



CODEN [USA]: IAJPBB

ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

<http://doi.org/10.5281/zenodo.3548229>

Available online at: <http://www.iajps.com>

Research Article

REGIONAL FEATURES OF ENDODONTIC ARCHITECTONICS

Nataliya Aleksandrovna Sokolovich, Nikita Sergeevich Chernomorchenko,
Svetlana Vasilyevna Sverdlova, Anatoly Anatolyevich Lunev,
Elena Anatolyevna Okulova,

Department of Dentistry, St. Petersburg State University, St. Petersburg, Russian Federation
NATALIYA ALEKSANDROVNA SOKOLOVICH- D.M.S., professor, head of the Department of Dentistry.

For contact: lun_nat@mail.ru, +79119614440, ORCID: 0000-0003-4545-2994

NIKITA SERGEEVICH CHERNOMORCHENKO- assistant professor of Department of Dentistry

For contact: nik85041@gmail.com, +79955932756, ORCID: 0000-0003-1332-3514

SVETLANA VASILYEVNA SVERDLOVA- head of the educational part of Department of Dentistry

For contact: sveta-show@yandex.ru, +79219676739, ORCID: 0000-0001-6644-4331

ANATOLYI ANATOLYEVICH LUNEV- assistant professor of Department of Dentistry

For contact: luniov2015@yandex.ru, +79112684077, ORCID: 0000-0001-7616-6144

ELENA ANATOLYEVNA OKULOVA- assistant professor of Department of Dentistry

For contact: med-ezhik@mail.ru, +79119034197, ORCID: 0000-0002-3889-0737

Abstract:

Background: The purpose of this study is to identify features and compare the structure of root canals in different regions of Russia.

Materials and Methods: In this study, we explore 263 first molars of the upper and lower jaws of St. Petersburg inhabitants. The study was carried out on computer tomography data analysis. A comparison was made according to the literature [6,7,8] with the structure of the roots and root canals of Moscow residents.

Results: Differences in the structure of the root system in the indigenous people of different regions of Russia were discovered.

Conclusion: The results of the study shows its practical value, since they allow expanding of the modern vision on the structure of the root system and the occurrence of possible variations depending on the region.

Corresponding author:

Nataliya Aleksandrovna Sokolovich,

D.M.S., professor, Head of the Department of Dentistry.

For contact: lun_nat@mail.ru, +79119614440,

ORCID: 0000-0003-4545-2994

QR code



Please cite this article in press Nataliya Aleksandrovna Sokolovich et al., *Regional Features Of Endodontic Architectonics.*, Indo Am. J. P. Sci, 2019; 06(11).

INTRODUCTION:

The quality of endodontic treatment is one of the most important problems in modern dentistry. According to various authors, from 60% to 80% of depulped teeth need to be treated [1]. Adverse outcomes of endodontic treatment, in most cases, occur due to iatrogenic errors due to ignorance of the anatomy of the root canals, non-compliance with treatment protocols, and the use of inappropriate obstruction methods [2]. The classical version of the root canal structure described in the literature is the exception rather than the rule [3; 4; 8]. Numerous foreign studies have revealed a huge number of variations in the structure of the root canals, but there are very few Russian studies in this area [3,4,7]. At this stage in the development of modern endodontics, a clear knowledge of the anatomy of the root canals is an essential condition for quality endodontic treatment. A large number of problems that arise during treatment are associated precisely with a misunderstanding of the spatial relationships of the elements of the pulp chamber and lack of knowledge of the structural features of the root system depending on the region of the country [6, 9]. Given the fact that Russia as a whole and the NWFD and Moscow are multinational entities, it should be assumed that when performing endodontic treatment, a wide range of root canal structure variations are encountered. Therefore, the study of the anatomical features of the root canal system in residents of various regions of the Russian Federation is an urgent task and is of great practical importance for dentists.

To achieve this goal, 63 computed tomograms of patients aged 26 to 64 were analyzed and the anatomy of the root canals of 265 teeth (the first upper molars - 145 teeth and the first lower molars - 120 teeth) was evaluated for residents of St. Petersburg. The distribution of teeth by group affiliation is presented in table 1.

RESEARCH RESULTS:

A feature of the anatomy of the canal-root system of the upper molars was the frequent occurrence of various root fusions: buccal, medial-buccal with palatine, distal-buccal with palatine. In the fused roots, a reduction in the number of channels, their merging with the formation of C-shapes, incomplete communication with the help of isthmus could also occur. Such non-standard anatomy disorients the endodontist when searching for root canals after opening the pulp chamber.

The first upper molars.

Out of 67 teeth, 88.1% of teeth (59 molars) had a standard three-root structure. 6 teeth had 2 roots due to fusion of buccal roots, distal-buccal and palatine, medial-buccal and palatine (each case was found in 2 molars). 1 first upper molar had one root.

The number of channels varies from 1 to 4. The most common three-channel structure is in 42 teeth (62.7%) and four-channel in 22 teeth (32.8%). 2 channels were found in two molars, 1 channel in one molar.

