



Academicians' Session: Clinical outcomes and the scientific basis for pediatric dental care

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The Academicians' Session, "Clinical Outcomes and the Scientific Basis of for Pediatric Dental Care," was held as part of the American Academy of Pediatric Dentistry Annual Session on May 26, 1996, in Chicago. Health care providers in all disciplines are facing increasing pressure to provide scientific evidence for the treatments they provide. The Academicians' Session consisted of a series of talks on this issue presented by speakers from academic programs. The following papers are based on those talks.

1. What is the scientific basis for oral health care? (Ann L. Griffen, Peter S. Vig)
2. The many sides of outcomes and their use in postdoctoral training (Paul S. Casamassimo)
3. Pediatric dental care: state of the art versus state of the science (James J. Crall)
4. "Scientific inquiry", a new course in evidence-based practice (Burton L. Edelstein)
5. The scientific basis for treatment and the Texas Medicaid experience (N. Sue Seale)

What is the scientific basis for oral health care?

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We've been hearing some new jargon lately such as "outcomes", "evidence based", and "patient centered". Third-party payers have raised questions about the outcomes of treatments and demanded evidence that they are effective. The providers of care are facing a change in public perception, and where once doctors were assumed to "know best", today there is some skepticism concerning their altruism and even their knowledge. All this translates into the expectation of consumers for a new and higher level of accountability, which health care providers must accept. "How Dentists Rip Us Off" is the headline on the cover of the February 1997 *Reader's Digest* for an article entitled "How Honest Are Dentists?".¹ This conservative magazine carries a piece of investigative reporting in which the writer obtained 50 dental examinations and 50 different treatment recommendations at costs ranging from \$465 to \$29,000. This variation in clinical practice ranging from no treatment to crowns on 28 teeth was explained by an ADA spokesman as not surprising since dentistry is an art based on science. What kind of art is it that can expose patients to such diverse recommendations for the good of their health? Who arbitrates or validates "good" art as opposed to "bad" art? Were the 50 dentists merely exhibiting their idiosyncratic artistic license, or is there something wrong? The "dentist as artist" analogy is potentially dangerous both to our

profession as well as to the health of our patients. The alternative is that we move to a more patient-centered and evidence-based philosophy of care. Recently dental education has been challenged by the Institute of Medicine Report to incorporate these concepts into patient care and the training of health care professionals.² While dentists are relatively new to such pressures and challenges, medicine has a longer history of grappling with problems of evidence-based care. We, too, now need to learn the terms, their meanings, and what is expected of us in this context. The rules are already established, and we as oral health care providers have the opportunity to comply with intelligence, enthusiasm, and knowledge, rather than oppose the inevitable changes that may be imposed on us if we resist.

Patient centered care

The fundamental concept behind "outcomes" and other jargon could be put simply: "does our care actually help our patients?". For those who have been practicing for any length of time, careful reflection will recall changing fashions in medical treatment such as radiation for acne, or less alarming, the formerly widespread use of tonsillectomies and myringotomy tubes. As scientific evidence regarding the outcomes of these procedures became available, their use was abandoned or targeted more carefully to those who would benefit. If we're honest, we have to

admit that there is little evidence to confirm the effectiveness of many of the treatments used routinely by dentists, and we might well be suspicious that some are of little benefit.

All current treatments work some of the time, but none work all of the time. For this reason there are usually several options for most clinical problems. Therefore, for clinical decision-making to be patient centered, we need to have better information on the probability of achieving those outcomes that are desirable, while reducing the chances of outcomes that are undesirable. When such information becomes available and forms the basis of our teaching and practices, we will be practicing evidence-based dentistry! We are not there yet. Before we can even start to obtain such information in a systematic manner, we first need to specify precisely what constitutes the outcome measures of interest. Treatment has outcomes with a number of attributes. There are both short-term and long-term outcomes as well as positive and negative outcomes. The positives are those that are desirable and confer a tangible benefit to the patient. Negative outcomes include all those that make up the costs and risks to patients. By cost we mean not only the fee for treatment but also other costs such as time, discomfort, inconvenience, and so forth.

An important aspect of the question as to whether our care actually helps our patients, and if so how much, might be, "What do patients want, anyway?". And we might well ask ourselves how that compares to what dentists want. Patients' utilities usually include avoidance of pain, maintaining or achieving an attractive appearance, comfortable functioning, expending minimal time in the chair and effort at home, and minimal cost of treatment. In contrast, dentists may focus on surrogates like the plaque index or deep pockets. We hate to see irregularities in the margins of restorations, and we want to see 28 teeth in a standardized "ideal" occlusion. A number of clinical criteria cherished by dentists have more to do with what looks pleasing to us than with ensuring oral health. In fact, irregularity of the teeth in terms of alignment or occlusal scheme has not been shown to be a predictor or risk factor for either caries or for periodontal disease. Biological variability in the arrangement and relationship of teeth, skeletal pattern, facial appearance, and so forth, is the rule and is consistent with health. The concept of ideal dental treatment is arbitrary and should not be confused with better health, and "non-ideal" is by no means synonymous with abnormal or unhealthy. Treating to attain what is to us ideal may not necessarily address the needs of the patient and therefore may not confer any tangible benefit. Certainly such treatments are not patient centered in motivation nor are they supported by evidence as being "good". Clinical excellence is more appropriately evaluated according to criteria that pertain to costs, risks, and benefits that address patients'

concerns and expectations. This is somewhat different from the ideas we came to accept during our dental school years. There we tended to look up to our teachers and peers as being clinically excellent if they produced work that met the highest standards of technical skill and looked like the textbook illustration of how it should look. However even the most skillfully produced item is of no benefit to a patient if that treatment was either unnecessary or inappropriate in terms of enhancing health.

