

Detection and Endodontic Management of Radix Paramolaris - A Rare Case Report

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Abstract: Normally Mandibular Molars Have Two Roots, Mesial And Distal. But Sometimes They Present A Variation Called Radix Entomolaris, Where The Tooth Has An Extra Root Attached To Its Lingual Aspect And Very Rarely Radix Paramolaris, Where Extra Root Attached To Buccal Aspect. This Additional Root May Complicate The Endodontic Management Of The Tooth If It Is Misdiagnosed Or Maltreated. The Occurrence Of Radix Entomolaris Is Common, While Radix Paramolaris Is Rare. This Report Presents A Case With Detection And Endodontic Management Of Mandibular Third Molar With Radix Paramolaris.

Key Words- Anatomical Variations, Mandibular Molar, Radix Paramolaris.

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I. Introduction

The Primary Goal Of Endodontic Treatment Is To Eliminate The Bacteria From Infected Root Canal And Prevention Of Subsequent Reinfection. This Is Mainly Achieved By Thorough Chemo-Mechanical Cleaning And Shaping Of The Root Canal, Followed By A Three-Dimensional Filling With A Hermetic Seal. In Order To Achieve These Endodontic Goals, The Clinician Must Have An In-Depth Knowledge Of Root Canal Anatomy And Its Variations That May Complicate The Endodontic Procedure. The Majority Of Mandibular Molars Have Two Roots, Mesial And Distal With Two Mesial And One Distal Canal.^{1, 2} But Sometimes They Present A Variation In Number Roots I.E. Three Roots In Mandibular Molar, First Mentioned In The Literature By Carabelli Known As Radix Entomolaris (RE) Located In Distolingual Position.³ When Located On Mesio Buccal Surface, The Anomaly Is Known As Radix Paramolaris (RP).⁴

Bolk Reported The Occurrence Of A Buccally Located Additional Root: The RP. This Macrostructure Is Very Rare And Occurs Less Frequently Than The RE.⁵ The Prevalence Of RP, As Observed By Visser, Was Found To Be 0% For The First Mandibular Molar, 0.5% For The Second And 2% For The Third Molar.⁶ For Successful Endodontic Treatment Of All Canals Of The Tooth Careful Radiographic Diagnosis Plays A Crucial Role. Radiographs Taken At Different Angulations Reveal The Basic Information Regarding The Anatomy Of A Tooth And Can Thus Help To Detect Any Aberrant Anatomy Such As Extra Canals/Roots. This Paper Describes Clinical Cases Of Endodontically Managed RP Observed In Permanent Mandibular Third Molar.

II. Case Report

A 45-Year-Old Male Patient Presented To Our Department With The Chief Complaint Of Tooth Pain In Right Mandibular Region. Medical History Was Non-Contributing. On History Taking There Were Episodes Of Intermittent Pain For The Past 15 Days. Pain Was Moderate In Nature, Non-Radiating, Aggravated On Chewing Foods And Was Relieved On Taking Medication. On Clinical Examination A Deep Occlusal Carious Lesion Was Seen With Respect To 48, And The Tooth Was Tender To Vertical Percussion. There Was No Mobility And Probing With A Periodontal Probe Did Not Reveal Any Periodontal Pocket. Vitality Testing With Dry Ice (R C Ice; Prime Dental Products India) Caused Lingering Pain, Whereas Electronic Pulp Stimulation (Parkel Electronics Division, Farmingdale, NY) Caused A Delayed Response. A Preoperative Radiograph Revealed Occlusal Radiolucency With 48, Approaching The Pulp Space With Periodontal Ligament Space Widening At The Apex. It Also Revealed The Presence Of An Additional Supernumerary Root On Mesio Buccal Side [Figure 1A]. From The Clinical And Radiographic Findings, A Diagnosis Of Symptomatic Apical Periodontitis With 48 Was Made, And Endodontic Treatment With 48 Was Decided And Explained To The Patient.

The Teeth Was Anesthetized Using The Standard Inferior Alveolar Nerve Block On Right Side With 1.8 MI (30 Mg) 2% Lignocaine Containing 1:200,000 Epinephrine (Xylocaine; Astrazeneca Pharma India Ltd.),

Followed By A Rubber Dam Isolation. An Endodontic Access Cavity Was Established And Two Mesial Canal Orifices And One Distal Canal Orifice Were Located. In Addition A Dark Line Guided The Operator Towards An Extra Orifice Located Slightly Distobuccal To The Mesiobuccal Canal Orifice [Figure 1B].

Orifices Were Enlarged Using Nickel-Titanium Hyflex CM Orifice Shaper (Coltene, Germany) To Improve The Straight-Line Access. The Canals Were Negotiated Using A Number 6, 8 And 10 K-File (Mani, Japan) And Working Length Was Determined With The Help Of An Apex Locator (Root ZX; Morita, Japan) And Later Confirmed Using A Radiograph [Figure 1C]. Cleaning And Shaping Was Carried Out Using Hyflex CM (Coltene, Germany) Ni-Ti Rotary Files Up To 4% 30 Size Of The Instrument In Mesial Canals And Radix And 4% 40 Size Of Instrument In Distal Canal. Copious Irrigation With 2.5% Sodium Hypochlorite And 17% EDTA Was Carried Out During The Instrumentation Phase. Final Irrigation Was Done Using 2% Chlorhexidine. The Canals Were Dried With Paper Points And Master Cone Was Selected [Figure 1D]. Obturation Was Performed Using Cold Lateral Compaction Of Gutta-Percha And AH Plus Resin Sealer (Maillefer, Dentsply, Konstanz, Germany) [Figure 1E]. The Tooth Was Then Restored With A Posterior Composite Resin Core [Figure 1F].

