- based approach to support current clinical procedures was initiated.[5] As explained above, evidenced-based research places importance on the use of high quality data to evaluate materials and procedures. The basis of this approach is to use objective, systematic, and reproducible methods to evaluate the evidence that supports dental therapy. Evidenced based dentistry de-emphasizes intuition and clinical experience in favor of examination of evidence from clinical research. The highest order of scientific evidence for treatment effectiveness is the randomized, controlled clinical trial, which is blinded and longitudinal. When it comes to areas of dentistry such as caries research, dental materials, implantology and others it is possible to design studies which stand up to the rigorous requirements of design as mentioned above. However, it may be extremely difficult to conduct such research on pediatric dental patients. Issues of parental consent, adolescent assent and compliance all contribute to the difficulty of performing such research. Every research project needs institutional review board (IRB) ethical approval; even simple surveys require review and approval. Research performed in private offices also needs IRB approval. Studies of issues such as HOME (hand over mouth exercise), separation, and voice control would never receive approval and even if they would it would be very difficult to design such studies that would make them scientifically acceptable to EBM.

In the teaching, education, and human aspects of pediatric dentistry you need the art. It is important to remember that the initial idea of EBM was to complement the human aspect of practicing medicine with an ability to analyze data and research studies in a critical manner but not to replace this aspect with science alone. EBM must play second fiddle to common sense. For example, it has never been proven in a randomized, controlled clinical trial, which is double blinded that jumping out of an airplane in flight without a parachute is fatal. Which subject do we designate to the control group? Yet, we all sense that jumping out of an airplane as described might not be a good idea.

Another troubling fact is that not all the science that is published is necessarily reliable. Scientific papers are written by humans not computers. In a questionnaire-based survey of US biomedical researchers published last year, respondents admitted to a range of dubious practices.[6] Transgressions included failing to present data contradicting one's own research (6%) and ignoring data based on a 'gut feeling' that it was wrong (15%). More than a third of US scientists, in this survey of thousands, admitted to misbehaving in the past three years. Martinson et al called this picture of misbehavior "striking in its breadth and prevalence."

It is important for Academy members to remember that EBM does not imply that all medicine practiced before EBM was unscientific. This is not only simplistic but, upon closer scrutiny, profoundly wrong[2]. The difference that needs to be made clear between the pre- and post- EBM era is not that before it people did not use evidence. Rather, the real failure was the lack of a framework and set of rules that used the evidence in a systematic and explicit fashion.[2] Subjecting all of the policies and procedures of pediatric dentistry through the rigors of EBM in order to be included in the Academy's guidelines is extreme. There are many principles and approaches to managing children that we know work but that have not been scientifically proven, for example, praise, tell show do (TSD), empathy, assertiveness and more.

The importance of the evidence-based approach to the practice of dentistry should not be devalued. As explained above it emphasizes the need for improving access to reviewed scientific dental literature and for improving the skills of dentists in the assessment of scientific papers. However, we still need to rely on common sense and the shared experience of ourselves and of our colleagues of the past. Only in this manner can we continue to practice the Art and Science of dentistry.

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