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prevention

international magazine for oral health

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periodontal health
"The link between oral disease and oxidative stress is still not that widely known"

infection prevention
Aseptic versus clean operating conditions in implant surgery

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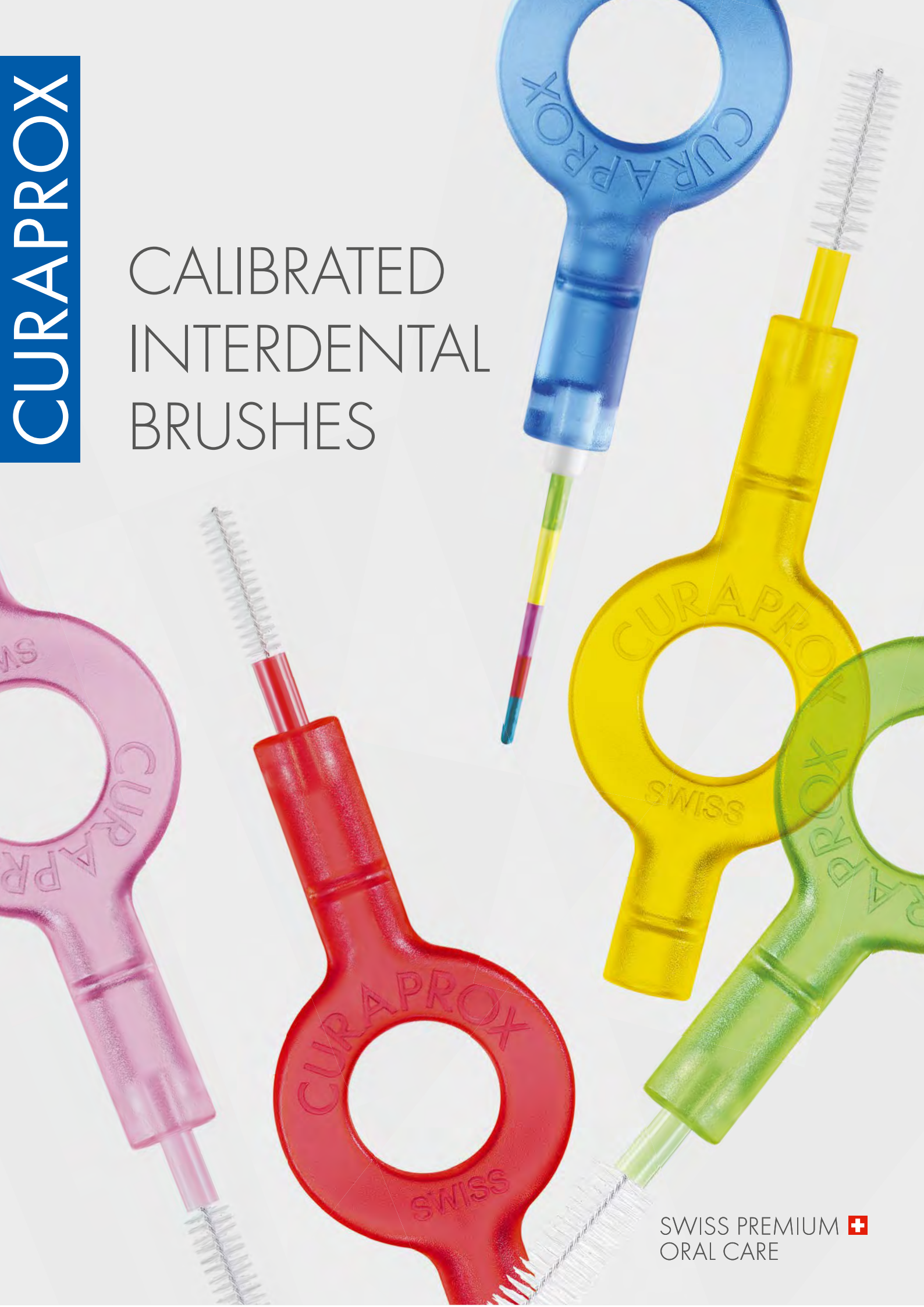
CALIBRATED INTERDENTAL BRUSHES



