

# prevention

international magazine for oral health

## special

The dental hygienist  
in times of COVID-19

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Designing for the  
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Reducing the risk of infection  
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**Magda Wojtkiewicz**

Managing Editor



# Everything has changed

As the new school year begins in the middle of a global pandemic, many are concerned about the negative impact that online or socially distanced learning may have on children's developing social skills. While mass media are mostly focused on the young, we tend to forget about the adults. It seems that adults lacking consistent and varied contact with others can develop social disorders as easily as kids do.

This problem may concern patients and dental professionals in equal measure. Therefore, now it is more important than ever to understand that many of us might feel socially anxious, impulsive, intolerant or even awkward when it comes to visiting or working in the dental office.

People change over time and certainly after something as significant as weeks of lockdown and a pandemic turn lives upside down. Patients who used to be calm might become nervous and uneasy. The same may apply to the dentist or dental assistant. People can feel uncomfortable with other people, and this is a natural consequence of isolation and a lack of normal social contacts and

interactions. Many of us have not met anybody new for months. Our reactions to strangers have changed. Personalities might shift, confidence in what we thought we knew may have been shaken, and situations which used to be quite predictable may have become completely new and unknown. The dental office environment, especially, might provoke more anxiety than before, and it is more reasonable to understand it than to fight it.

The truth is that the pandemic has changed everything, and to survive, we have to learn how to adapt to these new conditions. It does not matter whether at school, a restaurant or the dental office, we should leave our habits aside and start creating new behavioural patterns.

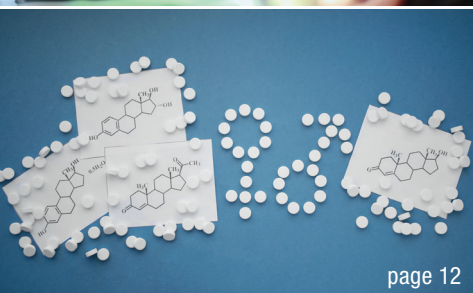
Where do we start? First, we should give ourselves and everyone else time and show patience regarding our own and other people's oddities and individual responses. Then, we can start to build new social relationships, based on respect and kindness.

Magda Wojtkiewicz  
Managing Editor





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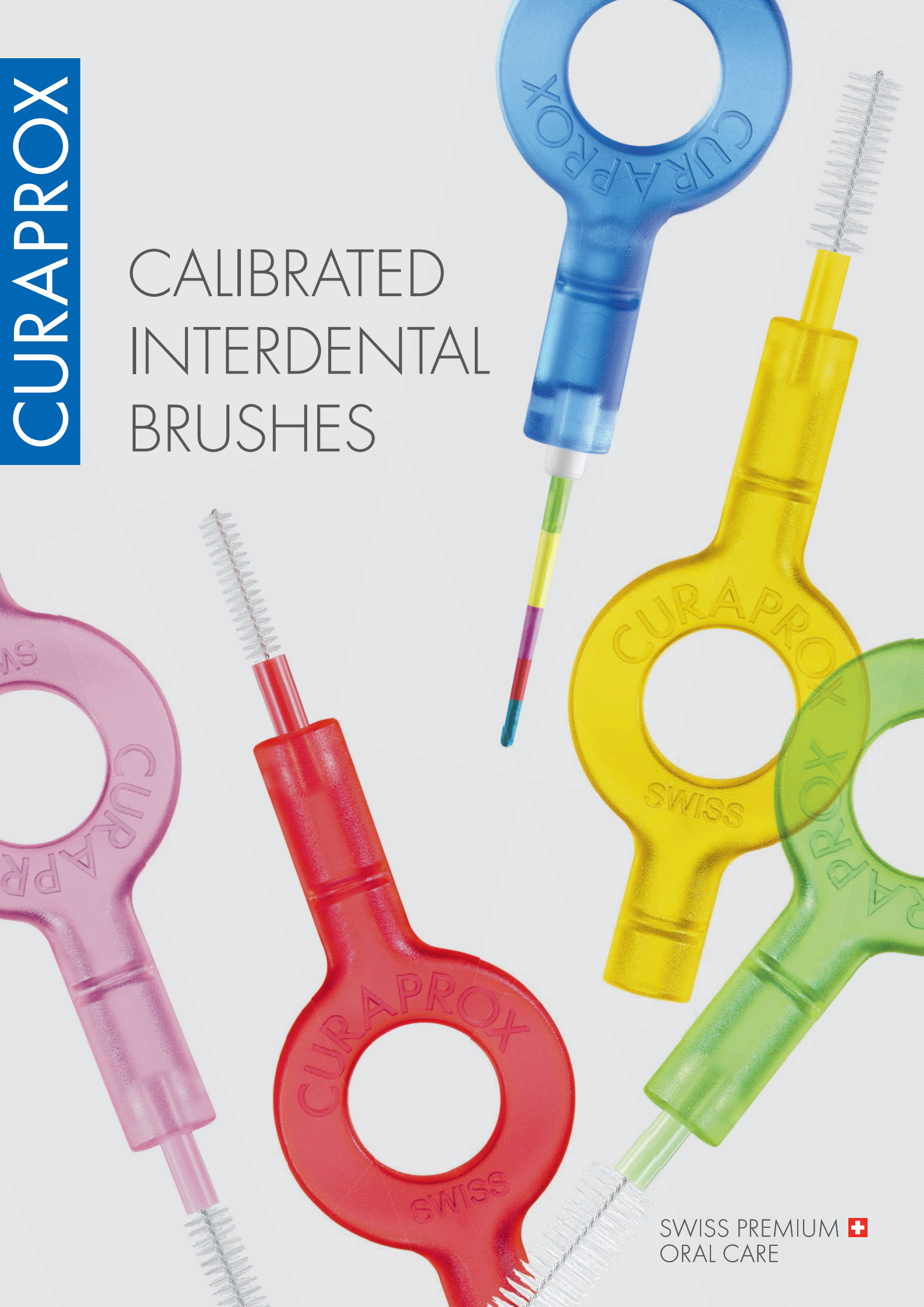
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# The dental hygienist in times of COVID-19

