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 referred to as a “gentle technique when...”

Apical microsurgery—Part I: Patient preparation

Dr John J. Stropko, USA

**Fig. 1:** The six-handed team utilises all that current technology can offer to achieve results that are precise and highly predictable.

**Fig. 2:** All equipment, instruments, monitors etc. are readily accessible when required during the entire surgical procedure.

**Fig. 3:** These small but effective Tempur pillows should be available for the comfort of the patient wherever needed.

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A T vess Company
reviewed with the patient to en-
sure they are taken at the ap-
propriate times before the sur-
ger appointment. The patient is also instructed to rinse with Peridex and take an anti-in-
flammatory (preferably 600 mg of Motrin if no allergies are present) the night before and on the morning of the surgery. At the time of the appointment and before the patient is seated, they are again asked to rinse with Peridex.

The dental chair should al-
low the patient to recline com-
fortably and even allow the pa-
tient to turn to one side or an-
other. Small Tempur pillows
placed beneath the patient’s
neck, small of the back or knees
make a big difference when used
(Fig. 3). After the patient is com-
pletely comfortable in the chair, they are coached on making slow and small movements of their head, if necessary during surgery. The patient is appropri-
ately draped for the surgery. It is especially important to wrap a sterile surgical towel around the head and over the patient’s eyes for protection from the bright light of the microscope and any

debra from the surgical proce-
dure.

An important psychological
point is not to tell the patient that
they may not move because this may cause unnecessary apprehen-
sion, stress or panic. In more
than 500 surgeries, I’ve only had one patient who didn’t hold still during the procedure once they were relaxed and had profound anasthesia.

The surgical team must now become comfortable with the position of the patient, the mi-

croscopic endoscope and asso-
ciated equipment. The modern
OM has many features to en-

hance comfort and pro-

ficiency during its use. Accessories such as

beam splitters, inclinable op-
tics, extenders, power focus and zoom, variable lighting and fo-

cal length all contribute to ease of use, ergonomics and profi-

ciency for the entire surgical
team. The mutual comfort of the patient, the surgical assistants
and the doctor is of the utmost
importance. The microsurgical
procedure may take an hour or
more, so unnecessary move-

ments or adjustments for com-

fort’s sake during the operation
may cause considerable in-

convenience.

The doctor’s surgical stool
must have adjustable arms to al-


dow 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 opera-
tion. 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 ei-

ther the doctor or the ‘scope’ as-

sistant. The surgical assistant can see the entire surgical envi-
noment 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 anasthesia is be-

coming profound, the needles
that will be placed into the tips of the Stropko Irrigators for use during the surgery can be mo-
dified. The notched ends of 25-
gauge Monojet Endodontic ir-

rigating needles (Ultradent/
Vista) are removed by bending
with Howe Pliers and placed into the end of the Stropko Irri-
gators. One tip is used with an air/water syringe, and the other tip is used with the dedicated air-only syringe (DCI). The en-

dodontic irrigating needles are then bent in the same config-

uration as the ultrasonic tip that is used for the root-end prepara-
tion (Fig. 4a). After the needle

has been bent, the ergonomics 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 Ir-

rigators 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 sy-

ringe 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 modi-

fied three-way syringe, for pre-

cise and dependable drying of the area without worry of mois-
ture (Young’s Surgical).

Also, as the lumens of the high-speed evacuator tips (Young’s Surgical) are so small, extra tips must be available if one should become clogged. A three-way syringe is available, so that the ‘scope assistant can occasionally clear the evac-

uator system of blood and tissue debris from the evacuator tip.

After topical anasthesic has been placed, local anasthesia is begun using less than one
carpuale of warmed two per cent lidocaine containing 1:50,000 epinephrine. This small amount is used to anesthetise the ingre-
dients. This is then followed with one or two 1.8cc carpuales of warmed Marcaine for nerve blocks and/or infiltrations. The 1:500 lidocaine is used for sub- incisional anaesthesia for correct-

Marcaine (Marcaine) because the Marcaine tends to cause a burn-

ning sensation upon injection, whereas the lidocaine is much more comfortable to the patient. This is then followed with one or two 1.8cc carpuales of warmed Marcaine for nerve blocks and/or infiltrations. All anas-

thesitic solutions are infused very slowly to avoid any unnec-

esary trauma to the tissue and to

create much less discomfort for

the patient.

After administering the local anasthesics, haemostasis stag-

ing is performed using two per cent lidocaine containing 1:50,000 ep-

inephrine. It has been shown that two per cent li-
docaine containing 1:50,000 ep-

inephrine produces more than a

50 per cent improvement in haemostasis compared with two per cent lidocaine containing
1:100,000 epinephrine. While

keeping the bend of the needle

towards the bone and directed
apically towards the root ends,

small amounts of two per cent li-
docaine 1:50,000 are slowly in-

jected into the free gingival tis-

s
sue in two or three sites to the buccal of each tooth (MB, B, DB), approximately three mm apical to the muco-gingival line. Slow injection of just a few drops of the anaesthetic causes a slight balloononing and blanching of the tissue in the immediate area.

This is an important step as it causes the mucogingival line to become more pronounced, allowing the doctor to have better vision, which results in more accuracy with the following haemostasis injections (Fig. 5a).

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 muco-gingival (Leueke-Oschenbein) 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 during 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. Occasionally, 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.

If the surgery is to be performed on the maxillary, the patient is instructed to close on approximately eight layers of sterile gauze, (four 2 x 2s folded over once) for stability of the jaws and keeping any debris from inadvertently entering the oral cavity. A single piece of a sterile 2 x 2 is also gently placed distal of the tooth/teeth to be operated on. If the surgical procedure is to be performed on the mandible, especially if a full sulcular flap is to be used, the doctor may want to make the incision with the mouth slightly open before placing the gauze.

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.

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 Indiana University. He recently retired from the private practice of endodontics in Scottsdale in Arizona. Dr Stropko is an internationally recognised author, teacher and clinician. He has been a visiting clinical instructor at the Pacific Endodontic Research Foundation (PERF), an Adjunct Assistant Professor at Boston University, a visiting clinical instructor 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 in the Endodontic Faculty at the Scottsdale Center for Dentistry. He can be contacted at topendo@aol.com.

References

Dental holidays in the UK
Can Britain really compete with Europe for dental implants?

Dental implants count as pa-

tients in the UK have traditionally been more expensive than in any other country in Europe, India or America. In the past, the cost for comparative treatment can be twice as much as other countries. This means more income for patients a

rended with shorter working hours in the USA to have dental implants and move money. Compared with our 


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