

# ENDODONTIC SUMMIT 2006

## SYNOPSIS OF LECTURES

### **Is there a future for Endodontics?**

**Harold Messer (Australia)**

At a time when great advances are made in improving and simplifying endodontic therapy, there are questions raised if the effort should be made at all to retain teeth by endodontic therapy. The impact of implants on modern dentistry cannot be ignored. Should the concept of endodontic success will be viewed from the perspectives of "functionality" rather than healing? Is there more that we can do to improve our techniques? Will more, be too much?

### **Root Canal Shape Considerations in Cleaning and Shaping**

**Yanti L S Siswadi & Bernard Iskandar (Indonesia)**

A thorough understanding of the complexity of the root canal system is essential for understanding the principles and problems of shaping and cleaning. The main objective of root canal therapy is thorough shaping and cleaning of all pulp spaces and its complete obturation with an inert filling material. Great variation in root canal shape especially at the apical makes shaping, cleaning and obturation difficult. Excessive instrumentation to achieve complete cleaning and shaping the irregularities of the root canal wall, will increase the risk of iatrogenic mishap. But in infected root canals the larger the apical preparation the greater the reduction of the bacteria and debris within the canal. The issue is how can we prepared the root canal without thinning the dentin wall but achieve a three dimensional clean root canal and obturation.

### **Antomy of the C-shaped Canal System**

**Fan Bin (China)**

The C-shaped canal system is a canal variant mostly seen in mandibular second molars, although it can also appear in maxillary and other mandibular molars. The main anatomical feature of C-shaped canals is the presence of an isthmus, a fin or a web connecting the distal and mesial individual root canals with a 180° arc, which makes the canal cross section look like the letter "C", i.e. C-shaped. Several studies have shown different trends in shape and number of roots and canals of C-shaped canal system amongst the different human ethnic populations. These variations appear to be genetically determined. For example, the prevalence of C-shaped canal in second mandibular molars is higher in the Asia population than that in other human races. Roots containing the C-shaped canal system typically have a conic or square configuration. The description regarding C-shaped roots was identified initially in comparative anthropology. Manning speculated that the failure of the Hertwig epithelial root sheath to fuse on the lingual or buccal root surface was the main cause of the C-shaped root which always contains the C-shaped canal. The C-shaped root may also form by coalescence owing to cementum deposition with time. Several studies have shown that mandibular second molars with the C-shaped canal system have many variations in canal configurations.

Clinical recognition of C-shaped canals is very important before treatment. The anatomical features of roots, Orifices, canal cross sections, apical foramina of the mandibular second molar containing the C-shaped canal systems will be discussed during the presentation. Also, the three-dimensional classifications of the C-shaped canal systems will be addressed and demonstrated with 3D-reconstructed images.

### **I can't reach the apex! What should I do?**

**Roger Rebeiz (Lebanon)**

The aim of this presentation is to describe the technique and the use of instruments that facilitate the access to the apex of narrow and curved canals. The shaping of these canals requires a particular strategy according to the obstacle and the site of the curve. The curves of the coronal third must be eliminated with the use of rotary instruments, Gates-Glidden or nickel titanium files, before commencing the cleaning and shaping of the apical part of the canal. The curves of the middle third must be smoothed to reach working length, following the rules which vary according to the tools used. The preparation of these curves is much easier with the use of nickel titanium instruments. When the instrument travels to the apex, the position of the apical foramen must be absolutely respected; it requires care and attention to avoid block, ledge and apical transportation.

At the end of this presentation one should be able to use the appropriate technique and instruments for managing the obstacles which prevent to negotiate difficult root canals.

## **Debridement – the First Step in Healing Ben Johnson (United States of America)**

If cleaning, shaping, sterilization and obturation are the triad to success, and endodontists are only having an 80-95% success rate, what are we missing? Is it the inability for our medicaments to sterilize, as many of us feel, or is it the tissue remaining in the root canal system? Why is it that we forget the 30-40% of molars and bicuspid have an isthmus that is inaccessible to our instruments? If this tissue is not removed, how will our medicine reach the full extent of the root canal system?

This presentation will explore our current instrumentation and propose a new irrigation technique that will deliver our medicines throughout our root canal system.

