Surgery can never replace solid endodontic principles and should always be a last resort. Apical microsurgery consists of nine basic steps that must be completely performed in their proper order, so the desired result can be achieved:

1. Instruments, supplies and equipment (including the operating microscope) ready;
2. Patient, doctor and assistants positioned ergonomically;
3. Anaesthetic and haemostasis staging completed;
4. Incision and atraumatic flap elevation;
5. Atraumatic tissue retraction;
6. Access, root-end level (RER and REB) and crypt management;
7. Root-end procedures: root-end preparation (REP);
8. Root-end fill (REF) techniques and materials; and
9. Sutures, healing and post-operative care.

Predictable microsurgery requires the use of an operating microscope (OM) and a team committed to operating at the highest level. The six-handed team approach optimises the instruments, equipment, techniques and materials that today’s level of technology presents for the benefit of all, especially the patient (Fig. 1).

Dr Berman, an old retired general surgeon, one of my senior-year dental school instructors, would begin each general surgery lecture by tapping the lectern with his pencil, and when he got our attention, he would say: “Treat the tissues with tender loving kindness and they will respond in a like manner.” I have heard those very words many times while performing apical microsurgery; it is truly a gentle technique when...
the steps are followed in the proper order.

A thorough past medical history and dental examination, using as many diagnostic aids as possible, is of paramount importance for a predictable microsurgical event. Thoroughness can help one avoid unfavourable experiences. For example, if the patient, or their physician, states they are sensitive or allergic to epinephrine to any degree apical microsurgery should not be performed. One of my golden rules of thumb is: No Epi, No Surgery ... Period! Should the doctor choose to proceed with the microsurgical procedure, it will be exceptionally more difficult for both the doctor, and the patient.

Today’s technology presents us with much more pre-surgical information than was available even a few years ago; thus, recent advances should be included in the diagnostic process whenever possible. A good example of current technology is cone-beam computed tomography (CBCT). The radiological images we used for many years were the best we had, but for very limited. Now CBCT enables the microsurgeon a view of all angles of areas of concern in the maxillofacial region and supplies much of what was missing in the field of dentistry.1

The preparation of the patient takes not only the patient into consideration. No Epi, No Surgery — Period! — also the entire surgical team. The micro-surgical protocol we teach involves four people: the doctor (pilot), the ‘scope’ assistant with the co-observer oculars (co-pilot), the surgical assistant using the monitor as a visual reference (pilot), the ‘scope’ assistant with the 'scope' assistant with the surgical protocol we teach in - to- camera. Both the team that has an overview, the environment and is the only one on the field who has an entire view of the operation belongs to the team. The mutual comfort of the patient, the surgical assistants and the doctor is of utmost importance. The microsurgical protocol may take an hour or more, so unnecessary movements or adjustments for comfort’s sake during the operation may cause considerable inconvenience.

The doctor’s surgical stool must have adjustable arms to allow the elbows to support the back and serve as a reference point, or fulcrum, if the doctor has to reach for an instrument during the procedure. Ideally, neither the doctor nor the ‘scope’ assistant are to remove their eyes from the oculars of the OM during the entire operation. The task of directing the whole operation belongs to the surgical assistant. The surgical assistant is the choreographer for the procedures viewed through the OM. He or she is in a position to observe, coach and/or pass instruments to either the doctor or the ‘scope’ assistant. The surgical assistant can see the entire surgical environment and is the only one on the team that has an overview, to keep track of everyone’s needs. It is important that all possible surgical instruments be organised for ease of access during the operation.

While the anaesthesia is becoming profound, the needles that will be placed into the tips of the Stropko Irrigators for use during the surgery can be modified. The notched ends of 25-27 gauge Monoject Endodontic irrigating needles (Ultradent/ Vista) are removed by bending the tip of the bend can be verified quickly and easily because the patient is in the proper position and so is the doctor.

Optimally, three Stropko Irrigators should be available for any surgical procedure; one three-way syringe fitted with a larger tip (Ultradent/Vista), for more general flushing of the surgical area (we call it the Big John); another three-way syringe fitted with a modified 25-gauge needle, for more precise cleaning and drying (Little John); and one with an air-only syringe also fitted with a modified 25-gauge needle, for more precise and dependable drying of the area without worry of mois- ture (Fig. 4b). Note, air pressure to the syringe must be regulated.

As also, the lumens of the high-speed evacuation tips (Young’s Surgical) are so small, extra tips must be available if one should become clogged. A few extra tips are available, so that the ‘scope’ assistant can occasionally clear the evac- uation system of blood and tissue debris from the evacuator tip.