The four-channel structure is due to the presence of a second mesio-buccal canal (MB-2), which has a much smaller diameter compared to the main medial-buccal canal (MB-1). The merging of these channels may occur at different levels or may not occur at all, in which case MB-1 and MB-2 open with separate apical openings.

The fusion of the medial-buccal canals in the apex was observed in 10 teeth (45.5% of all four-channel upper sixth teeth).

Merger in the middle part - in 3 teeth (13.6%).

The presence of 2 apical openings - 8 teeth (36.4%) 1 molar had a medial-buccal root structure with anatomy of the canals according to the 7th type of Vertucci classification. Starting with a common mouth, MB-1 and MB-2 channels were disconnected, then merged in the middle part of the root and split into 2 separate channels in the apical third and opened with separate apical openings.

The two-channel structure in two molars was due in the first case to the fusion of the distal-buccal and palatine canals, in the second - to the medial-buccal and distal-buccal canals.

A feature of the three-channel structure in 2 molars was a slit-like elongated form of the medial-buccal canal.

As for the bends of the roots of the upper sixth teeth, the medial-buccal canal most often changes its direction. 16 of 67 teeth (23.9%) have a distal deviation of this root. Of these, 2 deviates at the same time and cheek.

The distal-buccal canal can deviate both distally (4 teeth) and medially (2 teeth). In one molar, the distal-buccal root in the middle part bent distally, and in the apical medially (Fig. 1).

A close arrangement of the maxillary sinus to the tops of the upper sixth teeth was found in 19 people (28.4%) (Fig. 2)

The features of the upper sixth teeth were the frequent occurrence of a two-root structure due to fusion of the buccal roots, the distal-buccal and palatine, and the medial-buccal and palatine. In such teeth, the canals can have a C-shape (the so-called C-shape), which must be taken into account, because this form of the channel determines the type of instrumental processing and obturation. As for the root bends, most often the medial-buccal canal changes its direction in the distal direction. Symmetrical teeth are not similar in structure to the root canal system, while remaining similar in anatomical structure.

Lower molars

The structural features of the canal-root system of the lower molars are most often variations in the cross section and the number of channels in the distal roots, as well as the possible merging of the roots into one lower seventh teeth.

Lower first molars.

95.5% of the first lower molars have 2 roots. Only 2 molars have three roots: medial and 2 distal (Fig. 3). The number of channels varies from 2 to 4. Two channels due to the presence of one narrow slit-like channel in the medial root instead of two, were found in 4 teeth (Fig. 4). 3 channels had the majority of teeth - 26 (59.1%). The four-channel structure due to the presence of two channels in the distal root instead of one takes place in 14 teeth (31.8%).

The medial-buccal and medial-lingual canals can communicate at various levels. These canals have a common apical foramen in 22 teeth (50%). The buccal and lingual canals in the medial root can be connected throughout the isthmus, this structure was found in 4 teeth (9.1%). 2 independent and unconnected canals with 2 separate apical openings were found in 18 teeth (40.9%).

In the distal root in 14 teeth, 2 canals were found (31.8%). Of these, only 4 had two separate apices, Table 1.

	1-st molars	2-nd molars	Total
Upper Jaw	67	78	145
Lower Jaw	44	76	120
Total	111	154	265

the rest had a common one. If there is only one channel in this root, as a rule in cross section it is elongated and has a C-shape. In 8 teeth, the distal canal had a wide oval shape (18.2%). In 1 molar in the apical third, the distal canal bifurcated.

Root deviation in the first lower molar is rare: 4 teeth had a distal bend of the medial root and 2 teeth had a medial deviation of both roots.

A comparison was made of the structural features of the root system of the first and second molars of the residents of St. Petersburg and Moscow [6,7,8]

Table 2 shows a comparison of number of roots of the upper first molar among residents of St. Petersburg and Moscow.

Table 3 shows a comparison of the number of root canals of the upper the first molar among residents of St. Petersburg and Moscow.

Table 4 shows a comparison of the number of roots of the lower second molar among residents of St. Petersburg and Moscow.

Table 5 shows a comparison of the number of root canals of the lower the second molar among residents of St. Petersburg and Moscow.

Conclusion: As we can see, the results of the study have practical value, since they allow to expand the current understanding among dentists of St. Petersburg on the structure of the root system and the occurrence of possible anatomic variations. This information can serve as an aid to general practitioners in performing endodontic interventions, as well as help reduce the percentage of endodontic treatment failures. Comparison of the structure of the root canals of other groups of teeth of residents from various regions of Russia will be presented in the following publications.