SWISS PREMIUM ORAL CARE

Magda Wojtkiewicz

Managing Editor

Dear readers,

The world has become a very strange place, one in which things change by the minute. The COVID-19 pandemic has affected dental practices all around the globe. Dental practitioners in many countries are only allowed to treat emergency patients; others struggle with a lack of protective masks, gloves and disinfectants.

This pandemic is having an impact on the health of our loved ones, the businesses we rely upon, the condition of the global economy, the way we live our daily lives, the way we interact with other people, and the way we try to maintain good health. How we navigate through these unique and evolving challenges depends on us.

Microorganisms are all around us, on our body and inside it. Some of them, like viruses and bacteria, can be dangerous, provoking serious disease, which can be even lethal. But many bacteria and fungi play an essential role in helping our immune system keep us healthy.

A balanced diet is essential for our health and for our oral health. Why? Because the mouth is the beginning of the digestive tract and the oral microbiome is a biofilm in a complex environment in which bacteria, viruses and fungi interact at various times. Everything we eat influences the microorganisms inside our bodies, including our mouths, and can support the beneficial ones or the harmful ones.

The activity of certain microbes can modify the oral cavity environment and thus influence the growth of other microorganisms, leading to an imbalance and associated deleterious effects, as with *Candida albicans*, which is part of the normal microbiome of the oral cavity, but can quickly become pathogenic. Excessive consumption of simple carbohydrates can provoke the growth of pathogens responsible for tooth decay, *Streptococcus mutans* and *Streptococcus sobrinus*. But that is not all; also important are interactions between different microbes. Consider *S. mutans* and *C. albicans*. In the presence of *S. mutans* and the availability of simple carbohydrates, *C. albicans* can develop a better attachment to the tooth surface. In addition, *C. albicans* produces a thicker biofilm when it grows together with *S. mutans*, which indicates that *S. mutans* stimulates the growth of *C. albicans*. This example demonstrates the complexity of relations and interactions between microorganisms and the food we eat and thus the environment we provide for microorganisms, which can influence not only oral health but the condition of the whole body as a system.

Everything starts with the mouth, healthy food can help to maintain good oral health, and a healthy mouth leads to good general health, including a healthy digestive track and nervous system and a lower risk of systemic diseases like diabetes or cardiovascular disease. Therefore, watch what you eat, take care of yourselves and stay safe!

Sincerely,

Magda Wojtkiewicz
Managing Editor

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*Patent №RU 2311168

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WDS LABORATORIES

The evolution of paediatric dentistry

Dr Steven Schwartz, USA

Paediatric dentistry, as practised today, has evolved over a period of almost 100 years. In the early 1900s, the treatment of childhood caries consisted of extraction or just leaving carious teeth in place untreated because many dentists felt that they were going to fall out anyway. Sometime later, in the 1920s, groups of local study clubs with an interest in treating children (and in some cases limiting their practices to paedodontics—the precursor of paediatric dentistry) banded together to form the American Society of Dentistry for Children (ASDC). These dentists dedicated themselves to researching definitive methods of treating and preventing childhood caries and to management of paediatric behaviour in the dental environment. However, no established educational qualifications, standards of practice or certifying board yet existed.

Fig. 1

Fig. 2

Certifying paediatric dentistry

To meet these needs, the ASDC established certification requirements that led to the formation of the American Board of Pedodontics in 1940. In the late 1930s and early 1940s, dental schools instituted departments of paedodontics, followed by the establishment of postgraduate training programmes. In 1942, the American Dental Association's Council on Dental Education formally recognised paedodontics as a distinct specialty.

