боишиалгический синдром встречался в этой группе с близкой частотой у лиц обоего пола (у 33,7% женщин и 32,8% мужчин). Анализ патологии у госпитализированных жителей юга республики выводит на первое место неврологические проявления распространенного остеохондроза позвоночника у женщин (45,1% против 32,0% у мужчин) и люмбоишиалгический синдром - среди мужчин (42,3% против 31,6% у женщин; $p \leq 0.05$). Радикулопатический синдром встречался примерно с одинаковой частотой и у мужчин (17,4%), и у женщин (16,2%; различия не достоверны).

Отдельное внимание хотелось бы уделить диагнозу люмбалгии. Несмотря на то, что в среднем, частота его практически одинакова у женщин и мужчин (1,4%), имеются значительные отличия в территориальном распределении больных. У мужчин диагноз выставлялся в 3,4% и 3,6% соответственно пациентам южных и приравненных к Северу территорий и не ставился жителям Крайнего Севера. В свою очередь, среди женщин люмбалгия выставлялась в 1,57% жителям юга республики, 1,78% у жителей Севера и не встречалась среди жителей приравненных территории (различия недостоверны, в связи с малой частотой патологии).

Таким образом, проведенное исследование показывает, что основную часть пациентов со спондилогенной патологией периферической нервной системы составляют больные с неврологическими проявлениями распространенного остеохондроза позвоночника, люмбоишиалгией и радикулопатией. Существуют достоверные различия в структуре патологии в зависимости от гендерного фактора. Структура заболеваемости у женщин мало меняется в зависимости от территории проживания пациентов, в то время, как у мужчин она различается: жителям северных территорий достоверно чаще ставился диагноз осложнений распространенного остеохондроза, жителям юга – корешковый синдром на фоне поясничного остеохондроза. Структура заболеваемости южных районов республики и территорий, приравненных к Крайнему Северу, сходна, и достоверно отличается от структуры заболеваемости территорий Крайнего Севера в изучаемой группе.

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THE NEUROLOGIC COMPLICATIONS OF THE OSTEOCHONDROSIS OF THE SPINE COLUMN AT THE INHABITANTS OF KOMI REPUBLIC

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Abstract:

The all cases of hospitalization of the patients with vertebroneurological pathology in republican neurologic branch for 1998-2006 were analyzed. The majority of them were the patients with three types of nosologies: the widespread osteochondrosis, lumboischalgia and radiculopathy. Authentic distinctions in a structure of a pathology depending on the gender factor were found. The structure of diseases of women varies a little depending on territory of residing of patients, while for men it varies a lot. Comparison of structure of disease shows, that the areas equal to territories of the Far North are closer to southern areas, than to territories of the Far North .

Key words:

an osteochondrosis, lumboischalgia, radiculopathy, the Far North

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COMPARISON OF ENAMEL AND DENTIN MICROHARDNESS OF HEALTHY AND FLUOROTIC TEETH

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Abstract:

The aim of this study was to compare the enamel and dentin microhardness of teeth with TF (Thylstup-Fejerskov) scores of 0,1,2,3 and 4, using microindentation method. In this study we used Hanemann VEB Zeiss Jena device. The results demonstrated a decrease of the microhardness of the teeth having dental fluorosis when compare with healthy teeth, but the association was statistically significant only in the internal third of the enamel of the teeth having TF scores of 2,3 and 4 and at the enamel-dentin junction of the teeth with TF 4.

Ключевые слова:

microhardness, fluorosis, enamel, dentin

Hardness measures the resistance of a material under the action of local plastic deformations (3). Being familiar with the physical properties of the hard dental tissues is important not only for the understanding of the effects that different materials used in dental practice have on dental structures, but also for the logical interpretation of the way in which the

occlusal stress distributes at the dental units level (9). Numerous studies have shown the high degree of variability of the enamel and dentin microhardness in different parts of the same tooth, but also in different teeth, the results beeing somewhat controversial (2, 3, 4, 12).

In enamel of fluorosed teeth histopathological changes appear as subsurface demineralizations covered by a well-mineralized surface layer (5, 6). Once the fluorosis aggravates, the subsurface enamel becomes more and more porous, while the lesion extends toward the inner enamel. This extension and the degree of hypomineralization are directly correlated with fluoride intake and time of exposure during the development of the tooth. The dentin of fluorotic teeth presents also hypomineralizations, indicating the fact that the fluorine exerts a certain effect on the processes which are generally involved in mineralization (7).

The purpose of the study has been to compare the microhardness of the enamel and dentin of the teeth affected by dental fluorosis of different degrees with the microhardness of healthy teeth.

