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ASSESSMENT OF DENTAL PULP SENSIBILITY RECOVERY FOLLOWING THE REMOVAL OF FIXED ORTHODONTIC APPLIANCES USING ELECTRIC PULP TESTING

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Relevance. Orthodontic treatment induces biological responses in dental pulp due to the mechanical forces applied to teeth. These forces may alter pulpal blood flow and neural response, potentially affecting pulp sensibility and vitality. Such changes may impact pulp sensibility, complicating the differentiation between normal post-treatment responses and irreversible pulp damage. The assessment of pulp status following orthodontic treatment removal is clinically important to differentiate between reversible physiological changes and irreversible pulp damage. Electric pulp testing (EPT) is widely used as a non-invasive method to evaluate pulp sensibility; however, its reliability after orthodontic treatment remains controversial due to transient changes in neural response thresholds. Accurate assessment of pulp vitality is crucial to avoid misdiagnosis, guide appropriate clinical decision-making, and ensure optimal patient care.

Aim: this study aims to evaluate the pulp vitality of teeth after the removal of orthodontic appliances using Electric Pulp Testing (EPT) and to compare the results obtained immediately after appliance removal with those obtained one month later.

Materials and methods. A clinical longitudinal study was conducted on 5 patients (N=5) following fixed orthodontic treatment. Inclusion criteria required vital teeth free of caries, trauma, or extensive restorations. Pulp vitality was assessed using a digital Electric Pulp Tester (EPT) at two intervals: T0 (immediately post-appliance removal) and T1 (one month post-removal). The standardized EPT protocol involved tooth isolation with cotton rolls, air-drying to prevent current leakage, and the application of a conducting medium to the electrode tip. The probe was placed on the sound enamel of the middle third of the crown, with current increased gradually until the first patient sensation was reported.

Results and their discussion. The study observed a notable elevation in the sensory response thresholds of dental pulp immediately following the removal of fixed orthodontic appliances (T0). One month post-treatment (T1), EPT values demonstrated a consistent downward trend, indicating a gradual recovery of the pulp's neural excitability toward physiological norms. These findings suggest that the mechanical forces applied during treatment induce a transient state of reduced pulp sensibility that peaks near the time of appliance removal.

Conclusions. Fixed orthodontic treatment significantly increases the response threshold of dental pulp to electric stimulation. Consequently, clinicians should interpret Electric Pulp Testing (EPT) results with caution immediately following the removal of appliances, as transient changes in neural response can lead to a potential misdiagnosis of pulp status. To enhance diagnostic accuracy, future research should investigate the comparative reliability of supplemental testing methods, such as cold tests with ethyl chloride, in patients undergoing orthodontic movement.