

SEALANTS:

Some things every Parent, Patient, and Dental Care Giver needs to know about
“Sealants”

Or my opinions after three decades of experience, practice, research, and teaching

A brief history of a scientific odyssey

Part one of a series on Early Intervention

A Position Paper on Sealants:

“One definition of insanity is to keep on doing the same thing expecting different results.”

When I started practice over three decades ago, dentists in Refugio County were not routinely accepting children as patients. We almost immediately began to see numerous children who had been seen in the pediatric dental practices from the surrounding metropolitan areas. One of the most common and startling observations we made was that ALL children coming from these pediatric practices had sealants on their posterior teeth, sealants that were most often covering significant decay in the teeth they were meant to protect. I was aware of the development of sealants in the 1960's, had seen sealants placed, and I did initially buy into the theory of sealants, but the reality was that sealants weren't working, an obvious fact that was escaping the pediatric practices placing the sealants.

Fast forward to today, in a nutshell, my opinion is that traditional sealants are now obsolete, with mounting scientific evidence that unless sealants are meticulously maintained, eventual failure is the norm.^{i, ii} One of the hallmark articles, published on the basis of having meticulously examined sealantsⁱⁱⁱ far beyond the typical methods used in most private practices, found this damning evidence on sealants: “Between the ages of 17-23, 1/3 of the teeth without symptoms of dentinal caries showed dentinal radiolucencies. Over 70% of the existing lesions showed progression, both irrespective of the presence of a sealant.” A PowerPoint presentation built from this article is available on the web site. In short, sealants will work if the field is meticulously cleaned and dried, something that is very difficult and seldom achieved in the routine practice of dentistry.

This overwhelming evidence also raises several issues that can be boiled down to one question: “Why not do it right the first time?” In my decades of research and dental practice, sealants were first promoted as a one-time-procedure fixes all. As the members of the Texas Institute started questioning the long term effectiveness of sealants, the dental insurance companies, public health services, manufacturers, and the Universities began to recommend the “maintenance of sealants”, with no clear cut guidelines. Finally, there was a recommendation made to “reseal every five years.” After another few years of questioning the wisdom of placing sealants, there is now a consensus of opinion from these same entities that sealants must be “replenished every three years”. They weren't right for the first 35 years or so, so are they responding to the criticism, or is it that they are finally responding to the patient's needs?

If sealants must be meticulously maintained to assure even marginal rates of success, the financial savings rapidly evaporate considering that somebody must pay to maintain the sealants once the sealants are placed. Do the math.

Considering the current state of Dental Science, I believe it is time for the profession to move on to more definitive preventive measures based on science rather than technique. I do realize that many dental practices consider the Hygiene department's daily charges or "Production" of sealants an essential part of the daily practice income, but there is now indisputable scientific evidence that new methods are better than the stop-gap procedure of painting sealants on teeth and waiting to see what happens. This shotgun approach to prevention in any other health care field is unacceptable. Now that there are very definitive treatment options, I believe it is unacceptable to continue allowing Hygienists/Dental Assistants to place sealants, with currently available technology considering the potentially disastrous consequences should a sealant fail.

The past placement of sealants cannot be criticized any more than we can criticize any other technology that was the best for any given period of time. Until the advent of antibiotics, amputation was the standard of care for compound fractures. General Motors never apologizes for last years Cadillac, and the machines of today are much better in terms of safety and fuel economy than those of the 60's and 70's. The entire philosophy of placing sealants was developed around the fact that the diagnostic technology available to dentists in the 1960's and the 1970's was unreliable. Placement of traditional fillings has disastrous consequences since the average life expectancy of a traditional restoration placed by anesthetizing the patient, drilling out massive amounts of healthy tooth structure, and then placing an amalgam restoration is only about 14 years, at best^{iv}. Indeed, more than 70% of what we, as dentists, do on an average day is simply repairing the damage done to teeth by old filling technology.^v

The diagnostic technology of this past Century relied on the familiar dental pick, the dentist's visual skills, and "feeling" for early decay. This technology has been proven time and time again woefully inaccurate for diagnosing the early presence of decay. This old technology is only about 25% accurate^{vi, vii} in the detection of decay. Failure to diagnose decay and then placing a sealant can result in serious decay. Using this old technology to detect decay is less accurate than flipping a coin. It is now possible to very accurately diagnose the presence of decay in the Virgin tooth structure many practices are currently placing sealants on. This technology relies on good diagnostic skills of the dental practitioner. Decay can be now be detected in Virgin teeth with great accuracy using caries detection dye^{viii} and magnification, and with greater than 90% accuracy^{ix} by using Laser Caries Detection.

