

Evaluation of Three Rooted Maxillary First Premolars in a Kashmiri Population Using Digital RadiographyMubashir Mushtaq¹, Fayiza Yaqoob Khan²¹Department of Conservative Dentistry and Endodontics, Government Dental College and Hospital Srinagar, Kashmir, India²Department of Periodontics and Oral Implantology, Government Dental College and Hospital Srinagar, Kashmir, India**Corresponding Author:** Mubashir Mushtaq, Department of Conservative Dentistry and Endodontics, Government Dental College and Hospital Srinagar, Kashmir, India.**Type of Publication:** Original Research Paper**Conflicts of Interest:** Nil**Abstract**

A thorough knowledge about the normal and abnormal variation of anatomy of the teeth and their detection is essential for clinical success. Maxillary first premolars show a considerable variation in root canal morphology but the presence of three roots is rare. However, it must be taken considered radiographically and clinically during endodontic treatment. There is not much data regarding the prevalence of 3 rooted maxillary first premolar in a kashmiri population. The aim of this retrospective study was to evaluate the prevalence of three rooted/canalled maxillary first premolar in a kashmiri population with special reference to radiographic interpretation and diagnosis.

Keywords: three rooted maxillary first premolar, kashmiri population**Introduction**

The degree of clinical success in endodontic therapy depends on the accuracy of biomechanical instrumentation and obturation of the root canal system. One of the main reasons for treatment failure in endodontics is the lack of thorough knowledge about the anatomy of root canals. Therefore the first step in achieving a successful endodontic outcome is an exact diagnosis of the root canal

system and its anatomical variations. Maxillary first premolars show a considerable variation in root canal morphology but the presence of three roots is rare. This anatomic abnormality is an additional challenge, which influences all the stages of treatment including case assessment, access cavity design, canal orifice localization, and cleaning and shaping of the root canal system. The presence of three roots in maxillary premolar varies from 0.5% to 6% (1-4) with one canal in each of the three roots (5). The root canal anatomy of three rooted maxillary premolars shows close resemblance to that of maxillary molars and therefore they have been termed as mini-molars or as being “ridiculous” (6, 7). The ethnic background of thenpatients with three rooted maxillary premolars in many of the studies was not identified. The studies identifying ethnic background have demonstrated distinct differences between Asian and Caucasian populations. Single rooted maxillary first premolars are the dominant form in Asian population (8,9), and three rooted forms are rare (8, 9, 10). Routine preoperative radiography gives a two dimensional view of a three dimensional object but precise interpretation can reveal fine anatomic details that suggest the presence of extra roots or canals. An extra canal should be suspected,

whenever there is an abrupt straightening or loss of radiolucent canal in the pulp cavity (11). In case of maxillary premolar whenever the mesio-distal width of the root image is equal to or greater than the mesio-distal width of the crown, the tooth most likely has three roots (12). There has not yet been any studies/case reports of this morphological variant in Kashmiri population which has a majority of Caucasian population. Because of the lack of research on this macrostructure in Kashmiri population thorough knowledge of its occurrence and location are important. The aim of this retrospective study was therefore to evaluate the frequency of 3 rooted maxillary first premolar in a Kashmiri population diagnosed by routine digital radiography.

Materials And Methods

The study was conducted jointly in the departments of conservative dentistry and endodontics and Periodontics, government Dental college Srinagar. A total of 600 patients were included in the study. The criteria of patients for inclusion in the study were:

- Age >18 years
- Presence of at least one maxillary first premolar in the mouth
- Kashmiri origin patients

Eleven hundred eighty maxillary first premolars were evaluated using full mouth digital radiographs (Schick technologies, NY, USA) using mesial angulation of 20-30 degree. The digital radiographs were evaluated by at least two observers. The criteria for 3 rooted maxillary first premolar was clear visualization of an extra root (figs 1,2,3,4).



