Lasers have been used in different medical fields for many years with a great amount of success, in many treatments, notably eye surgery and hair removal. The technology is in an established aspect of modern dentistry and is widely used in Europe and the U.S. Dr. Anke Schieman had a chance to speak to Graeme Milieich, who is a fellow, diplomate, and founding board member of the World Congress of Minimally Invasive Dentistry (WCMID), prior to the recent ICDIO Congress in Stockholm in Sweden.

Anke Schieman: In a nut shell, what are the benefits of using laser in clinical dentistry today?

Graeme Milieich: Lasers have many applications in clinical dentistry. My research in the last four years focused on the clinical applications of hard tissue lasers. The broad range of laser applications has benefits for both the patient and the dentist. Many hard and soft tissue laser treatments are much less invasive compared with conventional approaches. I do not think there is another piece of technology in dentistry that has the ability Erbium lasers to have soft tissue, bone, and tooth structure, similarly by changing laser-operating parameters.

What is the advantage of lasers over rotary instruments, and are there limits to what a laser can do?

Yes, there are some limitations as to what can be done with a laser, like the removal of metal restorations and crowns. But if you consider the totality of the types of treatments offered by general dentists, these limitations are far less compared to conventional rotary instrumentation. For example, you could run into problems with soft tissue contours or bone levels as associated with a deep cavity while cutting tooth structure. With a laser you can remove both bone and soft tissue by simply changing a setting, and set your laser to complete the procedure in one appoint-

-mamento something that cannot be done with a high-speed drill, for example, when a drill can be done with a drill, scalpel, or bone bur can also be done with a laser. Additionally, many patients have a fear of dentistry based on the sounds and vibrations associated with rotary instruments. These sensations do not occur with the laser, meaning that patients find treatment much more acceptable.

What role does laser fluorescence detection currently play in the prevention of oral diseases?

With the advent of the kavo Di rolls 3000 in the early 2000s, the first general dentistry application of laser fluorescence technology took place. Like any new technology, it had to be understood first, in order to achieve the best results.

In order to provide patients with accurate treatment recommendations based on the clinician’s interpretation, an understanding of minimally invasive concepts is essential. Otherwise, the profession can be open to claims of over treatment. These charges often derive from a lack of understanding of the technology, its accurate application, and the concepts and applications of minimally invasive techniques.

Often, astute clinicians are at the forefront of this dissemination of new technology and techniques, and the research literature struggles to keep up with the clinical pioneers. This leads to a period with a shortage of validation for what eventually becomes a new and accepted standard of care. Further developments in the field are occurring and, as they filter into general practice, the standards of diagnosis will continue to improve. For new diagnostic technology to be readily implemented in general practice, it has to be both cost effective and time efficient.

What are the chances of treating peri-implantitis with lasers?

There are many case studies showing excellent results when treating peri-implantitis with a laser. The use for debridement and disinfection gives the competent clinician a tool that previously wasn’t available. The laser is safe to use around implants with little risk of damage to the implant. Personally, I have only treated one patient with peri-implantitis so far, and it was a complete success.

The use of laser in fields like endodontics or periodontology is highly controversial, the reasons are the main issues here?

Once again, competent laser clinicians are ahead of the research in these fields. Clinical results are being achieved that are now only beginning to be validated by research, and until the research results are available, use of lasers in these fields is going to remain controversial for many. Those that are using lasers and are observing the outcomes, have little doubt as to the efficacy of their treatments. Personally, I have been involved in research using the Waterlase for the treatment of peri-implantitis. The ability for complete debridement of the canals follow-up that preserves peri-implant bone. With any new technology, it had to be understood first, in order to achieve the best results.

In your FDí interview you talked about lasers associated with laser therapy. Can you give our readers a brief insight into what these concepts are?

The most common complaint from a new user is that it will not cut fast enough. The most significant contributor to slow ablation rates is the user, not the technology. The single biggest hurdle a dentist faces is that of user education. Peri-implantitis is the difference between rotary instrumentation and lasers. As a tip is moved around the tooth, it reaches a point where the operator can begin to see the commencement of ablation. This then gives a reference maximum operating distance in relation to the current settings and tip being used. New users are taught to start out of focus and move towards the tooth until the clinically observable ablation threshold is reached. This distance can range over several millimetres, depending on the various parameters. Understanding the concept helps new users avoid inadvertent high fluence effects at the ablation surface.

There are other issues that will be dealt with as separate topics in the lecture in regard to ablation rates in enamel. This is the area that new users find frustrating, because they tend to use rotary cutting movements with an end-cutting bur or diamond bur. Firstly, because laser ablation is a non-contact technique, magnification is essential. Secondly, enamel ablation rates are related to the orientation of the long axis of the enamel prism in relation to the plane of the ablation face. Ablation rates are 40 per cent greater when enamel prisms are ablated from their sides, rather than on their ends. This requires an understanding of the orientation of the long axis of enamel prism in relation to the plane of the tooth. The culmination of this understanding is epitomised in the time it takes a new user or a competent laser clinician to cut a slot preparation, with a new user often taking more than three times as long to complete the same procedure.

Recent research on shorter wavelength lasers or so-called blue lasers has shown them to be effective in disease detection, how far in the years to come?

Many dentists focused on minimizing intervention in low Moreover, the use of lasers is frequency specific, and as applications expand, so do the wavelengths that lead to a plethora of technology that becomes difficult for the clinician to incorporate into a practice. I envisage, in the near future, a diode-based laser that will have multiple, switchable frequencies that will allow one unit to accomplish varied tasks that previously required multiple devices. As uptake of laser technology increases, costs will decrease. The technology will become more applicable to more of the profession.

Do you expect lasers to be an essential part in every dental practice in 10 or 15 years?

The multiple applications of lasers are only going to expand in the future. At the moment, the lasers with the most clinical applications in one unit are the Erbium family, and many dentists have embraced this technology and are constantly expanding its clinical applications. We may see in the next 60 years to the initial introduction of the high-speed hand piece, which has a definite resistance to the technology, and it took over 10 years before it was readily accepted into general practice. Lasers have had a slower journey, mainly because of the cost, but with advanced technology to make them more applicable in the field of dentistry and the associated research and development costs that are reflected in the price of lasers. Taking the cost of a laser out of the equation, it is very likely that at some point in the future we will see every practice in the near future.

Thank you very much for the interview.