## **Predicting the Fatigue Life of Nickel-Titanium instruments in use Gary Cheung (Hong Kong)**

While endodontic treatment has benefited from the introduction of NiTi root canal instruments, clinicians remain concerned about their breakage in use. These engine-files may fracture as a result of shear or fatigue failure, with the latter being implicated in more than one-third of instrument breakages clinically. Although previous studies have shown that the fatigue life of various NiTi instruments is affected by the radius of curvature and the instrument size, none has examined the strain imposed on the instrument during the test and hence a relationship between the fatigue life of these instruments and the variables concerned has not been determined. Despite the increasing numbers of NiTi instruments of various designs now being marketed, there has been no report on how NiTi instruments of various cross-sectional configurations behave when subjected to rotational-bending, a deformation mode that resembles their use in curved root canals. Nor is there any report on the fatigue behaviour of these instruments in sodium hypochlorite solution, an agent that not only is routinely used in root canal therapy but also a highly corrosive solution to most metals.

This lecture will examine the fatigue behaviour of NiTi rotary instruments both in water and aqueous hypochlorite solution. Emphasis will be placed on the effect of the two media on the low-cycle fatigue life (below  $10^4$  revolutions, as this figure is most often reported in the dental literature) of various brands of instruments tested. A sensible way of predicting the fatigue life of these instruments, and hence their "safe" re-use (for those who choose to reuse them after proper cleaning and sterilization procedures), will be proposed.

## **All you need to know about Root Canal Perforations Jeeraphat Jantararat (Thailand)**

Perforation is a serious complication of root canal therapy. This lecture will discuss the classification based on prognosis, how to diagnose perforation, prevention and management of perforation. With new materials, better equipment and technique, good long term outcome can be achieved. There will be movie files of clinical procedures and graphic 2D and 3D animations included in this presentation.

## **Diagnosis and Management of Cracks and Fractures Tan Boon Tik (Malaysia)**

Diagnosing a cracked tooth can be difficult and frustrating experience for a clinician. Many times, cracks are not identified until a variety of symptoms are present. This is because a crack may not be visible and is often missed. Diagnosing a crack can be so complicated that even employing various tests, only presumptive diagnosis can be done via process of elimination of other causes. If caught early, appropriate treatment plans can be formulated and the crack can be stopped or at least slow down. In this lecture, a clear and systematic approach of diagnostic steps leading to a crack confirmation will be presented. Proposed clinical management for cracked and fractured tooth will also be illustrated.

## **Ultrasonics in Endodontics Anish Naware (India)**

Removal of tooth structure is a routine procedure in endodontic treatment. One has to be conservative in their approach. High-speed instruments like air-rotors or even low-speed instruments can be accident-prone during endodontic treatment. These aggressive instruments could be replaced by ultrasonics. Ultrasonic instruments are safe, conservative and less accident-prone. This lecture will elaborate on different applications of ultrasonics in day-to-day practice.

## **Micro-endodontics and Micro Computer Tomography Yoshitsugu Terauchi (Japan)**

In endodontics there are so many parts inside a tooth that we need to examine but are unable to see with our naked eyes. A surgical microscope has played an important role in those respects since it was introduced into endodontics in early 90's. The use of the microscope resulted in raising the treatment quality to a higher level and thus providing patients with better service. A microscope, in fact, enables us to see more details of root canal anatomy such as isthmus and hidden canals. However, there are some places that cannot be reached solely by the microscope. The limitations of the microscope leave those areas still mysterious and make us wonder what might be there. A micro CT was clinically tried in endodontics to narrow those blind areas a few years ago. The use of a microscope in combination of CT images successfully showed what we didn't used to see and did enhance endodontic treatments.

This lecture will explain what the micro CT can make up for those "difficult to reach" areas and how it can be combined with a microscope in endodontics. This lecture will also present clinical cases with lateral canals, hidden canals, cracked roots, broken files, and so on through "the eye of micro CT".

## **Advanced Non-invasive Light Activated Therapy : A New Approach for the Disinfection of Root Canals Anil Kishen (Singapore)**

Conventional endodontic treatment utilizes a chemico-mechanical approach for the disinfection of root canals. However, there are different factors that can limit 'complete disinfection' by chemico-mechanical approach. Factors that render complete disinfection of root canals difficult are (1) anatomical complexities of the root canals, (2) presence of dentinal tubules, (3) high reactivity and cytotoxicity of the chemicals employed, and (4) bacterial resistance to the antimicrobials used. In this lecture an advanced light activated therapy for the disinfection of root canals will be presented. This technique employs a novel photosensitizing and irradiating solutions, which along with low-power light, kills bacteria within dentinal tubules and anatomical complexities of the root canals, without any significant root canal enlargement. This easy to use technique, show wide-spectrum of antimicrobial activity, and is targeted more towards prokaryotic cells than eukaryotic cells. Findings so far highlights that this advanced light activated therapy is an effective method for the disinfection of root canals.