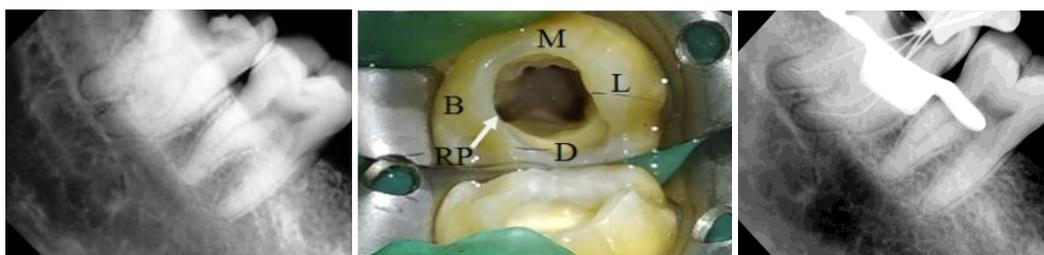


Figure 1 [A- Pre-Operative Radiograph, B- Clinical View Showing Location Of Radix Paramolaris Orifice (B- Buccal, M- Mesial, L- Lingual, D- Distal, RP- Radix Paramolaris), C- Working Length Radiograph]

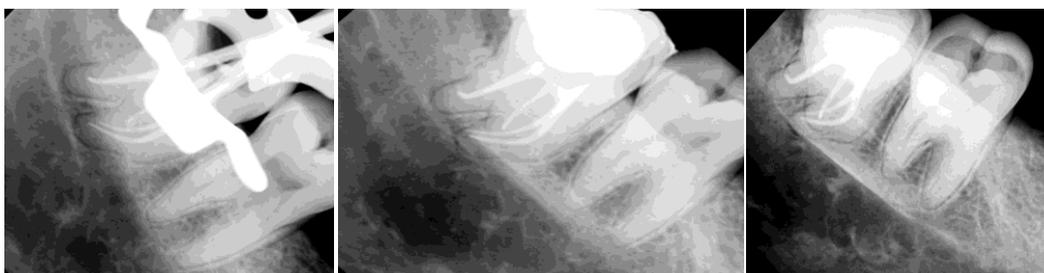


Figure 1 [D- Master Cone Radiograph, E- Post Obturation Radiograph, F- Six Months Follow Up Radiograph]

III. Discussion

The Etiology Behind The Formation Of Radix Is Still Unclear. In Dysmorphic Supernumerary Roots, Its Formation Could Be Related To External Factors During Odontogenesis Or Presence Of An Atavistic Gene Or Polygenetic System [Atavism Is The Reappearance Of A Trait After Several Generations Of Absence].⁷ Third Root Anomalies May Develop During Tooth Bud Morphodifferentiation As A Result Of A Developmental Aberration Of Both The Ectoderm And Mesoderm. Its Severity Depends On The Formation Stage Of The Involved Teeth.

The RP Is Located (Mesio) Buccally To The Main Roots. The Dimensions Of The RP Can Vary From A 'Mature' Root With A Root Canal, To A Short Conical Extension. This Additional Root Can Be Separate Or Nonseparate. Carlsen And Alexandersen Describe Two Different Types: Types A And B. Type A Refers To An RP In Which The Cervical Part Is Located On The Mesial Root Complex; Type B Refers To An RP In Which The Cervical Part Is Located Centrally, Between The Mesial And Distal Root Complexes.⁴

Endodontic Success In The Presence Of Radix Depends On Its Diagnosis, Anatomy Or Morphology, Canal Configuration And Clinical Approach Employed. An Accurate Diagnosis Of Radix Should Be Made To Avoid Complications Like Missed Canal Which Is A Common Reason For Endodontic Failure. As RP Is Situated In The Same Buccolingual Plane As The Mesial Root, It May Lead To An Inaccurate Diagnosis Due To Superimposition Of Both Roots On The Preoperative Radiograph, Resulting In An Inaccurate Diagnosis. To Reveal The Radix, A Second Radiograph Should Be Taken From A More Mesial Or Distal Horizontal Angle (20 Degrees).^{8,9} This Way An Accurate Diagnosis Can Be Made In The Majority Of Cases.

Modification Of The Conventional Triangular Access To A More Rectangular Or Trapezoidal Outline Form Helps In Locating The Orifice Of Radix. If The Radix Canal Entrance Is Not Clearly Visible After Removal Of The Pulp Chamber Roof, A More Thorough Inspection Of The Pulp Chamber Floor And Wall,

Especially In The Mesio Buccal Region, Is Necessary. The Laws Of Orifice Location May Help In Both Detecting And Locating A Radix Paramolaris.¹⁰ Based On The Literature, The Majority Of Radices Are Curved, Hence Precurved Files Should Be Used To Establish A Smooth Glide Path To The Apex. Controlled Memory Niti Rotary Files For Cleaning And Shaping Helps File To Follow The Anatomy Of The Canal Very Closely, Reducing The Risk Of Ledging, Transportation Or Perforation And Instrument Separation.⁷

IV. Conclusion

The Diagnosis Of A RP Before Root Canal Treatment Is Important To Avoid ‘Missed’ Canals And For Success Of The Endodontic Procedure. These Additional Roots Can Be Identified On Preoperative Periapical Radiographs Exposed At Two Different Horizontal Angles. To Overcome Procedural Errors During Endodontic Therapy Of The Radix In Terms Of Root Inclination And Root Canal Curvature, Operator Should Have A Careful And Adapted Clinical Approach. Therefore, Clinicians Should Be Aware Of These Unusual Root Morphologies In The Mandibular Molars To Avoid Endodontic Failure.

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