Efficient and ergonomic apical resection using the Kaiserswerth algorithm

Author_ Prof Marcel Wainwright, Germany

 благодаря минимально инвазивным техникам, таких как ультразвуковая хирургия и доступность надежных восстановительных материалов, хирургическое реинвентирование и реабилитация корондентически леченных зубов имеют гораздо более благоприятный прогноз, чем десять лет назад. Апикальная резекция является вызывающим хирургическим проце- сура — не только из-за ограниченной доступности хирургического поля. Инструментация апикальной резекции случая требует хирургической техники, которая является как простой, так и безопасной.

Этот отчет представляет два клинических случая, иллюстрирующих систему для применения ретроградных корондентических материалов, которая доказала себя в нашей клинической практике.

**Case 1**

34-летний мужской пациент обратился в нашу клинику впервые. Ортопантомограмма (ОПГ) случайно выявила апикальные перелуци в зубах #14, 36 и 46, которые были недостаточно корондентически лечены. Клинически, эти перелуции были асимптоматными и диагностировались как случаи хронического периапикального периодонтита или апикального остеита (рис. 1).

Также с пациентом мы планировали апикальную резекцию зуба #36 в сочетании с ретроградным заполнением корневого канала с последующим удалением непригодных зубов #16 и 46.

**Fig. 3**. Оптический снимок после удаления костного блока и выполнения апикальной резекции на зуб #36.

**Fig. 4**. Система MAP.

**Fig. 5**. Автоклавируемая коробка с сиреневой и мешковиной.

Together with the patient, we planned for an apical resection of tooth #36 in conjunction with a retrograde root-canal filling with subsequent removal of the non-salvageable teeth #16 and 46.
Following extensive consultation and patient education, surgery was performed under local infiltration anaesthesia. With our protocol, block anaesthesia is unnecessary in 98% of all surgical interventions in the mandible, and dispensing with it minimises the risk of iatrogenic nerve damage.

An incision was performed in the marginal gingiva, with a mesiodistal relief incision, followed by preparation of a full flap for adequate access to the surgical site. Using the Piezotome 2 (Acteon), a buccal bone window of adequate depth was prepared to gain access to the apical region at tooth #36 in order to perform the apical resection. It is helpful for the preparation to provide for undercuts in order to facilitate subsequent removal of the bone block. As no rotary instruments were used and because ultrasonic surgical instruments have a vaso-constrictor effect, the surgical field remained impressively free of bleeding and afforded a clear view of the site. The bone block was stored in Ringer’s solution to facilitate subsequent repositioning (Fig. 2). The root apices were then exposed and ultrasonically removed (Fig. 3).

After apical resection, our protocol called for thorough removal of all soft tissue using instruments, followed by complete decontamination of the cyst lumen using a diode laser. Care had to be taken to ensure that the laser tip did not make direct contact with the bone. Retrograde preparation of the root canals was also performed ultrasonically, which only takes a few seconds when using the Piezotome 2.

Following chlorhexidine-digluconate and sodium-hypochlorite rinses, the retro-prepared root canals were dried with paper points. In our clinic, we have had excellent success with the MAP (Micro-Apical Placement) retro system (PDSA), which has been on the market for many years (Fig. 4). The system comes in a sterilisable metal container (Fig. 5). The triple-angled endo tips (Fig. 6) greatly simplify the uptake and application of the material, with the syringe facilitating “injection” (retrograde obturation) of the root canal to a depth of several millimetres. This well-targeted application of the restorative material keeps the surgical field open (Fig. 7).

On application of ProRoot MTA (DENTSPLY Maillefer), the material was allowed to set, the cross-section surface of the resected area was smoothed and polished, the resection lumen was filled with a
quick-hardening bone cement (VitalOs, PD5A), and the bone block was re-
turned to its place (Fig. 8). The post-
operative radiograph shows the site 
following apical resection and retro-
grade root filling (Fig. 9).

The patient was prescribed Amoxicillin 750 mg and
Ibuprofen 600 mg post-operatively, as well as Arnica 
C30 to prevent swelling. Post-operative healing was 
uncomplicated and the sutures could be removed 
after eight days. Swelling was minimal, and the 
patient reported virtually no post-operative pain.

_Case II_

A 65-year-old female patient presented with an 
apical resection on tooth #14 that had been per-
formed _alia loco_ five years before. The patient was 
looking for help because the site had become infected 
again. She reported pain at tooth #14 on occlusal 
contact and percussion. A local digital radiograph 
clearly showed the area of apical resection, the two 
root-canal fillings, and a cystic peri-apical radiolu-
cency (Fig. 10). Since this was a surgical re-entry case, 
the same incision technique was used as chosen by 
the primary treatment provider, i.e. a crescent-shaped incision as described by Pichler (Fig. 11). The procedure 
was otherwise the same as in Case I. Following retro-
grade ultrasonic preparation (Fig. 12), ProRoot MTA 
was mixed to a working consistency and applied 
using the MAP System (Figs. 13 & 14). This clean and 
efficient application mode and controlled handling 
shortened the surgical procedure and reduced post-
operative complaints (Fig. 15). The post-operative 

radiograph (Fig. 16) shows an efficient retrograde filling of both root canals following revision of tooth 
#14. Owing to a projection artefact, the restorative 
appeared beside the canals, when it was in fact 
clinically located exactly within.

_Co nclusion_

Apical resection is a routine procedure in our 
clinic. Thanks to the use of ultrasonic surgery, the 
surgical laser and the MAP System, this procedure is 
reliable, predictable and simple, and we have pre-
served the natural teeth of many patients. Being an 
oral implantologist myself, I do not perceive anything 
contradictory in looking at these treatment methods; 
rather, apical resection is a complementary treatment 
mode and an attempt to preserve teeth over the 
longer term that would otherwise be considered 
lost.

_Editorial note:_ A complete list of references is available from 
the author.

_prof Marcel Wainwright_
_Dental Specialists and White Lounge Kaiserswerth_ 
Kaiserswerther Markt 25–27 
40489 Düsseldorf 
Germany

www.dentalspecialists.de