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Evaluation of odontological assistance to soldiers going on a mission, and prognostication of their odontological problems

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SUMMARY

The aim of the study was to evaluate the condition of the oral cavity in soldiers going on a military mission, the level of odontological assistance to them, and to prognosticate possible odontological problems during the mission period. We studied 50 soldiers going on a military mission in Iraq. During the study we applied odontological examination and panoramic imaging. We found that soldiers' teeth were treated, and they received comprehensive odontological assistance: 18% of soldiers had their teeth restored with single crowns and bridges, and 56% of soldiers had underwent endodontic treatment of their teeth. During the radiological examination we diagnosed individual cases of dental caries on the contact surfaces of teeth, and determined the level of the filling of root canals of endodontically treated teeth and the relationship of this level with radiological changes in apical periodontium. 67.3% of teeth had incompletely filled root canals, and radiological changes in their apical periodontium were reliably more frequent (80.6%) than in the apical periodontium of teeth with completely filled root canals (19.4%) ($p<0.001$). Of significant concern is the fact that frequently teeth with incompletely filled root canals and apical periodontal damage are restored using radical post-core and crowns.

Radiological examination showed that in teeth with signs of chronic apical periodontitis and insufficient quality of filling, the condition may become more acute and cause odontological problems. A part of odontological problems in soldiers may be caused by incorrect position of the third molars in the jaw and possible aggravated eruption of these teeth.

Key words: recruits, oral health, dental treatment needs.

INTRODUCTION

Soldiers' oral health condition must be good so that oral diseases and their complications do not impede their military service (1,2,3,4). Provision of emergency assistance to soldiers who leave for long-term training or military missions is of special concern. Untreated teeth - and especially diagnosed endodontic diseases - may cause incapacity in soldiers. Most authors point out the difficulty in providing emergency odontological assistance during long-term training or missions where hostilities take place (5,6). Soldiers' oral health and their odontological problems are relevant in our country as well, since Lithuanian soldiers also participate in various military missions in different "hot spots" of the world. Medical literature does not provide any data on the organization of odontological assistance to our soldiers during their military service, or data on whether our soldiers leave for military missions with treated teeth.

Data on the oral condition of Lithuanian military recruits, several years ago presented by E. Kelbauskas, showed that oral health of young men called in for military service is poor (7,8). The majority of these young men have carious teeth. Future soldiers need dental filling, complex endodontic treatment, tooth extraction, and prostheses (9).

The aim of our study was to evaluate the level of odontological assistance provided to soldiers leaving for military missions abroad, to assess the condition of the soldiers' teeth, and to prognosticate possible odontological problems during the mission. We also strived to analyze differences in dental condition between military recruits and soldiers, which would help to evaluate the level of odontological assistance provided to our soldiers during their military service.

MATERIALS AND METHODS

We performed a study of 50 soldiers leaving for a military mission. The soldiers' mean age was 24.5 (6.5) years (the youngest soldier was 20 years of age, and the oldest – 37).

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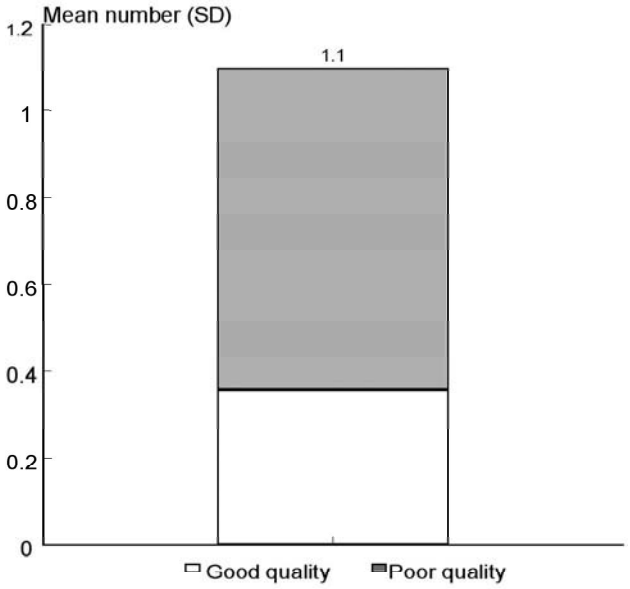

Fig. 1. Mean number of endodontically treated teeth per 1 person

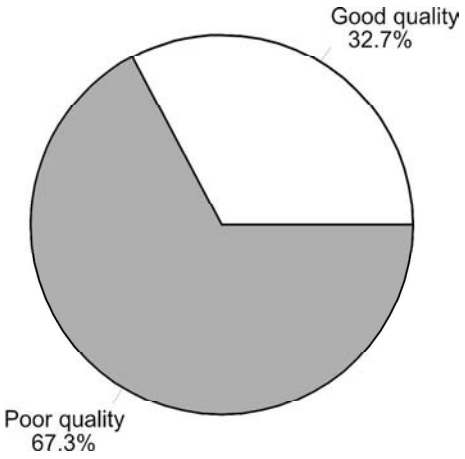

Fig. 2. Distribution of endodontically treated teeth (n=55)

The methods of the study were the following:

1) odontological examination of the soldiers' oral cavity and the evaluation of the condition of their teeth;

2) radiological panoramic imaging.

