[Don't Believe The hype.]

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Scientific method, common sense, experience and the patient: "LESS IS MORE"

It is my pleasure to contribute to the new Journal of Clinical Dentistry and Research through this editorial.

As a practitioner who is trying to find his way through a storm of new dental products, expensive technologies, conflicting scientific publications etc.; it is important, more than it has ever been, to examine one's beliefs, values and foundations, which will allow us to make the most appropriate choices for our practice. Facing such a plethora of restorative concepts implies considering a more rational approach based on the mimicking of the natural tooth. Four components are involved in this process: science, experience, common sense and the patient. It is my hope and prayer that the Journal of Clinical Dentistry and Research will share this approach, so as to produce the most significant publications and enlighten our deliberations.

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The scientific approach (evidence-based Dentistry) is often mentioned first, but unfortunately it is not flawless. Study conditions do not always represent the daily clinical reality. Due to medical ethics, it is not possible to standardize all the clinical conditions of a trial. A multitude of confounding variables, such as the operator, the nature of the clinical picture, the patient's chewing habits or diet can easily "contaminate" the results. Therefore, it is not uncommon that the null hypothesis be confirmed (no differences between the control and test groups), particularly in clinical trials, which by default have a majority of confounding variables. It is also shown that one of the significant variables in clinical practice is represented by the clinician himself and his ability to master a particular approach. Clinicians participating in numerous training courses and developing their skills will tend to produce more reliable results. It is also established that numerous acts of daily practice are lacking high-level scientific evidence. The scientific community even recognizes the existence of a "talking pig." This is a parable that explains that common sense must be recognized even in the scientific method.

According to this parable, a researcher has trained a pig to talk. "This is madness," you may tell yourself. But we bring this pig to speak to you and the pig says: "Good evening," and proceeds to a summary of the daily news. We hope you would be amazed by this phenomenon, and would not necessarily request a random selection of 100 pigs to verify that pigs can talk. By the same principle, it is possible to ask whether a randomized study is needed to prove that the use of a parachute can prevent death in case of airplane failure. These examples show that common sense should be used in every situation.

It is also not uncommon that conflicting scientific data be produced and then require a decision based on experience and common sense. Finally, it is quite possible that science, experience and common sense will all direct you towards the same therapeutic solution. However, the patient may be unable to choose this solution, for example, for economic reasons or availability. Segmenting treatment or providing a low-cost, alternative solution should be explored, which does not necessarily correspond to the so-called "ideal" solution proposed by the treatment team.

A critical element has characterized restorative approaches of natural teeth during the past 25 years. It is the consensus amongst a new generation of leaders that deep respect for intact dental tissue is paramount. Hence the motto "LESS IS MORE," and the fact of acknowledging that natural enamel and dentin are not the result of human work, but constitute an engineering masterpiece divinely designed. The responsibility of the clinician is to maintain the tooth biological balance, function, mechanics and aesthetics. Restorations must work in harmony and synergy with the remaining natural tissues.

There is a major socio-economic impact implied in this approach. The successful development of restorative material and techniques in these areas will have

an immediate and long-term effect on the practice of operative Dentistry in poor countries as much as in rich ones. To this end, studying the natural tooth in all its forms remains the force majeure or the so-called Bio-Emulation biomimetic approach. Natural teeth are constituted by a brain, the pulp, itself protected by a hybrid mechanical structure, both resistant and resilient. The union of enamel (brittle, but wear-resistant) and dentin (not wear-resistant, but resilient) at the DEJ is the cornerstone for the proper performance of natural teeth in the long term. It is by mimicking the DEJ in the biomimetic approach that the principles of retention and resistance form can be questioned and tested against the principle of absolute preservation of healthy tissue, even in the most desperate situations on anterior and posterior teeth (endodontically-treated teeth without ferrule). However, the strict application of biomimetic principle requires deep knowledge of the principles of adhesion to reproduce the structural continuity of the DEJ.

One of the most challenging aspects of adhesion is dentin bond. The plethora of commercial products to assist in this endeavor is staggering. In 2012, a meta-analysis on the parameters involved in dentin bond revealed a list of the ten most tested adhesive systems. A total-etch-and-rinse 3-step system with filled adhesive resin happened to be at the top of the list with the best bond strength and the best stability of bond. Even though it is now more than 20 years old, this same product remains the undisputed reference with adhesion strength around 50 MPa and the lowest rate of degradation. For comparison, a study of enamel-dentin adhesion revealed strength between 47.7 and 51.5 MPa, and concluded that adhesive systems have the potential to replicate the DEJ at the condition, however, of avoiding simplified systems, especially all-in-ones.

Another essential element is the adhesive application mode. The hybrid layer (interdiffusion zone) can be extremely thin, between 1 and 3 microns, depending on the system. Adequate polymerization of the adhesive layer is essential to protect the hybrid layer. As such, it is essential to recognize the oxygen inhibition phenomenon on the polymerization of resin, which can easily reach up to a depth of 40 microns and affect the quality of adhesion to the dentin. Therefore, a perfect polymerization of the adhesive interphase requires an adhesive resin layer of about 60-80 microns. A filled adhesive resin represents a double advantage. Because of the viscosity of the adhesive resin, it will act both as adhesive and flowable liner, thus achieving structural adhesion with the restoration. A double layer of filled adhesive resin has even been recommended to improve the fit of the restoration. It is important to understand this structural aspect of dentin bond. An extremely thin adhesive runs the risk of being badly polymerized with all resulting complications (compression and damage to the hybrid layer, especially when placing the restoration,; increased solubility, etc.). It is therefore crucial that the adhesive layer be included in the impression for semi-direct or indirect restoration. Hence the need to apply the adhesive system immediately after tooth preparation.

In addition to demonstrating its superiority to the traditional technique, immediate dentin sealing (IDS) ensures a multitude of protective functions during and after the provisional stage, thereby avoiding anesthesia for the trial of the final restorations as well as facilitating occlusal adjustments after the restoration delivery. A systematic application of the IDS technique has been described, and more than 20 advantages of the technique have been listed by the author with an experience of over 20 years. A radiopaque and filled adhesive represents a sure advantage for IDS because of its ability to generate a consistent layer of resin while an unfilled resin demonstrates insufficient thickness in the convex area of dental preparation.

There are major implications in the biomimetic approach, including the medical-biological aspect (i.e., the economy of healthy tissue and maintaining the vitality of the tooth) and socio-economic context (i.e., lower costs compared to the traditional, invasive prosthetic approach). For teeth with major loss of coronary tissues, traditional crown prosthetic treatment involves removal of large amounts of intact tooth, with potentially adverse effects on crown biomechanics, periodontal tissues (the need for clinical crown lengthening for short teeth) as well as non-negligible financial consequences. Using the adhesive technology, it is possible to preserve as much tissue as possible, in addition to limiting costs.

Several *in vitro* publications in preparation will challenge the use of root posts, even in the presence of nonvital anterior or posterior teeth without ferrule. The use of CAD/CAM technology proves to be an essential tool in this regard and allowed us to upgrade our expectations and produce a true biomimetic restoration using real enamel and real dentin.

In conclusion, using not only the scientific method, but also experience, training and common sense of the operator, it is possible to provide patients with minimally invasive restorative solutions based on the biomimetic approach. An absolute mastery of bonding techniques and the implementation of the new CAD/CAM tools will accelerate the phasing out of old concepts based on mechanical retention and resistance of dental preparations.

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