Dr Annamaria Genovesi, Giacomo Oldoini, Dr Saverio Cosola & Prof. Ugo Covani, Italy

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In 2001, the concept of the human microbiome was first introduced by Joshua Lederberg. The microbiome consists of the entire genomic heritage of microorganisms and biochemical interactions with the host.<sup>1</sup> Knowledge of the microbiome has profoundly changed oral hygienists' and dentists' clinical approach to controlling oral infections. Furthermore, the modern *modus operandi* has increasingly forced us to reduce treatment time and biological and economic costs and therefore carry out minimally invasive interventions with excellent results through periodontal support therapy. In this scenario, the patient becomes the protagonist and is no longer only the object of our therapy.

In the second phase of the coronavirus emergency, in which we must live with COVID-19 at least until a vaccine has been found, some of these revised protocols could be useful strategies to contain the pandemic and reduce cross-infection in dental practices. For dentists and dental hygienists 2.0, greater attention must be paid to the use of specific personal protective equipment (PPE), a rational flowchart of the sterilisation and sanitisation cycles, the reduction of aerosols and their bacterial and viral load, and ventilation of the practice.<sup>2</sup>

## Appointment flowchart

This is a premise for a necessary reorganisation of the dental practice, but not for a revolutionary change.<sup>3</sup> The reorganisation of the dental office will take place through an optimisation process of the management protocols for cross-infection, in particular with regard to airborne infections. In March 2020, at the start of the pandemic, the *New York Times* published an estimate of workers' risk of being infected with SARS-CoV-2.<sup>4</sup>

The report showed that, of course, medical professionals who treat COVID-19 patients on a daily basis are at the greatest risk. However, dentists and dental hygienists fall into the same risk category owing to aerosols and droplets produced during virtually all dental procedures. During procedures involving the use of aerosol sprays turbines, micromotors, air polishing and ultrasound, the aerosols generated may contain patients' potentially infective saliva and blood, emitting these into the environment.<sup>5</sup>

Several strategies have been proposed for dental professionals, such as telephone triage, waiting room management and new appointment schedule, and detailed

protocols and guidelines have been published by health authorities in countries throughout the world to minimise the risk of infection in dental practices.

The dental practice must principally focus on the following:

- reduction of the bacterial load in the patient's mouth in order to minimise bacterial airborne contamination;
- working safely;
- reduction of the amount of aerosol generated;
- use of high-power suction during dental procedures;
- use of non-thermal plasma technologies to filter the air and neutralise bacteria and airborne viruses;
- use of environmental air decontamination systems (ozone generators, ultraviolet and hydrogen peroxide ejectors);<sup>6</sup>
- careful decontamination of all surfaces; and
- use of appropriate PPE to protect the eyes, face, mouth and nose.<sup>5,7</sup>

