

The 'Ages' of dentistry treatment

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The need to find something better, to go further, has been the great catalyst of human evolution, a characteristic that spurred us on to invent the wheel, put a man on the moon, and that, in dentistry as a scientific field, has led to different ages that have helped to advance oral health levels.

As Oppenheimer said, "**Only he who studies the past has a future**, because studying the past allows him to REINVENT the future." Looking back on different periods aims to draw lessons from yesterday, to X-ray how dental treatment has been, in order to see where we have come from and where we are headed in the interest of society today. Thereby reducing the gap which exists, as is the case in nearly all the sciences, between the knowledge we have and applying it in clinical practice, because the different ages of dentistry still live on today.

As human beings we are sons and daughters of a time, a place, but above all an age, that will determine our health, because this is controlled by the social context of the moment, which in turn shapes our beliefs, which in turn will largely develop our behavioural attitudes towards health, from both the perspective of the patient and the professional.

THE PRE-HISTORY OF DENTISTRY: The age of acceptance

Disease has plagued humankind since the very beginning. The pre-history of dentistry goes right back to the origin of primitive man, when we might say that dentistry began. In this era, oral health was fundamental, a question of survival, because the mouth was and is a centre for basic life functions, such as nutrition or respiration; of more complex functions like speech, and even more specific ones like socio-cultural relations. We have an example of this in skull 5 of individual 21, which shows evidence of oral infection and can be visited in the Museum of Human Evolution. This fossil of a skull and the jaw of an adult *Homo heidelbergensis*, popularly called *Miguelón* in honour of the cyclist Miguel Indurain, which is fully intact, was found in the Sima de los Huesos (Sierra de Atapuerca, Burgos, Spain) in 1992. 400,000 years ago this man in his thirties was attacked by a fellow man with a stone. This attack had the dire consequence of causing a tooth fracture. Open for pathogens to enter, without antibiotics and perhaps without other medical remedies from the Pleistocene, a brutal infection developed that unleashed a generalised septicaemia, which is a serious and potentially fatal blood infection caused by bacteria in the bloodstream which deteriorates rapidly and ultimately appears to be the cause of his death.

1. THE PRE-RESTORATIVE AGE: tooth extraction

This first stage was the origin of the profession. Before there were dentists as we know them today in Europe, barbers were the ones in charge of extracting teeth, hence why in

Spanish they have the nickname *tooth puller*. These early healers learned their craft from others with more experience. American writer Noah Gordon's novel 'The Physician', published in 1986 and adapted to film, is a good portrait that gives us an idea of how the practice must have been up to the end of the 13th Century, performed on no scientific basis and in the worst hygienic conditions.

Later on, dentists began to come into fashion when they introduced laughing gas and ether, the first anaesthetics used in extractions. This was principally an optional treatment, as to lose teeth was a natural process of life, and to have lost all teeth by age 45 was common in much of the previous century, where in most cases they were replaced by a prosthesis. Moreover, it was thought that a woman's pregnancy would deprive her of calcium and it was normal for her to lose teeth.

All of this was a consequence of a socio-economic period where there was little information and when teeth had a fundamentally functional value. Ultimately as there was a full development in the kitchen, that is to say the 'soft food' diet, they could eat lentils and stews and so teeth no longer became fundamental tools. Consequently people did not invest in caring for their teeth, or in treatments which had their price and, at the time, were not as predictable as they are now, so if there was any kind of problem it was usually ignored.

2. THE RESTORATIVE AGE: treating disease

With the industrial revolution came tooth decay, so researchers and thinkers with a vision of the future made huge advances in the profession looking for relief from the discomfort it caused. In 1746, Pier Fauchard published the second edition of a book that contained the dentistry knowledge of the period, being the first to advocate the removal of decaying tissue and already talking about an apparatus to drill teeth.

This second stage is the birth of modern dentistry, and thanks to its development, we learned that tooth loss is not a consequence of age, but is the result of a disease or trauma. Then the focus shifted over to 'dental treatment', the aim being to repair what had been damaged or lost. Aimed at preventing decay, Dr. Robert Black's famous phrase, "extension for prevention", spread rapidly throughout the profession.

The aim of dentistry was, and still is, to develop technology and treatments to deal with chronic disease. For years, dentists tried to repair teeth problems. Patients often visited the dentist for treatment and then only returned when something broke again. The dentistry profession made advances that would have previously been considered miracles: removing nerves, prosthesis, implants. There is no denying that it was all done very effectively.

The downsides of losing teeth were quickly noticed, and it was known that if you had a problem the dentist could solve it and tooth extraction could be avoided through different procedures. This led to a leap forward as a tooth could survive longer in the mouth through its 'restoration'.