During odontological examination, we evaluated the condition of the dental hard tissues and determined the extent of odontological assistance – filled teeth, crowns, and prosthetic bridges.

During panoramic imaging, we evaluated the dental image of both jaws, identified endodontically treated teeth, evaluated the condition of their adjacent tissues (especially apical periodontium), observed certain complications that occurred during the endodontic treatment, and evaluated the level of root filling and the height of the filling from the root apex.

The data were recorded in a special questionnaire prepared for statistical processing.

RESULTS

Odontological examination showed that the prevalence of dental caries among soldiers was 94%, and 3 soldiers (6%) had all healthy teeth. The tooth decay intensity index DMFT was 7.84 (6.34), and the carious dental surface index DMFTs was 14.78(11.73). All teeth in the studied soldiers were treated, and carious teeth were restored using high quality fillings. 9 soldiers (18%) had dental prostheses. Of 20 teeth on which prostheses were used, 10 had single crowns (4 of them had radical core inlays), and the other 10 teeth were supporting teeth in dental bridges. 4 soldiers had 1 tooth each requiring individual crowns, and 2 soldiers needed restoration of dental line defects with 4 dental bridges.

The analysis of panoramic tomograms performed during the radiological examination showed that 3 soldiers had 5 carious cavities in contact surfaces that could not be detected during oral examination. Two carious cavities in the contact surfaces were very deep. Radiological study showed that 28 soldiers (56%) had 55 endodontically treated teeth. Mean number of endodontically treated teeth per one soldier is presented in Fig. 1. Panoramic tomograms showed that not all endodontically treated teeth had completely filled root canals. We detected cases when only the pulp chamber was filled, and root canals remained empty. We detected roots with only the coronal 1/3, 1/2, and 2/3 of the canal filled, as well as roots with completely filled canals. We also detected individual cases when the filling was protruding through the root apex. Root canals that were either not filled or incompletely filled were attributed to poor or insufficient quality of endodontic treatment, and completely filled root canals were attributed to good, high-quality endodontic treatment. We noticed that

Table. Analysis of the quality of endodontic treatment among tested soldiers

Teeth	Good endodontic treatment (Completely filled root canals)			Poor endodontic treatment (Incompletely filled root canals)		
	Canals treated	No radiological changes	Radiological changes	Canals treated	No radiological changes	Radiological changes
Anterior incisors	8	6	2	5	1	4
Canines	8	5	3	11	1	10
Molars	15	14	1	72	14	58
Total	31	25	6	88	16	72

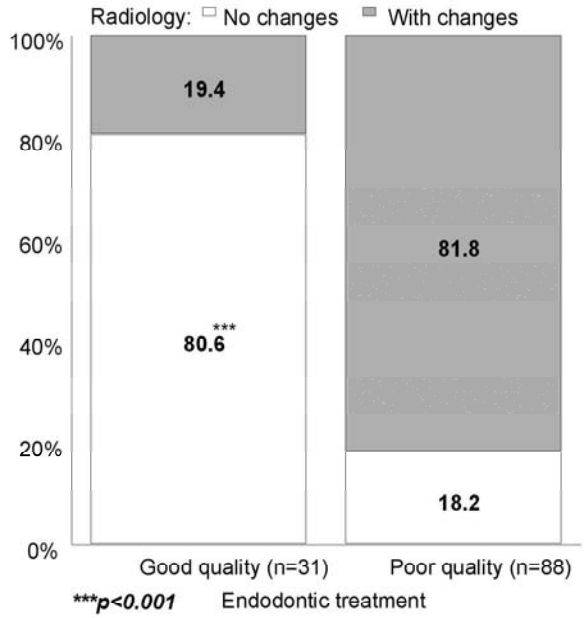

Fig. 3. Association between completely and incompletely filled root canals and radiological changes in the apical periodontium

the number of incompletely filled root canals significantly exceeded that of completely filled root canals (Fig. 2).

When analyzing the quality of endodontic treatment, we tried to associate the level of root canal filling with radiological changes in the apical periodontium. The obtained findings are presented in Table. The findings showed that in the presence of incompletely filled root canals, radiological changes typical of chronic apical periodontitis were observed in as much as 81.8% of cases. Meanwhile, in the presence of completely filled root canals, radiological changes typical of chronic apical periodontitis were observed in only 19.4% of cases (Fig. 3).