In 1947, a group of ASDC members met to organise the American Academy of Pedodontics (AAP) with the objectives to research and critically evaluate procedures used in children's dentistry. While ASDC membership was open to all dentists regardless of whether they went through a specialty training programme, AAP membership was open only to those dentists who limited their practices to children or who went through a formal specialty training programme in paedodontics. It was not until 1984 that the AAP changed its name to the American Academy of Pediatric Dentistry (AAPD). Eventually in 2002, the ASDC merged with the AAPD to form a single organisation.

After the establishment of certifying boards, the formal inclusion of paedodontics into dental

school curricula and the establishment of paediatric dentistry training programmes, rapid strides were made in adopting better modes of behaviour management. Caries prevention and clinical treatment for children also experienced significant advancement.

Advancing dental procedures

During the 1930s and 1940s, the concept of restoring primary teeth as opposed to simply extracting them became the generally accepted practice. Restorations of small to moderate-sized lesions in teeth were accomplished using amalgam. Treatment of more extensive caries (pulp exposure) was accomplished by introducing the practice of performing pulpotomies with formocresol, zinc oxide and eugenol along with full-coverage gold crowns. Preventing caries further advanced with the introduction of community water fluoridation programmes in 1945 and with the practice of adding sodium fluoride to toothpaste.

Dr William Humphrey described the first use of stainless-steel crowns in 1950. During the 1960s, they were adopted more generally for use in the restoration of grossly carious posterior and anterior teeth. Although the use of nitrous oxide for pain control dates back to 1844 when first introduced by Horace Wells, its use as an analgesic/anxiolytic agent was not common until the 1950s. Lidocaine with a vaso-constrictor as a local anaesthetic agent was introduced in the 1950s, but its routine use was advanced by the introduction of disposable plastic syringes in 1989.

