ALTERED PREPARATION DESIGN FOR CRACKED TEETH

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Cracked teeth are a common dental condition that is increasing in frequency as the population ages and retains teeth longer. Tooth cracks can cause a variety of difficulties, from small enamel fractures to dentin fractures needing extensive treatment or extraction. A full crown often is the indicated treatment for cracked teeth. I believe that altering the traditional crown preparation will decrease stress on the fractured segment of the tooth and improve the prognosis.

Force applied to a crown is transferred to the tooth (Figure 1). This occurs both while the crown is being cemented in place and while it is in use. These forces can act to separate the fractured tooth segments (in an external direction) or to move the fractured segments toward each other (in an internal direction). To minimize or eliminate externally directed forces, I recommend altering the standard full-crown preparation in the following manner:

- Shorten and bevel the cusps of the fractured segment (Figure 2).
- Use bases and build-ups to prevent any crown contact on the internal side of the fractured tooth segment (Figure 2).
- Place boxes and grooves in the unfractured portion of the tooth, not adjacent to or in the fractured segment.
- Place margins more apically than normally is done. This will increase bracing of the crown by surrounding more tooth and will help compensate for a shorter preparation wall.

> ***Minimizing external forces will help prevent propagation of the fracture and subsequent need for additional treatment and possible loss of the tooth.***

In addition to crown preparation design, there are other factors to consider. Posts, build-ups and bases, if used, should be placed passively. Rubber dam clamps and matrix bands can be used to stabilize the tooth during placement. Dentin

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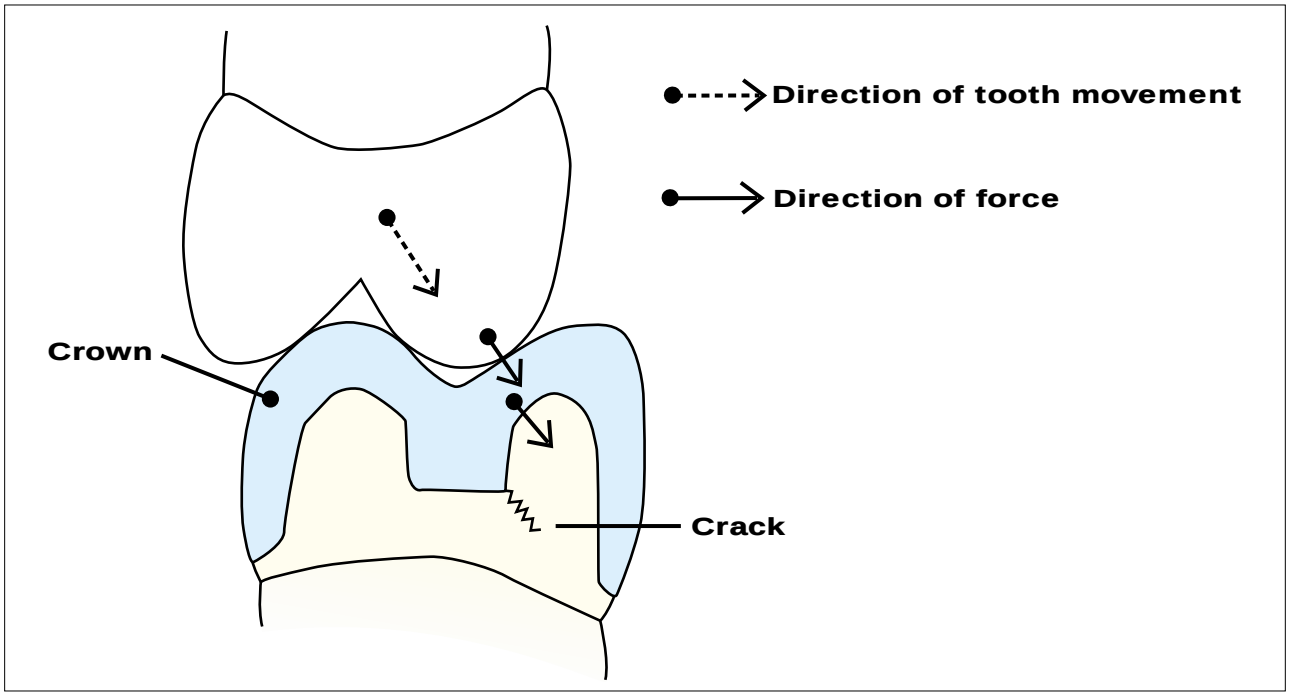

Figure 1. Occlusal forces on the tooth and crown.

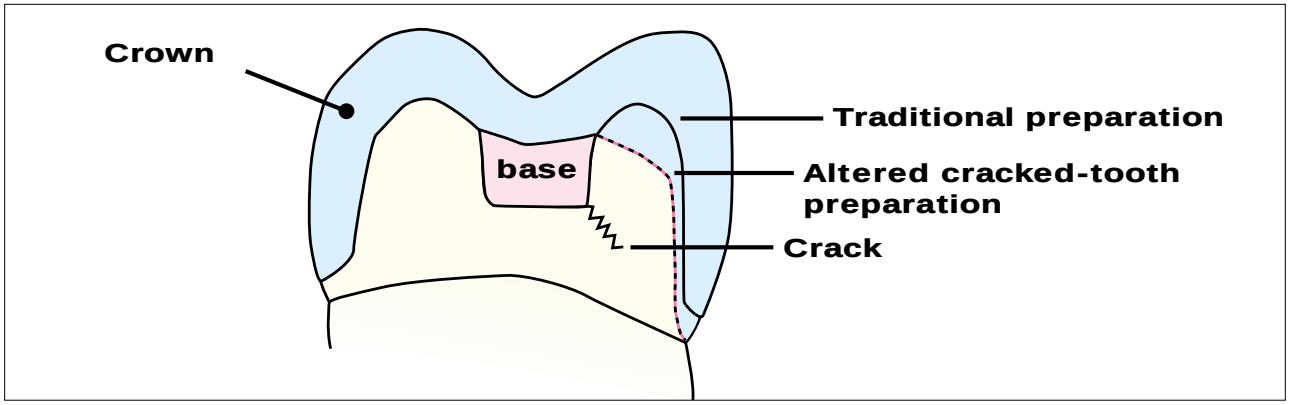

Figure 2. Altered crown preparation.

bonding agents are used with build-ups to help brace the fractured segment. Crowns should be seated as passively as possible to prevent the cement from putting stress on the fractured segment. Thicker die spacer and high-flow cement can be used. Treatment should be performed as soon as the crack is diagnosed to prevent the fracture from increasing in size.

CONCLUSION

I believe the preceding guidelines will help reduce the stress on the fractured tooth segment under a crown. Minimizing external forces will help prevent propagation of the fracture and subsequent need for additional treatment and possible loss of the tooth. I encourage research to establish the clinical significance of these ideas. ■

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