As educators we must also ask about the outcomes of our teaching. We have the complex task not only of providing and teaching state-of-the-art care, but also of supplying students with the tools they need to continue to update their decision-making skills so that their care is current throughout their practicing lifetimes. Students must be taught to evaluate current beliefs continuously, to acquire new knowledge, to judge its quality, and to use this information to make patient-centered clinical decisions.

The scientific basis for care

How can science help us help our patients, and what sort of science do we need? Clinical decisions can be based on data concerning the outcomes of treatments. Using those data we can find a strategy that gives the greatest odds of the best outcome for the patient.³ For example, we might compare the use of stainless steel crowns with the use of class II amalgams. Recently in Texas, the frequent use of stainless steel crowns by pediatric dentists was publicly criticized as financially motivated.⁴ Most pediatric dentists believe that stainless steel crowns are superior to amalgam restorations in many situations. But what sort of data is needed to justify their use to insurance companies seeking to minimize costs? Comparative initial cost for alternative treatment options is important. But other outcomes measures such as the longevity, the risk of carious involvement of additional surfaces, and the potential sequelae of restoration failure, such as pulpal involvement or space loss, need to be considered. A paucity of published outcomes data for stainless steel crowns and to other treatment options leaves pediatric dentists vulnerable to criticism and pressure to select what may be inferior treatment for our patients. Further research in this area is needed to establish the relative effectiveness of available treatment options.

How can we assess the quality of clinical evidence? Types of clinical evidence may be categorized and arranged in a hierarchy according to their strength. The least rigorous types of clinical evidence are anecdotes and personal opinions. Given human nature, cases we remember or hear about must be regarded with a healthy skepticism. We tend to remember successful outcomes, and we are certainly more likely to talk about them. But the anecdote has its place in the hierarchy because it can stimulate more rigorous investigation. Published case reports are in essence well-documented

anecdotes, and must be regarded with the same caution. Any treatment could appear to work one time. What we really need to know is how likely it is to work. And we need to know how well it works compared to no treatment; in other words, we need a control group. Case series offer more information than case reports. They include multiple cases, but those cases may have been chosen because they resulted in successful outcomes. For this reason, case series articles share many of the same weaknesses as case reports.

The next level in the hierarchy of clinical evidence is the retrospective study. These studies can be informative and inexpensive to perform, but can be subject to considerable bias. In reviewing records for a retrospective study it can be difficult to identify untreated controls, and patients thought to have the greatest likelihood of successful outcomes may have been selected for treatment. Bias may also be observed in the population for whom follow-up data are available; for instance, those with problems may be more likely to return for care. Additional bias may occur because the information of interest may have been recorded inconsistently. For example, does the absence of an entry in the chart indicate a negative finding or just that the record is incomplete? So although retrospective studies can be quite useful, they have some inherent deficiencies.

Prospective studies, in which measurements can be defined in advance and standardized and data can be recorded consistently, offer very good clinical evidence. The registry approach to prospective studies, in which multiple clinicians participate, is particularly powerful. Using the registry approach, practitioners may use the treatments that they are comfortable with and believe in, and the various protocols can be compared by pooling the data. Since the results can include the outcomes from a large number of practitioners, they may be more generalizable. It also offers an ethical advantage in that clinicians can offer the treatments that they believe work.

The randomized clinical trial, in which subjects are assigned randomly to treatment groups, is considered by many to be the gold standard for clinical research. On a practical level, however, there are significant drawbacks to this approach. It can be ethically troubling for clinicians to provide what they may believe to be an inferior treatment to a certain fraction of their patients. In addition, these studies can be extremely expensive, particularly if they are to include a large number of care providers. It is questionable if the extra rigor as compared to a simpler prospective study is justified considering the level of risk incurred by dental treatments. Carefully planned prospective studies of oral health care treatments can provide strong

scientific evidence of their effectiveness and provide the information we need to make good clinical decisions and justify our treatments.

Responding to the challenge

Like medicine and the rest of dentistry, we currently have inadequate data to support many of our treatments. We may be called upon to provide this evidence in the near future both as we teach our students and to justify care to those who pay for it. Outcomes data may also be necessary if we continue to face challenges to our status as a specialty. Beginning to collect data now, particularly on treatments unique to pediatric dentistry, will prepare us to face future challenges and help us to provide more effective care for our patients. The systematic gathering of such data should be undertaken in a planned fashion. Variables of interest and importance need to be specified beforehand, and the method of recording data standardized. The reliability and validity of data should be verified before collection goes so far that further revisions would invalidate earlier progress. Such information gathering can and should be done not just in academic institutions but more importantly in the real world environment of private practices in the community. Collaborative projects between the academic and private practice communities could provide optimum use of the resources available. Organizations such as the American Academy of Pediatric Dentistry can play an important role by helping to establish generally acceptable guidelines and protocols for clinical data collection, and by assisting with the analysis of data sets that combine many practitioners and represent a wide array of demographic and geographic variation.

Professions and specialties ultimately survive by virtue of the public trust they engender and the satisfaction of their clients. These factors become increasingly important when the service provided includes elements that are based less on need and may be of an elective nature that we perceive as relating to the "quality of life". We need to remember whose life it is and who judges its quality.

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1. Ecenbarger W: How honest are dentists? *Reader's Digest*, February 1997, pp 50-56.
2. Institute of Medicine: *Dental Education at the Crossroads*. Washington, DC: National Academy Press, 1995.
3. Vig PS, Vig KD: Decision analysis to optimize the outcomes for Class II Division I orthodontic treatment. *Seminars in Orthodontics* 1:139-48, 1995.
4. Seale NS: The scientific basis for treatment and the Texas Medicaid experience. *Pediatr Dent* 19:138-40, 1997.