But despite our best efforts, we saw the limits and side effects of treatment. Due to the gradual and cumulative nature of oral diseases, they become increasingly complex over time, which, as we move into the cycle of tooth repair or replacement, complicates treatments, worsening the prognosis and, consequently, the tooth and quality of life of patients. As the Spanish saying goes "If all the facts are so good, why are things so bad?"

The mechanical model of treating a disease is insufficient to meet the demands of the population today. Reparation is not the final stop. Therefore, in the second era, health became a rising star. People started not to want fillings or undergo complex treatments and were ready to take care of their mouths to maintain healthy teeth. In the search for this *holy grail*, some general prevention methods were developed so that we could avoid these diseases, such as brushing your teeth, not eating sweets or using fluoride etc. However, we observed patients who followed these recommendations but continued to suffer from disease, and some of those who do not follow them did not develop such problems. The answer is conclusive: we were not successfully preventing these diseases. We were falling into a simplistic trap that struck a chord among dentists, which led us to carry on being obsessed with treatment. This encouraged us to deepen our knowledge of these common diseases that were considered complex, multifactorial, and which brought us into the next era.

3. THE NEW AGE OF HEALTH Minimum intervention (MI) as a clinical model

In this third stage of dentistry, we learned that the majority of people in society would be vulnerable to the most common oral diseases throughout their lives, but we also knew that if original teeth were looked after **they could last a lifetime** in excellent condition. Oral health is still not guaranteed to all, only to those who are willing to work for it, this goal requires proper personal care supplemented by regular professional care. Ignoring mouth maintenance leads to the complications and suffering that we saw in the other ages and although we can alleviate them with treatments, we know the cost in well-being that it involves, as a repaired tooth will never be the same as a healthy one.

Our life expectancy continues to increase, which means that our teeth have more opportunities to develop problems, but moreover we want them to last longer than has been the norm over millions of years. For our teeth to serve us well over the course of our current long existence, the natural goal is to maintain personal dental health from infancy to old age. In cases where people have had any sort of dental treatment, we should aim to help them to create a healthy oral environment, in order to reduce the risk of diseases coming back, because, this is a silent epidemic, which accumulates over the years. Just like when we buy a car, we start to care for it when it is still new so that it stays in good condition, but we cannot buy a new mouth like we would do with a car and so we have to substitute tooth loss with prosthesis.

Traditionally we have had to wait for a problem to manifest itself physically before we would be able to intervene because we had no way to analyse risk and predict potential diseases before they happen. Minimum Intervention (MI) dentistry offers the means for clinical application in this new age of health. The concept of **maximum health care with minimum intervention** has given rise to new diagnostic tests that facilitate the ability to 'predict' problems in order to intervene against the disease before the lesion appears and to use types of treatment which are aimed not only at the final phase of the

process, but in its beginnings too, which helps to improve health levels (increasing the organism's protection barriers). These techniques make it possible to preserve tissue and minimise any side effects of the treatment.

The starting point to apply MI dentistry is the evaluation of risk factors that lead a person to develop the disease. Biological analysis, saliva tests, bacterial tests, pH measurements and inflammatory markers are some of the tools that enable us to understand the vulnerability of an individual to a disease and link them to the most common predisposing factors such as, amongst others, hereditary factors, diseases including diabetes or any immuno-depression, improper nutrition, hormonal changes, stress, habits such as smoking or poor oral hygiene, defective restorations, a previous history of oral disease, xerostomia driven by drugs and occlusal considerations. This analysis of all the circumstances which could endanger the patient provide an understanding of the components that lead the patient to develop the abovementioned multifactorial diseases, so as to make a *prognosis* (low, medium or high risk), design *protective* measures (individualised prevention) and, in the event of a lesion, perform MI treatments with minimal biological cost.

The new patient, in many cases, comes to the clinic healthy, not expecting to have any symptoms, and an analysis of markers is made to determine what likelihood there is of developing a disease. It helps patients to understand the risks facing them and to discuss strategies to reduce them before a lesion appears; a proactive therapy. The end goal is to maintain health, prevent and stop the onset of disease or to treat it in the initial phases when the process is still reversible. Dental health is largely the result of correct daily behaviour over time and vice versa. We know now that people with better oral health enjoy better general health.

This new philosophy of working is not limited to the oral cavity as it was in the previous era, but advances more generally, that is to say, a dental disease is considered a major part of overall health. The key consideration is that the mouth is the reflection of, or the gateway to, personal wellbeing. The third age of dentistry gives the individual the opportunity to be better for longer, and for their teeth to survive. MI has developed tools that can help people to, in reality, 'participate' in their own health.

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