



The X-1 concept



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The time a human being is likely to live is defined as life expectancy, a statistical measure of the average time an organism is expected to live, based on known aspects. Life expectancy has increased in the last 100 years, as all body systems function for longer. Teeth are exposed to many risks and hazards due to their working environment, wetness, low pH, temperature changes, and load due to chewing and parafunction, as well as caries, periodontal disease, and trauma.

The mouth is a “wear machine” due to its daily working nature, and thus it is interesting to explore whether the teeth are reliable partners in the lifespan increase and the role that dental clinicians have to play. A tooth life cycle starts after its eruption and may end either within the body or with an extraction. A tooth may undergo a restorative procedure or receive a root canal treatment along with a post and core and a prosthetic restoration. Performed restorative procedures are meant to assist in maintaining teeth in function in the mouth, as lack of necessary treatment jeopardizes their survival in the long term. Clinicians are responsible for maintaining oral health, including correct diagnosis and selection of the correct treatment plan and procedures.

A tooth can receive a limited number of restorative procedures, and if it undergoes a total of “X” procedures in the life cycle, each treatment will reduce the total left by one, defined as the “X-1” value. However, the X value is unknown, and there is no guarantee that a tooth will survive even one treatment. Every next procedure in the list of X-1 treatment events starts in a less favorable situation than the previous, causing a further loss in tooth structure. Loss in tooth material weakens the

tooth and reduces its resistance to forces exerted in function and parafunction.

Dentistry’s main goal is to maintain teeth in the mouth, and the remaining amount of tooth material at a given time is a crucial factor in the life prospects of a tooth. In the process of restoring a tooth, its material is sacrificed for quality and longevity (eg, parallelism, clearance, esthetic aspects), and not only due to the reason for the restoration. This creates a strong link between the clinician and the life cycle of a treated tooth following the sacrifice of tooth material.

Root canal treatment is a good example, as it is common practice to crown a tooth after treatment. The literature supports crowning in such cases to protect the tooth from future potential lethal cracks. A fabricated crown has a life cycle that depends on the oral environment, the patient’s habits and vulnerability to caries and periodontal disease, and trauma events. The crown preparation sequence includes a significant irreversible reduction of tooth material, which complicates future restoration. In cases with significant decay, this may determine further use of the tooth.

Adhesive techniques were introduced to replenish and restore partially lost tooth material, sacrificing less tooth substance, with promising survival rates. This should simplify the process of elongating the lifespan of an abutment tooth as the starting point for the next restorative procedure. When a restorative procedure is selected, whether it is a conservative filling or a composite buildup after a root canal, the next future procedure should be virtually taken into account along with all possible measures planned to postpone the



procedure. It is reasonable to state that a composite restoration will not be there for life. Also, there is no guarantee that the replacement will be similar in nature and/or extensiveness.

This is the basis of the “X-1 concept,” that one should be as conservative as possible in selecting a treatment plan or a procedure, as less is more. Minimally invasive concepts are growing in popularity, with the increasing confidence in adhesive and additive dentistry. These have opened new treatment modalities to recreate the anatomy of a defective or broken tooth, giving it functional durability and pleasing esthetics in a more conservative and less extensive clinical procedure.

When performed meticulously, this concept gives the tooth a better chance to be part of the “wear machine” during the patient’s lifespan, allowing more restorative cycles, with each procedure sacrificing less tooth material .

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