Figure 1



Figure 2

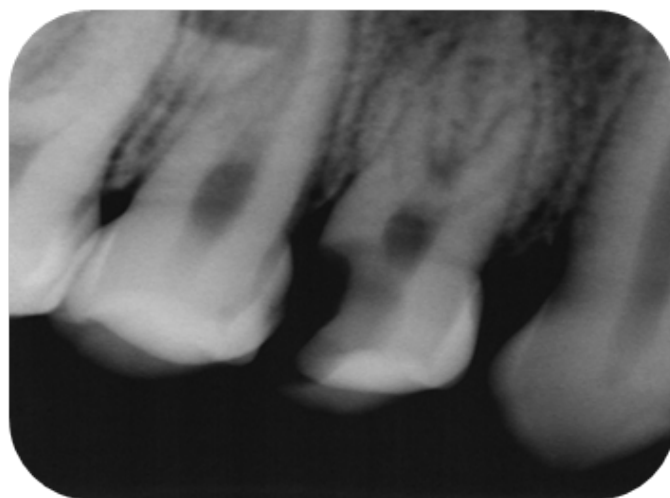


Figure 3

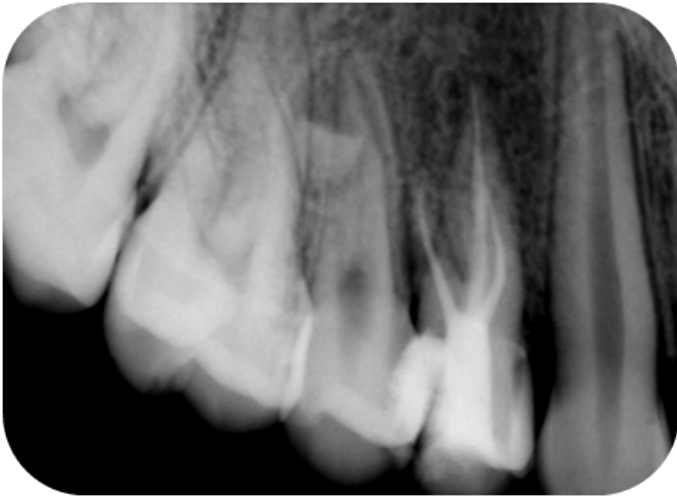


Figure 4

Results

The preoperative radiographic estimation in 1180 maxillary first premolars was carried out during the period of the study. Pre-operative radiographic estimation revealed that 30 percent of the maxillary first premolars had one canal and 69.74 percent had two canals and only a rare 0.25 percent had 3 separate roots and canals, Table 1.

Table 1

Teeth	1 canal No (%)	2 canals No (%)	3 canals No (%)
Maxillary first premolar	354 30	823 69.74	3 0.25

Discussion

The basic goal of root canal treatment is thorough mechanical and chemical cleansing of the entire pulp cavity and its complete obturation with an inert filling material. Endodontic therapy requires a thorough knowledge of root canal morphology to adequately shape and clean the canal system. Proper care and attention should be directed in identifying and negotiating extra roots and canals. Maxillary premolars can exhibit several anatomic configurations in different populations (13-19). But, in the literature only a few cases related to three

rooted maxillary first premolar are reported (20-24). Our article has described the clinical management of first premolars with three canals and three separate roots. Detection of three-canalled maxillary premolar can often be difficult on routine preoperative radiographs. The root canal configuration of three-rooted maxillary premolars resembles that of a miniature three-canalled maxillary molar; the canals being classified as the mesio-buccal, disto-buccal and palatal canals. Three rooted configuration can be sometimes seen on preoperative radiographs. In our case, diagnostic periapical radiography revealed a three separate rooted maxillary first premolar. But, it was difficult to find canal accesses because the buccal orifices were too close to each other and therefore, it was very hard to locate them. A three-canalled maxillary premolar requires an access cavity modification into a "T" shape mesio-distally extending the buccal aspect of the usual outline form. This modification allows good access to each of the two buccal canals (22). A thorough knowledge of variations will assist the dentist in reaching conclusions when diagnosing and treating endodontic cases. The possibility of presence of multiple canals and additional roots in different cases should be carefully explored and treated.

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