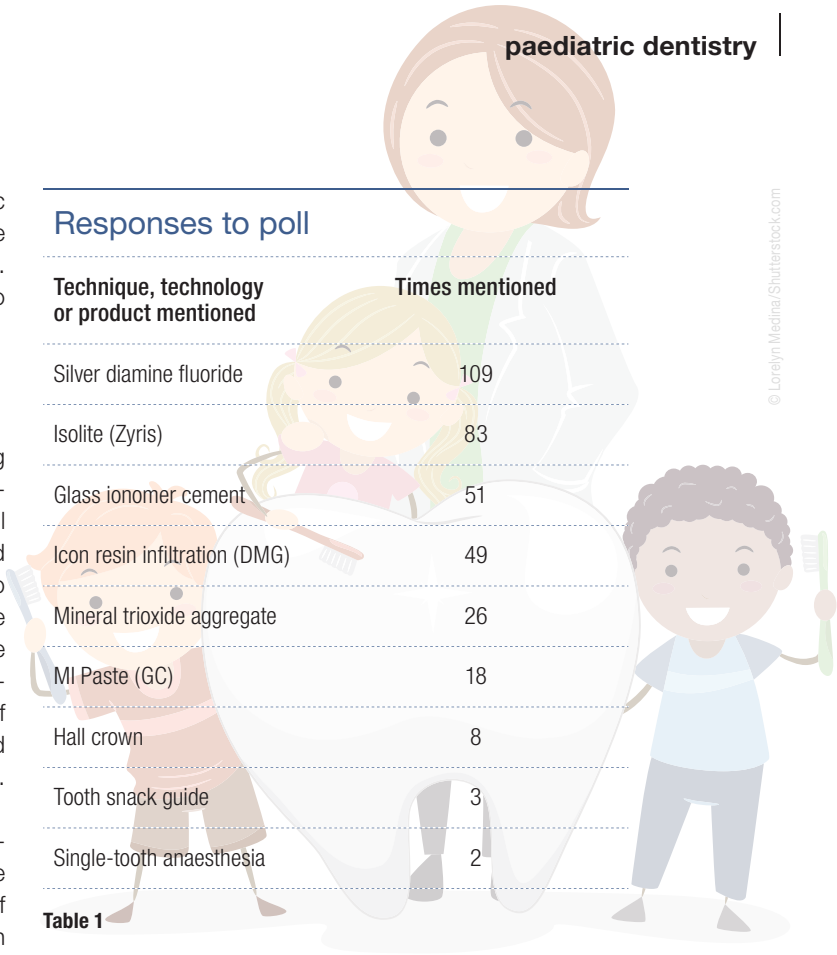
Improving dental equipment

Preparation of tooth restorations advanced from using belt-driven handpieces in the 1930s to the development, in 1957, of air-driven handpieces by Dr John Borden. The 1990s saw the rise in popularity of electric micromotor-driven handpieces offering high torque and low vibration. Advancement in soft-tissue surgery and tooth preparation occurred with the introduction of lasers in 1960 for soft-tissue management and the Er:YAG laser for use on dentine in 1997. With the development of the first fully reclining electric dental chair (DentalEz), in 1958, sit-down, four-handed dentistry was introduced, improving productivity and shortening treatment time.

Responses to poll

Technique, technology or product mentioned	Times mentioned
Silver diamine fluoride	109
Isolite (Zyris)	83
Glass ionomer cement	51
Icon resin infiltration (DMG)	49
Mineral trioxide aggregate	26
MI Paste (GC)	18
Hall crown	8
Tooth snack guide	3
Single-tooth anaesthesia	2

Table 1



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Introducing innovative materials

Aesthetic dentistry took a major step forward in the late 1940s. In 1947, direct-filling methyl methacrylate resins were introduced to dentists in the US.

In the 1950s, bonding agents were introduced. In 1955, Dr Michael Buonocore found that, by applying phosphoric acid to enamel, significant mechanical bonding of resins could be achieved. Dr Rafael Bowen introduced composite resins in 1962. Their use was enhanced with the introduction of ultraviolet polymerisation in 1973 and the introduction of visible light-polymerised resins in 1978. Microfilled resins came into use in 1977, providing practitioners with highly polishable and stain-resistant restorations.

The 1970s also brought about the use of sealants as a preventive measure. Acceptance of the concept of preventive restoration involving removal of only carious tooth structure had been secured by the practice of performing restorations using composite resins. Furthermore,

Fig. 3

Timeline of the evolution of paediatric dentistry

1910s	Childhood caries treated primarily by extraction or with indifference
1920s	American Society of Dentistry for Children formed
1930s	Dental schools instituted departments of paedodontics
1930s	Belt-driven handpieces commonly used with speeds limited to 3,000 rpm
1940s	Restoring primary teeth became the generally accepted practice
1940	American Board of Pedodontics formed
1942	Paedodontics recognised as a distinct specialty
1945	Community water fluoridation programmes introduced
1947	American Academy of Pedodontics organised
1947	Direct-filling methyl methacrylate resins introduced
1950s	Use of nitrous oxide for pain control popularised (discovered in 1844)
1950s	Lidocaine introduced as a local anaesthetic agent
1950	Stainless-steel crown restorations first described by Dr William Humphrey
1955	Mechanical bonding of resins demonstrated by Dr Michael Buonocore
1957	Air turbine handpieces introduced in the US with speeds of up to 300,000 rpm
1958	First fully reclining electric dental chair in use
1960s	Stainless-steel crown restorations popularised
1960	Lasers developed and approved for soft-tissue treatment
1962	Composite resins introduced by Dr Rafael Bowen
1970s	Use of sealants as a preventive measure began
1972	Glass ionomer cements introduced
1973	Ultraviolet polymerisation of composites introduced
1977	Microfilled composite resins created
1978	Visible light-polymerising units introduced to replace ultraviolet polymerisation
1980s	Pre-veneered stainless-steel crowns and composite strip crowns introduced
1984	American Academy of Pedodontics changed its name to "American Academy of Pediatric Dentistry"
1989	Disposable plastic syringes marketed
1997	Er:YAG laser introduced for use on dentine
1997	Electric micromotor-driven handpieces introduced offering high torque and low vibration
2002	American Society of Dentistry for Children merged with the American Academy of Pediatric Dentistry into one organisation
2010	Prefabricated zirconia crowns pioneered for paediatric use
2015	Silver diamine fluoride approved by the U.S. Food and Drug Administration as an anti-caries agent
2017	Prefabricated fibreglass crowns offered for paediatric use

