

Egyptian Prosthodontic Association (EPA Newsletter)

Restoring the Endodontically Treated Molar: A Structure-Based Approach to Cuspal Coverage

Clinical Update



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The clinical question

We were taught a simple rule: once a molar has had root canal treatment, cover the cusps. It is easy to teach and easy to defend, but it treats every root-filled molar identically, regardless of how much sound structure remains. The more relevant question is not whether root-filled molars should be crowned by default, but which ones require cuspal protection, which do not, and which fall into a grey zone where either approach is defensible. The framework that follows is built on the tooth's residual structure, not its endodontic history.

Why the tooth actually weakens

The old belief that root canal treatment dries out and embrittles dentine has not held up well. Access alone changes cuspal stiffness only slightly. What really weakens a cusp is losing the marginal ridge that supports it, and losing both ridges is far more damaging than losing one¹. In short, the marginal ridges, not the root filling, decide how much load the tooth can still carry.

The fracture risk we see clinically comes mainly from accumulated tissue loss: caries, old restorations, the access cavity itself, and

Reduced proprioception after pulp removal is often mentioned too, but it is not something we can measure or plan around at the chair. The practical point: base the cuspal-coverage decision on the structure in front of you, not on the fact that the tooth has been root-treated.

Chairside assessment: five checkpoints

Make this judgement on a clean, isolated tooth, after every existing restoration and all caries have been removed. Assessing structure around a leaking amalgam is a guess, not a diagnosis. Work through five checkpoints.

Walls. Count the sound axial walls and note which marginal ridges survive. A wall thinner than about 2 mm gives little real support however intact it looks; plan to cover the cusp it carries.

Ferrule. Look for 1.5-2 mm of sound axial dentine above the cemento-enamel junction, at least 1 mm thick and continuous around the whole preparation. A complete ferrule is one of the strongest predictors of long-term success, particularly when a fibre post is planned⁴.

Margin position. If the margin sits below the bone crest, decide now between deep margin elevation and surgical crown lengthening, and respect the supracrestal attachment either way.

Occlusal risk. Note parafunction, the opposing dentition, and the tooth's role in the arch. A heavy occlusal load changes the decision more than almost any other factor.

occasionally over-enlarged canals^{2,3}.

The patient. Periodontal status, caries risk, and the recall interval the patient will realistically keep all shape the final choice.

Give the post less credit than habit gives it. A good ferrule protects the tooth far more than any post; the post's real job is to retain the core, not to reinforce the root⁵.

A structure-based framework

Group molars by what remains of the crown, not by the presence of a root filling (Figure 1).

Group 1 - both marginal ridges intact. There is no structural indication for cuspal protection. A well-executed direct adhesive restoration conserves tissue, costs the patient less, and keeps every future option open (Figure 2).

Group 2 - one marginal ridge lost, a wall thinner than 2 mm, an existing crack, or parafunction. Cover the affected cusps. An onlay or overlay is usually enough, and a full crown is rarely necessary. In a low-caries-risk mouth with stable occlusion and reliable recall, a bonded overlay is a sound, conservative choice. Where parafunction is present, the tooth is

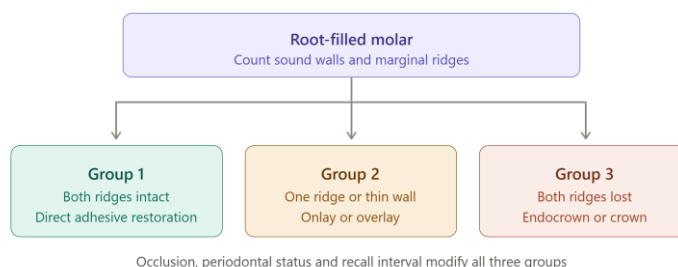


Figure 1. Structure-based framework for the root-filled molar. Count the sound walls and marginal ridges first; occlusion, periodontal status and recall interval modify all three groups.



Figure 2. Group 1. Conservative access in a mandibular molar with both marginal ridges intact. A direct adhesive restoration is sufficient after root canal treatment.

Group 3 - both marginal ridges lost, fewer than two sound walls, or an incomplete ferrule. Coverage is required, and waiting rarely improves the outcome. Where the pulp chamber is deep and enough bondable substrate remains, an endocrown is a conservative alternative to a post-retained crown (Figure 3)⁹. Where too little coronal tissue remains to retain a core on its own, a post and core beneath a full crown is still the right solution (Figure 4).