It is also important to point out that magnification is considered absolutely essential to accurate diagnostic technique. While many dentists are now using some form of magnification for operative and diagnostic procedures, it is my experience and the experience of most of my associates that the overwhelming majority of Hygienists/Dental Assistants absolutely refuse to use magnification, even though the cleaned fissures they are sealing and any early decay that can cause failure^x will be of a size and width that is impossible to see with unaided eyesight.

Recently we accepted into our practice a family that claimed to be previously treated in the pediatric department of a Major University. We found significant decay under most of the “sealants”, a reflection of the primitive state of diagnosis and treatment of that University, in my opinion. The parent also had no memory of any use of magnification or instructions on the importance of “replenishing” the sealants every three years. As is often the case, we were able to detect decay under the “sealants” and were able to lift the mostly unbonded sealant off of this tooth to reveal massive decay.





There is now extremely reliable technology available that allows treatment of the chewing surface of the erupting permanent molars that may eliminate as much as 70% of all future dentistry for the lifetime of the patient, that could result in thousands of dollars in savings for the patient, while avoiding the destructive, expensive, and inconvenient cycle of repair and replacement over a lifetime. We have stood behind our technology for stopping decay in permanent molars for my professional lifetime since 1983 provided that: 1. The molar or bicuspid tooth is normal and erupts under our care. 2. We see the patient within one year of the initial placement of the restoration. 3. We see the patient again each five years. We see claims on the Web and in lectures from dentists claiming to “do the same thing” with a variety of techniques and procedures. If the dentist is NOT willing to warranty his/her work for a professional lifetime, it is not “the same thing”.

In my opinion, I believe it is time to move on to modern, scientifically based technology, leaving the technique of sealants in the last Century where it belongs. If conservation of tooth structure, and reduction of future dental procedures is important for you, your children, grandchildren, or friends, please contact us.

A longer, more complete version of this article will be available on the www.TIADS.com website soon.

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ⁱ Clinical Research Associates Newsletter (CRA 23(12)1999

CRA Air Abrasion Treatment of Stained Pits & Fissures in Teenagers & Young Adults Under Age 30 Showed:

1. Cariious defects were almost always present under stained pits & fissures of non-smokers.
2. If sealants were placed years earlier, & not maintained, teeth were always decayed.
3. Practice of sealing stained pits & fissures need reconsideration.
4. Patients want to be made aware of their oral condition & help make treatment decisions. Most preferred to explore & excise rather than watch or seal, even though their insurance might not pay for treatment.

ⁱⁱ Feigal RJ: Sealants and preventive restorations: Review of effectiveness and clinical changes for improvement. *Pediatr Dent* 20:85-92, 1998.

Expected rate of sealant loss in permanent molars is 5% to 10% a year. Sealant success rates in studies involving regular upkeep of sealants are much higher; one study involving annual recall and repair kept 85% of sealed teeth caries-free after 8-10 years. About 5% of sealed surfaces may require maintenance or restoration each year.

^{iv} Poorterman, Weerheim, Aartman, Kalsbeek: Radiographic Dentinal Caries and its Progression in Occlusal Surfaces in Dutch 17-Year-Olds: A Longitudinal Study. *Caries Res* 2003;37:29-33

^{iv} Berry TG, Nicholson J & Troendle K. Almost two centuries with amalgam: Where are we today?
J Am Dent Assoc 125:392-399,1994.

^v Larson TD, Douglas WH, Geistfield RE: Effect of prepared cavities on the strength of teeth. *Oper Dent* 6:2, 1981.

Replacement dentistry accounts for about 75% of all operative work, and caries at the margins of restorations is frequently cited by dentists as the reason for replacing restorations.

^{vi} Lussi, A. A comparison of Different Methods for the Diagnosis of Fissure Caries without Cavitation. *Caries Res* 27:409-416,1993

Low sensitivity to visual, probing and bitewing examination leads to a significant number of teeth with dentinal caries being undetected

^{vii} Penning, C, van Amerogen JP, Seef RE, ten Cate JM.: Validity of probing for fissure caries diagnosis. *Journal of Caries research* 26(6):445-9, 1993
"Probing found unreliable for the detection of Caries."

^{viii} Rainey, JT. Diagnosing defective sealants with caries detection dye. *Texas GP* 24(4):6-7, 1998

^{ix} Ross, Gerry Caries Diagnosis with the DIAGNOdent Laser: a user's product evaluation. *Ontario Dentist* March 1999 21-24

^xM. Bravo, E. Osorio, I. Garcia-Anllo, J.C. Llodra, and P. Baca The Influence of dft Index on Sealant Success: A 48-month Survival Analysis *J Dent Res.* 1996 Feb;75(2):768-74.

This current research has shown that the retention of the sealant is related to the incidence of decay of the particular patient. Those teeth with decay are the ones needing sealant protection the most, are the least likely to have long term retention of the sealants.