Table 2

the application of sealant to the remaining pits and fissures served to introduce dentists to the importance of minimally invasive dentistry. Glass ionomer cements (GIC) were also introduced in the early 1970s. Taking advantage of GIC's fluoride-releasing properties, GIC composite restorations soon replaced amalgam as a preferred restorative material.

The 1980s saw stainless-steel crowns being replaced with more aesthetic full-coverage techniques, such as pre-veneered stainless-steel crowns and composite strip crowns. More recently, zirconia crowns (originally used only for adults) were introduced for paediatric use in 2010, followed by fibreglass crowns in 2017.

Adopting improved techniques

Currently, there is movement toward more intensive preventive treatments with the introduction of minimally invasive techniques such as using an application of fluoride varnish, silver diamine fluoride (approved as an anti-caries agent by the U.S. Food and Drug Administration in 2015) and remineralisation materials.

Recently, I conducted an informal poll targeting members of a collaborative paediatric dentist group on Facebook. I questioned the members regarding what techniques, technologies and products they started using in the past five years that have: (1) made a significant improvement in the way they deliver care; (2) improved treatment outcomes; and (3) enhanced patient satisfaction. A relatively small number of the group members posted responses, yielding the results summarised in Table 1.

I was surprised that no one mentioned lasers, prefabricated zirconia crowns or social media services, considering that these technologies, products and services are so highly advertised in print and at dental meetings. How do we explain why respondents failed to mention these widely advertised items as contributing to any significant improvement in the way they deliver care? Why did only three additional responses even attest to their use? Forum members mentioned two reasons why they did not include such items as laser treatment or zirconia crowns in their responses. The reasons they offered were the following:

- lack of or minimal instruction in paediatric dentistry training programmes in utilising new technologies (lasers, single-tooth anaesthesia, zirconia crowns); and
- issues relating to the business and practical application of the procedure. They mentioned coding and reimbursement issues. While being reimbursed for silver diamine fluoride or remineralisation may be a problem, the fees charged for these procedures are generally affordable. The higher fees charged for full-coverage aesthetic restorations and laser treatment, however,

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may make these options unaffordable for parents without insurance reimbursement. In addition, respondents mentioned longer preparation time for zirconia crowns compared with stainless-steel crowns.

Regarding the issue of preparation time, it should be pointed out that hands-on training programmes sponsored by zirconia crown manufacturers help practitioners improve their technique and reduce their preparation time. The first point cited in the poll results (lack of or minimal instruction), especially, warrants being addressed more fully and ought to be resolved by ensuring adequate instruction during dental residency.