Material and method

A number of 32 extracted third molars who were included were used in this study.The teeth were divided into 5 lots. The first 4 lots included teeth affected by dental fluorosis having TF (Thylstrup-Fejerskov) scores of 1,2,3 and 4. The fifth lot was represented by healthy teeth (TF 0) pertaining to persons of the same age as those to whom the fluorotic teeth belonged. The teeth have been longitudinally sectioned using diamond discs at low speed and under constant cooling with water, then they have been fixed in chemically activated acrylic resin (fig. 1). The samples have been finished with silicon carbide paper under irrigation. The final finishing and the polishing were made with a polish and diamond paste at a Buehler metallographic polishing machine, the Minimet model. The samples have been degreased with ethylic alcohol in order to eliminate the impurities and washed three times, five minutes each, with distilled water.

The Vickers hardness measurements have been accomplished with a microhardness testing device (the Hanemann model, VEB Zeiss Jena) having a square diamond head at an angle of 136 degrees, the examination of the indentations being achieved with optical microscope (Neophot 21). The indentations have been effected with a descent rate of 30 seconds and a loading rate of 50 g. The minimal distance between two consecutive indentations was 40 μm. In order

Fig.1. The aspect of the teeth fixed in chemically activated acrylic resin

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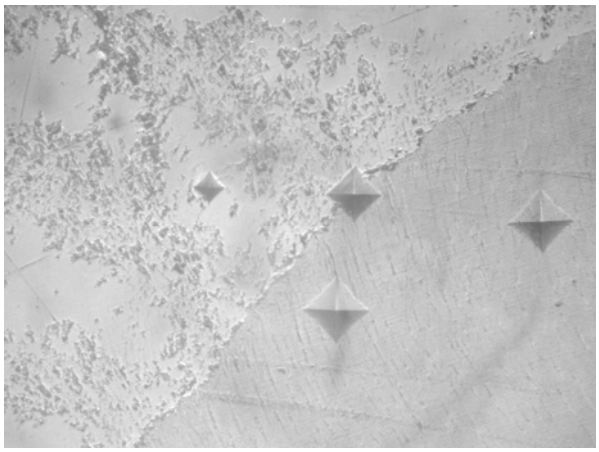

Fig.2. Light microscope images of well-shaped indentation in enamel and dentin

for an indentation to be accepted, it had to fulfil a series of criteria: to be sharp on the diagonal edges, to have a uniform aspect and not to present irregularities in the tested area (fig. 2).

The length of the axes of the square-shaped indentations was „read“ with a micrometric scale set at the eyepiece of the hardness testing device, the hardness being calculated according to the formula: $D=1854,4*F/d^2$ (N/mm^2) (where D is the value for the Vickers hardness, F is the test force, d is the length of the indentation diagonal).

For all the teeth that have been studied, the hardness values have been calculated in the following regions: the external, medial and respectively, internal third of the enamel, the enamel-dentin junction, the external and respectively, medial third of the dentin.

Results

The values for the enamel hardness in the external third of the fluorotic teeth varied between 301 Mpa (for TF 4)