The evaluation of the quality of endodontically treated teeth showed that a part of teeth with incompletely filled root canals were restored with radical core inlays and covered with crowns.

Root canals of all 10 teeth with dental crowns were treated, and only 2 teeth had completely filled root canals and no signs of pathological changes in the apical periodontium.

Of 10 teeth that were covered with dental crowns and served as supporting teeth in dental bridges, only 1 had undergone endodontic treatment; its root canal was filled completely, and no changes were seen in the apical periodontium. Radiological study showed that a part of soldiers had unerupted third molars, and in 8 soldiers these teeth were malpositioned, and their eruption may be complicated. We also detected complications of endodontic treatment: broken instruments (2 cases), cysts that developed as a result of poor quality endodontic treatment (2 cases), and remaining buccal root following the extirpation of the upper molar (1 case).

DISCUSSION

The study showed that all teeth of the soldiers were treated. The analysis of panoramic tomograms revealed 5 carious cavities in the contact surfaces of 3 soldiers' teeth. This confirms numerous authors' statements about the increasingly wider application of radiological examination for the diagnostics of dental caries, especially in its early stages and in cases when it is localized in the contact surfaces of molars and premolars (10,11,12,13,14). The comparison of the data on the oral status of soldiers leaving for a military mission with respective data on Lithuanian military recruits revealed an essential difference. If as many as 91.5% of recruits needed treatment of carious teeth, all teeth in soldiers were treated, and only radiological examination revealed individual carious lesions. We are pleased to note that 18% of soldiers had underwent dental prosthetics, and only 4% of soldiers still needed to have individual teeth covered with dental crowns and dental line defects corrected by the application of bridges. Meanwhile, according to the findings presented by E. Kelbauskas, only individual military recruits had dental prostheses, and as many as 22.8% of them required orthopedic assistance. In addition to that, 34.6% of military recruits needed extraction of teeth or roots destroyed by dental caries. Endodontic treatment was indicated in 40.3% of military recruits (7,9). The analysis of clinical examination and radiological study showed that 56% of soldiers had endodontically treated teeth. These findings indicate that soldiers during their military service period receive comprehensive odontological assistance. Using radiological examination, we tried to evaluate the quality of endodontic treatment, taking into consideration roentgenological changes in the apical periodontium and filling of root canals (15). According to the data published in literature, the majority of authors state that the success of endodontic treatment depends on the condensation of the filling material and its height in the root canal (16,17,18). Endodontic treatment is most successful when the filling material is as close to the apical foramen as possible, i.e. at 0.5-2 mm from the apical foramen (19,20). Cases of unsuccessful treatment are also more common when the filling material protrudes through the root apex (21,22).

According to our findings, 67.3% of endodontically treated teeth had incompletely filled root canals. This may influence the success of endodontic treatment. Incompletely filled root canals significantly increase the probability of remaining infection in the canal, supporting chronic inflammation in the apical periodontium. This assumption is corroborated by the findings of our study. In the presence of incompletely filled root canals, radiological changes in the apical periodontium were detected in 81.8% of cases, compared to only 19.4% of cases in the presence of properly filled root canals ($p<0.001$).

Our study showed that the condition of the oral cavity of Lithuanian soldiers going on a military mission is good. This indicates that during the period of their military service, soldiers receive comprehensive odontological assistance, and their teeth are treated. However, the evaluation of the findings of the radiological examination allowing for the estimation of certain qualitative indicators of odontological, and especially the endodontic treatment, leads to the prognostication of possible odontological problems that may occur during the military mission. According to our findings, as many as 13 soldiers (26%) in the nearest future may require emergency odontological

assistance. Two soldiers run the risk of symptomatic pulpitis due to deep carious lesions in the contact surfaces of their teeth, and one – due to a denticle filing the pulp chamber in an intact molar (23). 8 soldiers run the risk of possible complicated eruption of mandibular third molars related to their incorrect position in the jaw. According to the data presented in scientific literature, the problem of the third molars ranks among the most common ones necessitating urgent surgical assistance among soldiers (24,25,26). The rest of the soldiers may require urgent medical assistance in cases of a more acute development of chronic apical periodontitis in the presence of incompletely filled root canals. The transformation of the condition into the more acute one may be caused by a sudden change in the climatic conditions, cold, and other causes (27,28,29).

All soldiers were informed about possible odontological problems, and two of them were advised to solve them before leaving for the military mission.

CONCLUSIONS

1. All teeth in soldiers who are leaving for a military mission are treated. The soldiers' oral condition is good compared to the oral condition of military recruits.
2. Radiological panoramic imaging allowed for the diagnostics of occult carious lesions and for the identification of possible odontological problems.
3. Odontological problems among soldiers may arise due to improperly endodontically treated teeth and incompletely erupted third mandibular molars.

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