After topical anaesthetics has been placed, local anaesthesia is begun using less than one carapule of warmed two per cent lidocaine containing 1:50,000 epinephrine. This small amount is used to anesthetise the injection area and is replaced with the blocks and infiltrations. The 1:50,000 lidocaine is used with tunnels without epinephrine and Marcaine (Marcaine) because the Marcaine tends to cause a burning sensation upon injection, whereas the lidocaine is much more comfortable to the patient. This is then followed with one or two 1.6cc carapules of warmed Marcaine for nerve blocks and/or infiltrations. All anaes- thetics are warmed and directed very slowly to avoid any unnec- essary trauma to the tissue and to create much less discomfort for the patient.

After administering the local anaesthetics, haemostasis stag- ing is performed using two per cent lidocaine containing 1:50,000 epinephrine. It has been shown that two per cent lidocaine containing 1:50,000 epinephrine produces more than a 50 per cent improvement in haemostasis compared with two per cent lidocaine containing 1:100,000 epinephrine.2 While keeping the tip of the injecting needle against the bone and directed apically towards the root ends, small amounts of two per cent lidocaine 1:50,000 are slowly in- jected into the free gingival tis-
As the anatomy of the tissue unfolds during the injections, the doctor should continue visualising and planning the incision (Fig. 5b). As the anatomy of the tissue unfolds during the injections, the doctor should continue visualising and planning the incision (Fig. 5b). The amount and nature of the attached gingiva is an important consideration whether a full sulcular or a mucogingival (Leubke–Oschenbeck) flap is used. In general, a full thickness sulcular flap is routinely used unless aesthetics is a concern and there is an adequate zone of attached gingiva present.

In order to ensure haemostasis, the lingual tissues should also be infiltrated to reduce blood flow and thereby increase the procedure more completely. When performing surgery on the posterior quadrant of the mandible, special attention should be given to the apical region of the mandibular second molar. On occasion, a small foramen, called the foramen coli, may be present. The f. coli contains an ascending branch of the mylohyoid nerve. Lingual haemostasis staging can contribute to more profound anaesthesia, will enhance crypt management and will contribute to a more predictable event with less stress for the entire team as a result.

In either case, with the aid of the OM and using a pre-filled 3 ml syringe fitted with a 20-gauge needle the entire surgical site is rinsed with Peridex, to ensure the area is free of debris and plaque before the incision is made (Fig. 6). The surgical site is now ready for the next important step in the procedure: Flap design, the incision and atraumatic flap elevation. Stropko Irrigators are available from SybronEndo or Obtura Spartan in the United States, from Clinicians Choice in Canada, or directly from www.stropko.com.

**References**


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**About the author**

Dr John J. Stropko
received his DDS from Indiana University in 1964 and for 24 years practised restorative dentistry. In 1989, he received a certificate for endodontics from Scottsdale in Arizona. Dr Stropko is an internationally recognised authority. He has been a visiting clinical instructor at the Pacific Endodontic Research Foundation (PERF), an Adjunct Assistant Professor at Boston University, and an Adjunct Professor of graduate Clinical Endodontics at Loma Linda University. His research on in vivo root canal morphology has been published in the Journal of Endodontics. He is the inventor of the Stropko Irrigator, has published in several journals and textbooks, and is an internationally known speaker. Dr Stropko has performed numerous live micro-endodontic and micro-surgical demonstrations. He is the co-founder of Clinical Endodontic Seminars and is currently an instructor of Microsurgery at the Endodontic Faculty at the Scottsdale Center for Dentistry. He can be contacted at topendo@aol.com.

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**Dental holidays in the UK?**

**Can Britain really compete with Europe for dental implants?**

Dental implants have been a much sought after treatment by patients worldwide. The recession and general trend for implant companies to increase prices, whatever the economic forecast.

Dr. Stropko believes it’s time for change. Either the implant companies are going to support us through these difficult times or we have to find the cost for competitive treatment. The 2008 financial crisis has had an impact on all aspects of life. Lingual anaesthesia has been reduced due to the cost of dental implants in a full or partial denture.

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**Either the implant companies are going to support us through this recession or we’ll learn from our experiences and move on!**

The recession is a great opportunity for implant companies to increase prices, whatever the economic forecast. But, according to Dr. Stropko, the cost for implant companies to increase prices is too much.

**“How can we achieve this without sacrificing the profitability of our practices?”**

**“The implant companies are not going to support us through this recession, so we have to find a way to make a profit.”**

**Comfort Zones**

**“Sellers must be realistic in their expectations.”**

**“The implant companies are not going to support us through this recession, so we have to find a way to make a profit.”**

Dr. Stropko believes that the cost for implant companies to increase prices is too much. The recession and general trend for implant companies to increase prices, whatever the economic forecast.

**Proactive Approach**

For example, one implant manufacturer, DENTAL TRIBUNE: United Kingdom Edition · October 5–11, 2009 Clinical 23

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