Modern endodontic microsurgery is drastically different from traditional endodontic surgery in many ways. Accurate diagnosis provided by cone beam computed tomography (CBCT), knowledge of the soft-tissue physiological principles, proper magnification and illumination provided by an operating microscope, conservative osteotomy and root resection, microscopic management of the apical third, the use of ergonomic microsurgical instruments such as micromirrors and ultrasonic tips, and the application of biocompatible and bioceramic materials are just some of the key features of current microsurgical procedures and promote a favorable long-term outcome.

In particular, proper flap design and soft-tissue management are among the most important concepts in current endodontic microsurgery. The primary purposes of flap design and elevation are to provide adequate surgical access to the underlying bone and root structure and to promote scar-free soft-tissue healing. Flap design and elevation should prevent any damage to adjacent critical anatomical entities. The major flap designs used in endodontic microsurgery are the paramarginal and the intrasulcular flaps; the outline can be either triangular or rectangular. The flap outline mainly depends on the length of the roots, the proximity of anatomical structures and accessibility to the apical area of the treated teeth.

Owing to the position of the roots and root apices, surgery on anterior teeth relies on direct and straightforward access to the apical lesion. Furthermore, the esthetics of the soft tissue is a priority. In the molar region, the esthetic appearance of the soft tissue plays a secondary role, with the focus being on convenient and adequate surgical access to the root apices that allows for faster and complication-free endodontic surgery.

Paramarginal flaps and incisions at the level of the papillae are preferably performed using a microblade, which has the advantage of minimal trauma, especially in the presence of thin or poorly keratinized tissue. The use of a microblade often results in scar-free healing, which is particularly important when surgery is conducted on anterior teeth or when esthetics plays a primary role.

Once the apical microsurgery has been completed, great care has to be taken in repositioning and suturing the elevated soft tissue. The ultimate esthetic result of the soft-tissue manipulation depends on several factors, such as the tissue biotype, the kind of incision performed, the choice of instruments used for incision, the elevation and retraction of the flap, as well as the careful reapproximation and proper suturing technique.

In endodontic microsurgery, the most commonly used suturing techniques are the single-knot suture and the continuous sling suture. Synthetic monofilament 5-0, 6-0 or 7-0 sutures are generally used to secure the flap.

Figures 1 to 10 demonstrate a clinical case of soft-tissue healing after endodontic microsurgery performed on tooth #14.

Editorial note: This article was first published in Dental Tribune Germany, Issue 7/2017.
Fig. 1
Pre-op radiograph of tooth #14. The tooth was symptomatic and sensitive to percussion.

Fig. 2
Clinical pre-op photograph of the soft tissue.

Fig. 3
A triangular paramarginal flap was raised to access and treat the apical third of tooth #14.

Fig. 4
Intra-op photograph of the resected root.

Fig. 5
Synthetic monofilament 6-0 sutures were used to secure the flap in its original position.

Fig. 6
Note the reapproximation of the soft tissue at the junction between the vertical and horizontal incisions (10× magnification).

Fig. 7
On the day of suture removal (72 hours after surgery), the tissue showed good healing.

Fig. 8
Clinical photograph of the soft tissue immediately after suture removal.

Fig. 9
Control of the soft tissue two months after the surgery.

Fig. 10
Control of the soft tissue four months after the surgery. The vertical and horizontal incisions are barely visible.