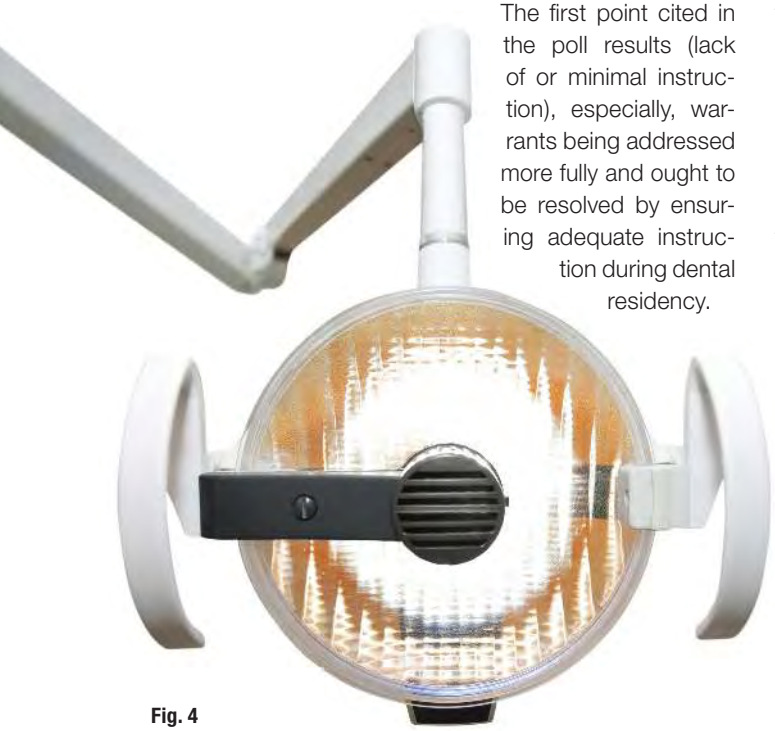

Fig. 4

Enhancing residency instruction

Over a period of approximately 100 years, children's dentistry treatment options have evolved, following these sequential, progressive steps: (1) no treatment (or tooth extraction); (2) treatment using unaesthetic materials; (3) use of aesthetic materials; (4) minimally invasive restorative treatments; and (5) more proactive preventive treatments. Behaviour management has similarly evolved from relying on physical restraint as previously practised to the non-traumatising dental experiences of today. Parents, possessing increased awareness of the newer techniques providing more aesthetic treatment outcomes and overall pleasant dental experiences for their children, are demanding that dental providers use these newer treatment options and techniques.

To meet parental expectations and patient needs, dental provider training opportunities in these newer techniques and technologies must be available to those in dental undergraduate and postgraduate training programmes, as well as to those in practice. Dental schools and hospital residency programmes must provide adequate training that will enable graduates to implement the newest and most advanced techniques and technologies. Only in this way will their graduates be able to meet patient needs and satisfy parental expectations. School, hospital and programme administrators often claim funds are not available to provide such training, but it is their obligation as advocates at teaching institutions responsible for training the next generation of paediatric dentists to find the means to do so.

Funding one or two faculty members to attend educational forums or manufacturer-sponsored programmes will enable them to return to their programmes with the knowledge and ability to train students. Requesting manufacturers and suppliers to provide a limited amount of free product, or in the case of technology companies (e.g. lasers, isolation products and computerised delivery systems), use of their products for a limited period, will at least expose trainees to proper techniques required in the use of these products.

Continuing dental education

If you are a provider already in practice and no longer able to benefit from training offered in a residency programme, you must take advantage of continuing education opportunities to keep abreast of recent advances in paediatric dentistry. You may do so by attending formal training programmes and meeting with exhibitors at dental meetings. Or make the effort to attend specialised training programmes sponsored by product manufacturers. Sales representatives should be welcome to visit your office rather than be brushed off. As providers, we must become involved in organised dentistry to educate and encourage third-party payers to reimburse patients, at a reasonable level, for newer and more effective procedures.

Advances and innovations in paediatric dentistry are coming down the pike at quantum speed. As dental health professionals, it is our obligation to keep up with them and make them available to our patients.

about

Dr Steven Schwartz
After graduating from the New York University College of Dentistry in the US, Dr Steven Schwartz completed a postgraduate residency in paediatric dentistry at the then Jewish Hospital and Medical Center of Brooklyn in the US. He served as clinical associate professor in the Department of Pediatric Dentistry of the then University of Medicine and Dentistry of New Jersey in the US. Before retiring, he was the director of the paediatric dentistry residency programme at Staten Island University Hospital in the US. Dr Schwartz is a diplomate of the American Board of Pediatric Dentistry and writes and lectures on clinical and practice management topics.