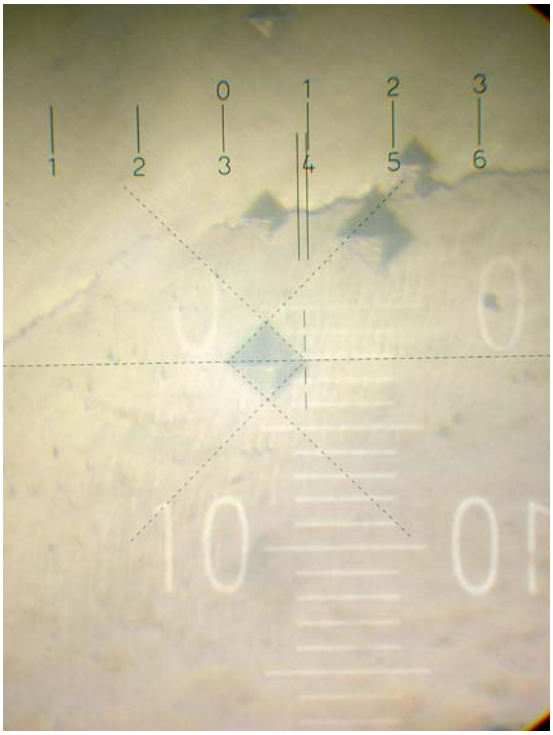

Fig.3. The measurement of the axes length of the square-shaped indentations

and 370 Mpa (for TF 1), in the medial third between 258 Mpa (for TF 3) and 363 Mpa (for TF 1), and in the internal third between 243 Mpa (for TF 4) and 280 Mpa (for TF 1). For the healthy enamel, the hardness values varied between 301 and 340 Mpa in the external third, 292 and 370 Mpa in the medial third and between 270 and 310 Mpa in the internal third. At the enamel-dentin junction the hardness values have considerably decreased, varying between 114 Mpa (for TF 4) and 124 Mpa (for TF 1). The same tendency of the hardness to decrease at the junction has also been observed in the case of healthy teeth, the values varying between 118 and 120 Mpa. At the dentin level, in the case of fluorotic teeth the variation interval for the hardness fluctuated between 57 Mpa (for TF 4) and 68 Mpa (for TF 1) in the external third and between 58 Mpa (for TF 3) and 74 Mpa (for TF 1) in the medial third. As regards the healthy teeth, the values for the dentin hardness oscillated between 58 and 68 Mpa in the external third and 66 and 73 Mpa in the medial third.

The data have been statistically analyzed by using the non-parametric Mann-Whitney test for independent samples. Statistically significant differences have been observed between the hardness values in the internal third of the enamel of the teeth with TF 2 ($p=0,043<0,05$), TF 3 ($p=0,029<0,05$) and respectively, TF 4 ($p=0,021<0,05$) and the hardness values in the same area of the healthy teeth, as well as between the hardness values at the enamel-dentin junction in the case of teeth with TF 4 when compare with the hardness values for healthy teeth ($p=0,020<0,05$).

Discussions

In the case of fluorotic teeth there have been demonstrated to exist certain structural changes at the level of the enamel, such as: the accentuation of the perikymata, large areas of hypoplasia and hypomineralization, the appearance of certain patterns of the irregular enamel rods, aspects which accentuate once the dental fluorosis aggravates (5, 6, 8, 15). This is how we can explain the more and more decreasing values of the hardness at the enamel level starting from the first degree towards the fourth degree.

In the case of fluorotic teeth we have discovered a slight decrease of the hardness values immediately under the surface area, which can be explained by the fact that the hypomineralization areas appear in the subsurface area, maintaining an extern area of enamel with a higher mineralization. This tendency of the mineralization to decrease with the rise of the degree of fluorosis becomes concrete in our study in a decrease of the hardness values in the internal third of the enamel in a statistically significant manner when compare with the hardness of the healthy teeth. In the healthy human enamel, the hardness values, the mineral content and the density gradually decrease from the surface to the enamel-dentin junction (8, 10, 13).

The low values of the hardness registered at the level of the enamel-dentin junction can be explained by the fact that this is a special area, where two types of tissues, different in structure, and not behaving like a binding area between the enamel and the dentin, meet.

The hardness values also vary at the dentin level. The tendency of the dentin hardness to decrease toward the enamel-dentin junction, as this study proved, confirms the data obtained by certain authors (11), but on the other hand contradicts the results of other studies (4, 15). The fact that the dentin is also affected by hypomineralization in fluorotic teeth (6) reflects in the more and more decreased hardness values. It is obvious that the hardness differences between the enamel and the dentin are also the result of the difference regarding the organic and anorganic material content of the two tissues, as it is well-known (1).

Conclusions

There has been observed a tendency of the enamel and dentin hardness to decrease with the rise of the degree of dental fluorosis, but the hardness differences in comparison with the healthy teeth have been statistically significant only at the level of the internal third of the enamel for the teeth with TF 2,3 and respectively, 4 and at the enamel-dentin junction for the teeth with TF 4.

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СРАВНИТЕЛЬНЫЙ АНАЛИЗ МИКРОТВЁРДОСТИ ЭМАЛИ И ДЕНТИНА ЗДОРОВЫХ ЗУБОВ И ПРИ ФЛЮОРОЗЕ

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Аннотация:

В этой работе исследуются микротвёрдость эмали и дентина зубов с флюорозом 1,2,3 и 4 степени (по класификации Thylstrup-Fejerskov), в сравнении с здоровыми тканями зубов. Микротвёрдость зубов исследуется по методу микроиндентации при помощи апарата Hanneman VEB Zeiss Jena. Результаты демонстрируют что твёрдость эмали и дентина зубов с флюорозом значительно снижается в различии от тех же структур при здоровых зубах, оссобенно, отмечаются статистические изменения в внутренней 1/3 эмали и на уровне дентино-эмалевой границе.

Ключевые слова:

микротвёрдость, флюороз, эмаль, дентин