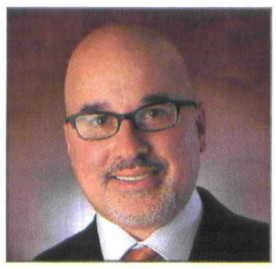
CLINICAL ROUNDTABLE



Robert A. Margeas, DDS
Adjunct Professor
Department of Operative Dentistry
University of Iowa College of Dentistry
Iowa City, Iowa

Private Practice
Des Moines, Iowa

Michael R. Sesemann, DDS
Private Practice
Omaha, Nebraska

President-Elect
American Academy of
Cosmetic Dentistry

Cherilyn G. Sheets, DDS
Private Practice
Newport Beach, California

Question:

What is the optimal way to treat fractured tooth syndrome?

DR. MARGEAS

Diagnosing and treating cracked teeth is a difficult dilemma. When do we restore a tooth that is cracked? Do we restore all teeth that present with cracks? What about the asymptomatic tooth that displays cracks? It is difficult to understand the etiology of cracks, as there are really no controlled clinical studies to refer to. It is important to use different tools to accurately diagnose cracked teeth. It starts with magnification. If you can't see it, you can't treat it. Transillumination can be a good diagnostic tool. The crack checker, such as the Tooth Slooth® (Professional Results, Inc, Laguna Niguel, CA) has been an excellent tool in my practice for diagnosing cracks. Pulp testing and periodontal probing should be performed during differential diagnosis. Often, patients present with sensitivity to cold, sweets, and biting pressure. It is not until the offending cusp fractures that the pain goes away and we can accurately diagnose the problem. From a clinician's standpoint, I want to know if the crack crosses the occlusal surface. Is there an oblique fracture? Is there a restoration present? Is the tooth sensitive to sweets or cold? Can the explorer tip be placed in the crack, or has a fracture already occurred? What type of restoration do we place? I do not believe a bonded restoration can hold the tooth together long-term. An onlay or full-coverage restoration is my treatment of choice. Equilibration to distribute the stresses evenly can be beneficial. Also, there are times when the tooth is non-vital and needs endodontic therapy. I feel it is important for the endodontist to use a microscope to see how far the crack extends. If it is supracrestal, then a full-coverage restoration is indicated. If the crack extends subcrestal, then you will not be able to get a good seal, even with a full-coverage restoration. Therefore, extraction is indicated. If I do not feel confident that the tooth will remain vital, I may provisionalize the tooth for 3 to 6 months so as to not have an access opening created through my new restoration.

DR. SESEMANN

In answering this question, I must distinguish between horizontal and vertical fractures. The clinical example that most dentists are faced with on a regular basis is the classic horizontal cusp fracture at the base of a cusp on a posterior tooth. When I am faced with that type of clinical presentation, I am going to recommend that the cusp be covered and/or removed and restored depending on the severity of the crack. I am comfortable using gold or bonded ceramic onlays, depending on the patient's personal desires for esthetics. When the tooth involved is a second molar, I am more than likely going to suggest gold as a best option because of the extensive occlusal forces and shortage of vertical space that comes into play. If the remaining cusps are happy and healthy on any given tooth, I will integrate the restoration as a partial-coverage restoration with either gold or porcelain.

If the patient's clinical situation indicates a vertical fracture, the restoration is almost always going to be a full-coverage restoration. The significant decision-making is now not as much about how to restore the symptomatic tooth, but when. For me, if symptoms, diagnostic procedures, or visual identification lead to the verification of a vertical crack threatening to go beyond the cementoenamel junction, restorative treatment takes on an added urgency. This is a structural condition that I feel has no chance of ever getting better while being "watched." If treatment must be delayed for some reason, a vertically cracked tooth can become pulpally challenged, requiring endodontic care, or it can become structurally damaged to the point where the only viable treatment is extraction and prosthodontic replacement. That is a scenario that I do not wish to happen "on my watch" if we can avoid it.

DR. SHEETS

One of the more challenging procedures for dentistry is the diagnosis and treatment of cracked teeth. Unfortunately, using traditional methods of crack detection depend on the tooth having substantial structural defects, even catastrophic fractures, before identification. In our work with natural teeth, it is appearing evident that the fracturing process begins years earlier than the start of clinical symptoms. Additionally, the cracking process begins from the inside and works structurally outward, so it is often not clinically visible until the later stages. In our research, we have been using percussion-probe diagnostic testing to identify structural cracks in teeth for more than 8 years and have tested more than 9,000 sites. This method provides a nondestructive way to assess the structural stability of teeth beyond the traditional use of radiographs, transillumination, biting tests, and visual examination.

The importance of being able to have early detection of structural defects cannot be overemphasized. Just like any substance that has repeated, sustained regular impact, with time structural cracks start to form that eventually lead to fatigue failure.

Strong preventive measures should be taken with patients who demonstrate parafunctional activities, especially if their teeth are still unharmed. Protective occlusal splints, stress reduction programs, and medical hypnotherapy will all play a strong role in the future treatment of vulnerable patients. Additionally, when restorations are being planned for patients with a history of parafunctional activity, the clinician must be diligently looking for cracks. By using the more sophisticated magnification and illumination systems available today, one can often see asymptomatic cracks under cusps even during routine restorative care. Signs such as these must not be ignored, but incorporated into the diagnosis and treatment planning process. For instance, a planned occlusal restoration may be changed to an onlay or veneer onlay to protect damaged cusps from further, more significant fractures.

Once a tooth is symptomatic, our protocol is to place a provisional restoration to remove torque/shearing forces. If after 3 months the tooth is asymptomatic, a definitive restoration can be placed. However, if the tooth exhibits increasing sensitivity, then endodontic evaluation is indicated. If the fracture is catastrophic and endodontic therapy is impossible, then we would recommend extraction. Typically, for these patients we would favor replacement with a dental implant so as to not produce additional dynamic loading on the surrounding abutments.