### The modified full-mouth disinfection protocol and its important role in the COVID-19 era

Minimally invasive non-surgical therapy has been widely used in dental practice with the main objective of decontaminating periodontal pockets to the highest possible degree using a minimally invasive approach. The Istituto Stomatologico Toscano follows this principle by carrying out the modified full-mouth disinfection (MFMD) protocol developed by Dr Genovesi. In 2014, this protocol was established with the aim of reducing the inflammation and bacterial load of periodontal pockets before proceeding with instrumentation in order to reduce the risk of bacteremia.<sup>8</sup> It consists of a two-step approach. During the first appointment, the patient is instructed and motivated to maintain correct oral hygiene at home and employ chlorhexidine or other antimicrobial substances for 15 days.<sup>9</sup> After about ten to 15 days after the motivation session, the patient usually presents with significantly improved clinical parameters already—less plaque and bleeding—and, hence, lower levels of inflammation and better trophism. During this second appointment, a full-mouth disinfection (FMD) is performed.

In a clinical study published by our group, which compared different FMD protocols, we observed that pain during the treatment session as well as inflammation and plaque indices were significantly lower in the test group (MFMD) compared with the control group (FMD) after ten days of home treatment.<sup>10</sup>

In view of the current pandemic, this two-step protocol allows the reduction of the duration of the treatment session and therefore the duration of exposure to potentially contaminating aerosols compared with FMD in a single session. It should be emphasised that all this is carried out by reducing the number of visits to the dental practice (two



compared with other protocols of non-surgical sextant or quadrant therapy. Furthermore, the first motivation session can be carried out wearing PPE and respecting the safety distances to reduce or totally eliminate the risk of contamination. Oral hygienists could even consider the possibility of performing this motivation session remotely, via a mobile app or social networks, for example.

### Motivation

We will certainly be able to enhance and improve our communication with and ability to motivate the patient if we dedicate more time to it, perhaps even making a telephonic or social network consultancy service available for our patients in order to minimise our intervention. The success of the motivation session depends greatly on the communication skills of the dental hygienist. In a 10- to 120-minute session, the hygienist must motivate the patient to change his or her habits radically—and we all know how difficult it is to change habits. To succeed, the dental hygienist must employ language capable of engaging that specific patient, targeting his or her individual cognitive and clinical characteristics.

This task is far from simple and is the primary example of proactive therapy, defined as such by Genovesi and Marconcini et al.,<sup>10</sup> in which the patient is placed at the

**“The success of the motivation session depends greatly on the communication skills of the dental hygienist.”**



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centre of the dialogue and becomes part of the therapeutic path. The attribution of responsibility generates a positive change that will hopefully lead to a long-term oral disease prevention and oral health maintenance regime. During the motivation session, the microbiological principles of the oral microbiota, the formation of biofilm, and the important interaction between oral health and systemic health are explained to the patient.

### Mechanical procedure

The patient is instructed on correct at-home oral hygiene, supported by using the appropriate mechanical cleaning tools. In our experience, the sonic toothbrush represents the gold standard of home care for the patient because, owing to the dynamic fluid action, it is able to remove plaque and effects a change to the microbiota that corresponds to health. For interdental cleaning, we recommend silicone-bristle brushes or air and water cleaning aids for interdental spaces. These aids are easy to use without any particular manual ability, even where access is more difficult, and unlike dental floss, these tools are less harmful to the gingivae and more effective.

### Toothpastes and mouthwashes

The choice of toothpaste and mouthwash is essential for optimising the clinical effectiveness of mechanical instruments and to promote a state of eubiosis. There are a very large number of products dedicated to oral home

care on the market. Each product has its indications and characteristics. Normally, chlorhexidine is administered only for a very short period of use—in the acute phase or, more precisely, in the first phase of MFMD. Later, it will be replaced with proactive products. In the initial reactive phase, NitrAdine tablets (PerioTabs; bonyf) or zinc-based antimicrobial products can also be suggested to patients. In the proactive phase, the products are based on ozone, in the form of toothpastes and gels with higher concentrations or ozonated water, or, in less problematic situations, products containing natural antiseptics; and nanohydroxyapatite, propolis gel, GLIC toothpaste and GLIC mouthwash (Polifarma Benessere) in diabetic patients; or other biomimetic products.<sup>11</sup>

### Operative session

During the operative session of MFMD, the following operational precautions must be considered.

#### *Ultrasonic instrumentation*

Aerosols generated by ultrasound are an intrinsic feature of the devices.<sup>12</sup> Therefore, in this situation of high transmissibility of the virus, it is preferable to limit the use of ultrasound in favour of manual tools. If there are biofilm and non-calcified deposits, it is also recommended to reduce the level of irrigation and power of the ultrasonic devices. In this scenario, it is highly recommended to use devices with which one can better regulate the water supply and reduce the amplitude of movement of the insert, minimising cavitation (Fig. 1). In situations where the use of ultrasound at a higher power is needed, it is important to increase the safety precautions indicated by scientific societies, such as PPE or efficient aspirators.

