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.

During the next visit, the tooth was again isolated and opened. The calcium hydroxide paste was removed, using 10 % removal of a fractured instrument: Two case reports
Author: Dr Rafael Michiels, Belgium

Fig. 1 Diagnostic radiograph, showing two separated instruments in the mesial root.
Fig. 2 A modified Gates-Glidden bur used for creating a plateau above the instrument.

Under the patronage of
H. H. Sheikh Hamdan Bin Rashid Al Maktoum
President of the Dubai Health Authority
Profoundly easy. This clearly high-
removing the instrument from
moved. While removing the in-
mesio-lingual canal was also re-
formed using 3% sodium
shaped to a size 40.06 ProFile. Fi-
approach. Given the position in
vial, a deep apical split of the
determined in both mesial canals
percha softening. The canals
was rotated at 500rpm in an X-
approach. Given the position in
was exposed.
After the removal of both in-
struments, working length was de-
determined in both mesial canals
with the electronic apex locator
(DENTSPLY Maillefer). No
chemical was required for gutta-
percha. All canals were
fractured instrument could be vi-
muscle 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
was suspected. After pro-
ng with small K-files, a patent
palatal was confirmed.
The instrument was frac-
tured in the buccal canal.
A titanium ProtoUltra tip #8
(DENTSPLY Maillefer) was used to
loosen the instrument. In the
meantime, copious irrigation with
5% sodium hypochlorite was
performed.
The fractured instrument was
retrieved (Fig. 16) and after
determining working length (Fig. 11), shaping with rotary
nicked-titanium instruments
(Twisted Files, SybronEndo) was
started. Both canals were shaped
to a size 25.08 Twisted File. The
master apical file was kept small
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-file-
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).
Topspeed was used as a root-
canal sealer. Both canals were
obturated according to the con-
tinuous wave of condensa-
tion technique with the Elements
Obturation Unit. After obtura-
tion (Figs. 14 & 15), a temporary
restoration in glass-ionomer ce-
ment was placed together with a
cotton pellet, which was soaked
in an alcohol and chlorhexidine
mixture first and then air-dried
after it had been placed in the
access cavity.
Final radiographs (Figs. 16 & 17) were taken, both parallel and
angled. The prognosis of this
case was good and the patient
was referred to his general den-
tist for a definitive 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 I. The referring den-
tist had fractured a small instru-
ment—most likely a size 10 or 15
K-file, according to his referral
letter—while performing root-
endodontics is all about the three
lights the above-mentioned diffi-
culty range of instru-ment re-
trival.
After the removal of both in-
struments, working length was de-
determined in both mesial canals
with the electronic apex locator
(Root ZX Mini, Morita). A glide
path was established and the
mesial canals were initially shaped with a ProTaper S1
(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 (Fig. 4) and
tag-back was confirmed. Topspeed
(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 radiograph, with a rubber dam and access
was gained through the tempo-
rary restora-
tion, 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-
nalised 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
was suspected. After pro-
ng with small K-files, a patent
palatal was confirmed.
The instrument was frac-
tured in the buccal canal.
A titanium ProtoUltra tip #8
(DENTSPLY Maillefer) was used to
loosen the instrument. In the
meantime, copious irrigation with
5% sodium hypochlorite was
performed.
The fractured instrument was
retrieved (Fig. 16) and after
determining working length (Fig. 11), shaping with rotary
nicked-titanium instruments
(Twisted Files, SybronEndo) was
started. Both canals were shaped
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thus minimising new instrument
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canal was carried out with sterile
saline. Tapered gutta-percha
cones were then fitted and tug-
back was confirmed (Fig. 15).
Topspeed was used as a root-
canal sealer. Both canals were
obturated according to the con-
tinuous wave of condensa-
tion technique with the Elements
Obturation Unit. After obtura-
tion (Figs. 14 & 15), a temporary
restoration in glass-ionomer ce-
ment was placed together with a
cotton pellet, which was soaked
in an alcohol and chlorhexidine
mixture first and then air-dried
after it had been placed in the
access cavity.
Final radiographs (Figs. 16 & 17) were taken, both parallel and
angled. The prognosis of this
case was good and the patient
was referred to his general den-
tist for a definitive coronal
restoration.

Conclusion
In the end, removal of a frac-
tured instrument can be very dif-
cult and it may take a long time
to accomplish. Dr Marga Bee
once said on the BOOTS forum
that she was being taught that
endo-conixial is all about the three
Pc: Passion, Persistence and Pa-
tience. This hits the nail right on
the head as far as instrument re-
trivial is concerned.

Editorial note: A list of references is available from the publisher.

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