Managing coronal destruction
A clinical case demonstrating the pre-endodontic reconstruction of a tooth

For many years, post systems have been an important component of post-endodontic core build-ups. Post crowns or posts and cores used to be manufactured in a dental laboratory with the primary goals of repairing the restoration on significantly destroyed teeth and stabilizing the tooth structure. With the development of adhesive systems, mechanical anchoring of the denture to the remaining tooth structure became increasingly less important, to such an extent that clinicians now debate whether a post is even needed.

Whether a tooth requires stabilization must be critically questioned as well, particularly in view of the risk of fracture and its causes. In this regard, root fractures, vertical root fractures and crown fractures have to be assessed differently. The risk of a fracture of the crown increases with the size and depth of the cavity being prepared in the tooth (Fig. 1).

A tooth with a mesial-occlusal-distal cavity (MOD) and an endodontic trepanation has a much higher risk of fracture than an undamaged tooth does. The risk of a cuspal fracture can be significantly reduced through a preparation covering the cusps for endodontically treated teeth with an MOD cavity (Fig. 2).

Vertical root fractures differ from fractures in the area of the crown. Lost endodontically treated teeth owing to a vertical fracture are often treated with a post. The difference in the elastic modulus between the hard tooth structure and...
post material has been sug-
gerated as a cause of a vertical 
fracture. It can thus be con-
cluded that post treatment and
root canal treatment are the 
primary reasons for a vertical 
fracture.\(^1\)

Preparation that preserves hard tooth substance is consid-
ered to be a superior solution for preventing fractures. In ad-
dition, the fracture resistance in the coronal area is increase-
d through adhesive build-up 
materials and restorations that cover the cusps. The post and 
the dentine should have a sim-
ilar elastic modulus in order to 
reduce the risk of a vertical root fracture. The decision 
whether to use a post in the 
case of an endodontic build-up 
critically depends on the de-
gree of destruction of the tooth; 
the more hard tooth tissue 
present, the less the need for 
a post.

The diagram in Figure 3 
shows three different degrees 
of destruction of an anterior 
Tooth. In the case of a coronally 
 intact but root-filled anterior 
Tooth, an adhesive restoration is 
sufficient. When treating teeth 
with damage to the hard tissue 
and for which a crown is 
planned, the remaining core 
height and width to be en-
closed by the crown play a 
decisive role (ferrule effect). 
If the ferrule is more than 2 mm 
wide, a build-up secured with 
an adhesive is sufficient. If it is 
narrower than 2 mm, the use of a glass fibre post is indicated.

Clinical case
A busy sales representative 
came to our practice with tooth 
12 broken. Owing to time con-
straints, we only had one hour 
available for the reconstruc-
tion of the crown. The fracture 
line ran circumferentially at 
the level of the gingiva (Fig. 4).
A root canal treatment had 
been performed on this tooth 
by another dentist three months 
before.

Initially, the patient re-
quested preservation of the 
Tooth but, after discussion, he 
said that he was not able to 
invest time in undergoing 
systematic tooth treatment. 
The clinical findings showed a 
retained root. The degree of 
tooth mobility was Grade 
0-1 and the probing depth was 
1–2 mm around the tooth. X-ray 
images showed a root filling up 
to approximately 5 mm before 
the radiological apex, as well 
as apical radiolucency (Fig. 1).

We diagnosed chronic apical 
periodontitis in tooth 12. The 
apical radiolucency should be 
subsequently observed and, 
if necessary, root canal treat-
ment should be revised prior 
to placing a crown.

Being able to position a 
rubber dam clamp is a basic 
prerequire for endodontic 
treatment and for pre-endo-
dontic reconstruc-
tion. If a clamp 
cannot be positioned, surgical 
crown lengthening is indi-
cated, if applicable (Fig. 6).

The retained root was cleared 
of remaining tissue, caries 
and plaque. Then the optimal 
post diameter was determined 
using a stencil. A size of 1.3 mm 
was selected.

Since there was only a small 
amount of remaining tooth 
substance, the post cavity was 
prepared to a depth of 6 mm and 
thoroughly rinsed. The canal 
and remaining exposed dentine were conditioned with 
55 % phosphoric acid for 
15 seconds and then rinsed 
with a multifunctional syringe 
for 15 seconds (Fig. 7).

Excess fluid was suctioned 
off with a micro-suction de-
vice. The pre-bond was applied 
using an application tip and 
worked into the surface for 
15 seconds. The micro-suction 
device was again utilised to 
remove any excess.

In order to prepare the 
bonding material, Bond A and 
B were mixed in equal portions 
for 5 seconds and massaged 
to accelerate the reaction. 
Then they were blown to a thin layer 
and light cured for 10 seconds. 
The tooth was built up with 
the dual-curing core build-up 
material LuxaCore Z-Dual 
(DMG Dental; Fig. 9) and the 
post cavity was filled with 
LuxaCore Z-Dual. The Luxa-
Core post (DMG Dental) was 
positioned and the material 
was light activated (Fig. 10).

The crown was built up in 
small increments, activated, 
and contoured and polished 
with diamond grinding tools 
(Figs. 11 & 12).

Editorial note: A complete list of refer-
ces is available from the publisher.

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