Two adjunctive procedures extend the range of molars that can be treated adhesively. Deep margin elevation relocates a deep cervical margin coronally so the tooth can be isolated and bonded without surgical crown lengthening, provided the supracrestal attachment is respected⁷. A pre-endodontic build-up restores missing walls before treatment starts, which improves isolation and makes planning the definitive restoration far more predictable⁸.

Choosing the form of coverage

Once cuspal coverage is indicated, case selection still matters more than the specific material. Table 1 and figure 5 summarize the matching of the restoration to the clinical picture.



Figure 3. Group 3. Deep pulp chamber with adequate bondable substrate; suitable for an endocrown.



Figure 4. Group 3. Minimal coronal tissue; a post and core with a full-coverage crown is indicated.



Table 1. Clinical picture and restoration match

Clinical picture	Recommended restoration	Why
Both marginal ridges intact, conservative access	Direct adhesive restoration	Preserves tissue and keeps every future option open
One ridge lost or thin wall; low caries risk, stable occlusion, reliable recall	Bonded onlay / overlay	Protects the cusps without over-preparing sound tooth
One ridge lost, plus parafunction, a terminal tooth, or unreliable recall	Full crown	The extra retention pays off under higher functional risk ^{6, 10}
Both ridges lost; deep pulp chamber, adequate bondable substrate	Endocrown	Conservative and performs well over the medium term ⁹
Both ridges lost; minimal coronal tissue, cannot retain a core alone	Post and core + full crown	The only reliable way to retain the restoration
Deep subgingival margin	Deep margin elevation or crown lengthening	Restores access for isolation and bonding, respecting biologic width ⁷

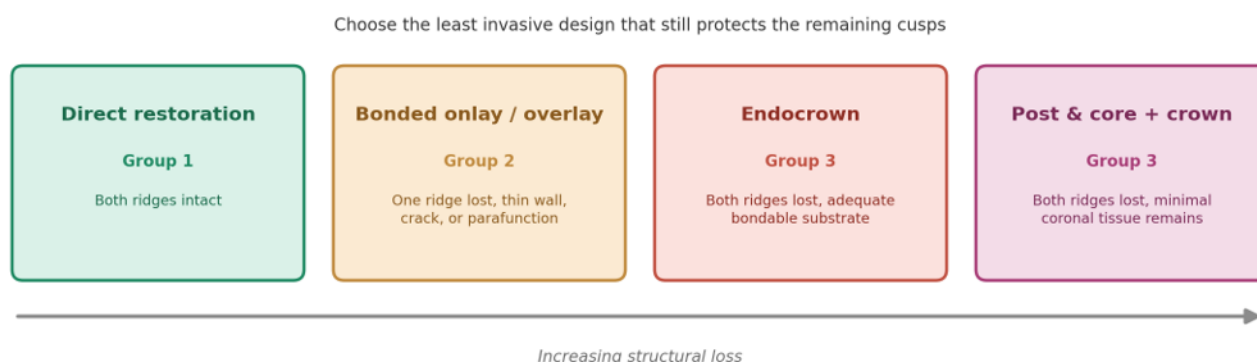


Figure 5. The restoration spectrum for the root-filled molar, from most conservative to most invasive.

Chairside tips that make the difference

Seal the tooth definitively, and do it early. A provisional left in place for months undoes whatever the definitive restoration was meant to achieve; where the tooth must stay unprotected for a while, provisionalize with cuspal coverage rather than a flat temporary. Use rubber dam for every adhesive step, without exception. Check the occlusion in intercuspal position and in excursions, relieve the restoration from working and non-working interferences where the occlusal scheme allows, and offer an occlusal splint to patients with parafunction. Where a ferrule cannot be achieved without violating the supracrestal attachment or exposing the furcation, have an honest conversation about extraction and replacement rather than restoring on hope.

Clinical summary

Current evidence does not justify crowning every endodontically treated molar, nor abandoning crowns altogether. Where both marginal ridges are intact and access has been conservative, restore adhesively and keep your options open. Where structural loss is extensive, cover the cusps, and do it now. Between these extremes lies a large group of molars where either approach can be defended, and for those teeth the decision should rest on residual tooth structure, occlusal risk, periodontal status, and the maintenance the patient will realistically receive. A prompt, well-executed restoration matters more than the label attached to it.

In brief

- Root canal treatment itself does not weaken a molar; losing the marginal ridges does.
- Count the sound axial walls and check for a ferrule before choosing a restoration.
- Both ridges intact: restore directly. One ridge lost, a thin wall, a crack, or parafunction: cover the cusps. Both ridges lost: coverage is not optional.
- Cuspal coverage is a spectrum: onlay, overlay, endocrown, full crown. Choose the least invasive design that still protects the remaining cusps.



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