#### *Sonic instruments*

By nature, the sonic insert has a reduced aerosol production. It would thus be useful to apply this technology wherever possible.

#### *Vector technology*

This technology exploits the shock wave produced in the periodontal pocket by cavitation. It eliminates uncontrolled oscillating movements and mechanical vibrations and requires a reduced flow of water. Therefore, the water is not sprayed and aerosol production will be almost completely eliminated. For this reason, this technology should also be employed when possible in order to reduce the generation of aerosols.<sup>13</sup>

#### *Use of prophylaxis powders*

The powders have literally revolutionised the therapeutic approach to the patient. We know that aerosol produced during this kind of therapy is significant in terms of quantity and waste. It is therefore important, when there is a need, to modulate their use, reducing the time of



application, choosing powders suitable for the clinical situation and preferably using trolley devices that optimise the effectiveness of the jet. The reduction of aerosols is also favoured by intermittent use of the device.

### Periodontal cleaning

It is preferable to use subgingival tips (Fig. 2), normally indicated for periodontal sites over 5mm deep. These allow us to limit excesses of the jet by directing it entirely into the periodontal pocket.

### Supragingival cleaning

Micronised sodium bicarbonates and calcium carbonates satisfy all types of supragingival needs (restorative materials, erosion, brackets, pigments, plaque and exposed implant surfaces) and reduce the duration of application. In this case, choosing powders dedicated to the subgingival area can be wrong because powders with lower abrasive indices increase spraying duration and therefore aerosols (and costs).

### General use

The pedal should be used intermittently and never in a continuous jet, greatly reducing waste and nebulisation caused by continuous spray of the jet. Of course, we must not forget that it will be necessary to have powerful aspirators that reduce the spread of potentially contaminated aerosols, the retractor connected to the suction side and positioned near the patient's oral cavity.

### Manual instruments

There is no doubt that, even if for a short period, we must come back to manual instrumentation, limiting the use of ultrasound. In manual instrumentation, it is important to choose instruments that allow us to be effective but also ergonomic. Universal instruments, including DSS1/DSS2 curettes (with graduated rod) or DS1/DS2 curettes (without graduated rod) with a double working blade with perio-anatomical adaptations for anterior or posterior sites, and M23 and M23F scalers, are excellent tools. In this way, we can meet the need to reduce the instrumentation time by optimising the performance of non-surgical periodontal therapy (Fig. 3).

### Ozone therapy, laser therapy and probiotics

Periodontal therapy can and must also be supported on a professional level by proactive agents and devices.<sup>14</sup> For example, the efficacy of professional use of ozone or probiotics has been highlighted by several publications by our institute, and these substances may provide a further therapeutic opportunity in the hands of the dental hygienist to preserve the patient's periodontal health,<sup>15, 16</sup> especially in this historic time in which we must reduce aerosols, but still keep the oral cavity of our patients healthy. In addition, ozone is known to be non-specific and broadly effective on bacteria, fungi and viruses owing to its oxidising properties.<sup>17, 18</sup>



In a recent study, we evaluated the effectiveness of pre-surgical rinsing with ozonated water in the reduction of airborne infections, analysing the surface near the working area using microbial cultures. The results showed that ozone therapy might be considered useful as a preoperative rinse for decontamination purposes, as well as to reduce airborne contamination. Ozone therapy has been reported as being effective for a range of different virus types, including SARS-CoV.<sup>19</sup>

*Editorial note: A list of references is available from the publisher.*

## about

The **Istituto Stomatologico Toscano** is a foundation for clinical, research and advanced training in dentistry in Lido di Camaiore in Italy. It offers continuing and further education courses, as well as conferences (currently postponed or made available online). Its masters' courses are provided in collaboration with Saint Camillus International University of Health and Medical Sciences in Rome in Italy. A master's degree in non-surgical periodontal treatment for dental hygienists starts in January every year. It consists of theoretical and practical lessons on one weekend per month and individual study for a final thesis, which is supported by tutors. In addition, an international postgraduate programme is available for dentists (one- or two-year master's degree). More information can be found at [www.istitutostomatologicotoscano.it](http://www.istitutostomatologicotoscano.it). Courses are being conducted online on the institute's own education platform currently in order to guarantee students continuity of training and pursuit of the educational assessments, including thesis drafting and research. The institute also organises free-of-charge webinars with Dr Simone Marconcini and Prof. Ugo Covani.