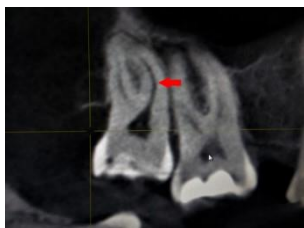


Fig. 1

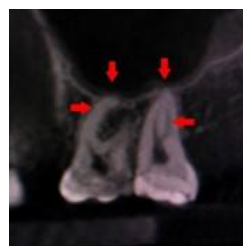


Fig.2

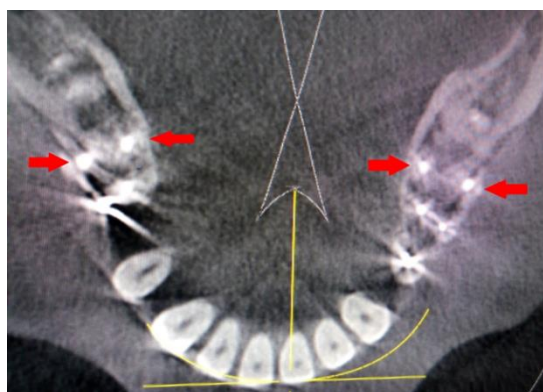


Fig. 3

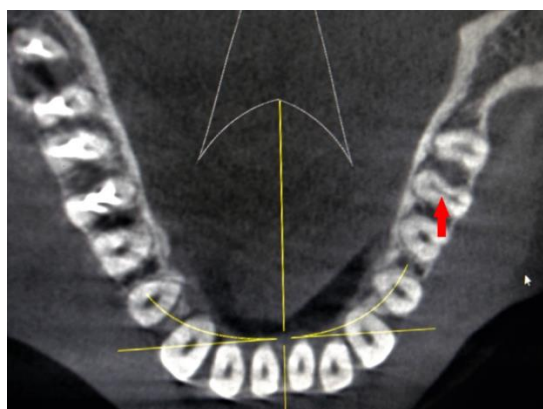


Fig. 4

Table 2.

AMOUNT OF ROOTS (1-st MOLAR OF UPPER JAW, %)				
Place of Research	Amount of examined teeth	One root	Two roots	Three roots
Moscow	207	0	0	100
Saint-Petersburg	140	0.7	4.2	95.1

Table 3.

AMOUNT OF ROOT CHANNELS (1-st MOLAR OF UPPER JAW, %)						
Place of Research	Amount of examined teeth	One channel	Two channels	Three channels	Four channels	Five channels
Moscow	207	0	0	40.0	58.9	1.1
Saint-Petersburg	140	0.7	1.6	64.8	33.9	0

Table 4.

AMOUNT OF ROOTS (1-st MOLAR OF LOWER JAW, %)			
Place of Research	Amount of examined teeth	Two roots	Three roots
Moscow	407	100	0
Saint-Petersburg	204	99.1	0.1

Table 5

AMOUNT OF ROOT CHANNELS (1-st MOLAR OF LOWER JAW, %)				
Place of Research	Amount of examined teeth	Two channels	Three channels	Four channels
Moscow	407	0.7	78.6	20.7
Saint-Petersburg	204	1.9	66.3	31.8

REFERENCES:

1. Petrickas, Zakharova, Olhovskaya, Chestnyh «The prevalence of dental caries complications» // Dentistry - 2014. - No. 1 - p. 19-20.
2. Denisov L.A., Kovetskaya E.E., Andreeva V.A. "The rationale for repeated endodontic treatment." // Dentist. Minsk - 2013 - No. 1 (8). S. 88-93.
3. Vertucci FJ. Root canal anatomy of the human permanentteeth. Oral Surg Oral Med Oral Pathol 1984;58:589-99.
4. Weine FS, Pasiewicz RA, Rice RT. Canal configuration of the mandibular second molar using a clinically oriented in vitro method. J Endod 1988;14:207-13.
5. Lee KW, Kim Y, Perinpanayagam H, Lee JK, Yoo YJ, Lim SM, et al. Comparison of alternative image reformatting techniques in micro-computed tomography and tooth clearing for detailed canal morphology. J Endod 2014;40:417-22.
6. Svetlana Razumova, Anzhela Brago, et al. A Cone-Beam Computed Tomography Scanning of the Root Canal System of Permanent Teeth among the Moscow Population. Hindawi International Journal of Dentistry Volume 2018, Article ID 2615746, 6 pages .
7. Svetlana Razumova, Anzhela Brago, et al. Evaluation of the relationship between the maxillary sinus floor and the root apices of the maxillary posterior teeth using cone-beam computed tomographic scanning. Journal of Conservative Dentistry and Endodontics Volume 22, Issue 2, March-April 2019, 139-143.
8. Svetlana Razumova, Anzhela Brago, et al. Evaluation of Anatomy and Root Canal Morphology of the Maxillary First Molar Using the Cone-Beam Computed Tomography among Residents of the Moscow Region. Contemporary Clinical Dentistry, Volume 9, Supplement 1. June 2018, 133-136.
9. Batyukov N.M., Konstantinov A.A., Chibisova M.A. "Possibilities in visualizing the structure of teeth using computed tomography and a microscope for endodontic treatment" // Institute of Dentistry - 2016 - No. 3 (72) - p. 38-41