Removal of a fractured instrument: Two case reports

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Fractured instruments pose a challenge to every endodontist. The difficulty in the retrieval of these instruments ranges from surprisingly easy to downright impossible. The clinical outcome of cases with fractured instruments depends on several factors, such as the position of the instrument in the canal, the type of material, the instrument size and canal anatomy. Failure in retrieval of the fractured instrument does not automatically result in failure of the case. One can still try to bypass the instrument, choose a surgical approach, or even wait and see. However, if we bear ‘nothing ventured, nothing gained’ in mind, then we should always at least try to retrieve the fractured instrument.

Case I

A 27-year-old female patient was referred to our practice. She was in good health and had an American Society of Anesthesiologists (ASA) score of 1. The patient had some mild clinical symptoms on tooth #30 due to apical periodontitis. She had been told, by the referring dentist, that there was a fractured instrument in her tooth and that the instrument had to be removed first in order to allow for decent retreatment.

Before starting with the treatment, a new diagnostic radiograph was taken. In this case, the diagnostic radiograph (Fig. 1) showed not one but two broken instruments in the mesial root, one in each mesial canal. Thereafter, the tooth was isolated with the rubber dam and the coronal filling was removed. Straight-line access was established, as this is imperative in order to be able to reach and see the fractured instruments. Gates-Glidden burs (DENTSPLY Maillefer) were used to enlarge the mesial orifices coronally.

One-and-a-half hours after starting the treatment, the fragment had been loosened but was still stuck in the canal. We decided to leave it in place for the time being and made a new appointment. Calcium hydroxide paste (UltraCal XS, Ultradent) was put into the coronal part of the mesial canals and the tooth was sealed with glass-ionomer cement (Fuji IX GP Fast, GC) and a cotton pellet. During the next visit, the tooth was again isolated and opened. The calcium hydroxide paste was removed, using 10 %...
fortunately easy. This clearly high-
the mesio-lingual canal was sur-
removing the instrument from 
canal was very time-consuming, 
moved. While removing the in-
canal was also re-
After five minutes, the fragment 
was retrieved (Fig. 10) and after 
it had been placed in the ac-
ment was placed together with a 
cotton pellet, which was soaked 
with 5% sodium hypochlorite 
for 10 minutes. This allowed a very 
ervative coronal restoration.

A new diagnostic radiograph 
was taken, which showed the 
fragment approx. 5mm from the 
 apex. The tooth was isolated 
with a rubber dam and access was 
gained through the tempo-
rary restoration, which was 
placed by the referring dentist.

After opening, the remnants of calcium hydroxide paste 
were removed with 10% citric acid and passive ultrasonics. The 
fractured instrument could be vi-
sualised immediately (Fig. 9), 
because the canal was very large 
in the middle and coronal part.

This allowed a very conserva-
tive and tissue-saving ap-
proach. Given the position in 
the canal and the shape of the 
canal, a deep apical split of the 
case was good and the patient 
was referred to his general den-
tist for a definitive coronal 
retrieval is concerned._

After the removal of both in-
struments, working length was 
determined in both mesial canals 
with the electronic apex locator 
(Roentgeno, Maillefer). Smear-
layer removal was carried out by 
irrigating the canal with 10% cit-ic acid. A final wash of the canal 
was performed with sterile saline. Tapered gutta-percha 
cones were then fitted (Fig. 4) 
and tug-back was confirmed. Topseal (DENTSPLY Maillefer) 
was used as a root-canal sealer.

Obturation was performed 
according to the continuous 
wave of condensation technique 
with the Elements Obturation 
Unit (SybronEndo). After obtura-
tion (Fig. 5), a temporary restora-
tion of glass-ionomer cement 
was placed (Fuji IX GP Fast). Fi-
nal radiographs (Figs. 6 & 7) were 
taken, both parallel and angled. The radiographs show two com-
pletely separated mesial canals; 
hence, instrument removal in 
both canals was favourable. The 
prognosis of this case was good 
and the patient was referred to 
she general dentist for a defini-
tive coronal restoration.

...Case II

A 19-year-old male patient 
was referred to our practice. He 
was in good health and had an 
ASA score of 1. The referring den-
tist had fractured a small instru-
mant—most likely a size 10 or 
15 K-file, according to his referral 
letter—while performing root-
canal treatment on tooth #4. The 
root-canal treatment was neces-
sary because of a trauma that 
the patient suffered. The buccal cusp 
had fractured and the pulp was 
exposed.

A titanium ProUltra tip #8 
(DENTSPLY Maillefer) was used 
to loosen the instrument. The 
master apical file was kept small 
because the canal was very large 
due to the deep split (Fig. 12) and the 
tension felt while shaping, thus minimising new instrument 
fracture. Apical finish- ing was 
carried out with size 25 K-flex-
ofiles. Smear-layer removal was 
performed with a rinse of 10% citric acid. A final wash of the canal 
was carried out with sterile saline. Tapered gutta-percha 
cones were then fitted and tug-
back was confirmed (Fig. 15).

Topseal was used as a root-
canal sealer. Both canals were 
obturated according to the con-
tinuous wave of condensa-
tion technique. The Elements 
Obturation Unit was used. After obturation (Figs. 14 & 15), a temporary 
restoration in glass-ionomer ce-
ment was placed (Topseal, DENTSPLY Maillefer). Smear-
layer removal was carried out by 
irrigating the canal with 10% cit-ic acid. A final wash of the canal 
was performed with sterile saline. Tapered gutta-percha 
cones were then fitted and tug-
back was confirmed. Topseal (DENTSPLY Maillefer) 
was used as a root-canal sealer.

Obturation was performed 
according to the continuous 
wave of condensation technique 
with the Elements Obturation 
Unit (SybronEndo). After obtura-
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