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FEATURES OF MICROSCOPIC ANALYSIS OF NON-CARIES LESIONS OF TOOTH HARD TISSUES

Non-Caries Lesions of Tooth Hard Tissues, Specifically Abrasion, are a Common Phenomenon in Dentistry that Requires In-Depth Study Due to Their Significant Impact on the Tooth Structure and Overall Health of Patients. Abrasion Occurs as a Result of Mechanical Wear of Dental Tissue under the Influence of Physical Factors, Such as Hard Toothbrushes, Abrasive Cleaning Pastes, or Incorrect Tooth Brushing Techniques. As Cases of Abrasion Continue to Increase, Especially Among Individuals Who Do Not Follow Proper Oral Hygiene Practices, It Is Important to Use Modern Research Methods for Analysis and Diagnosis [1].

The Purpose of This Study is to Investigate the Microscopic Characteristics of Abrasion as a Non-Caries Lesion of Tooth Tissue, Identify Its Clinical Manifestations, and Examine the Mechanisms of Its Development.

The Issue of Abrasion is Relevant Since Improper Oral Hygiene Habits Can Lead to Serious Tooth Damage. The Use of Scanning Electron Microscopy (SEM) in Dental Practice Opens New Opportunities for Detailed Damage Analysis, Allowing for High-Resolution Images, Which Are Critically Important for Developing Effective Preventive and Therapeutic Strategies [1-3].

For the Study, Samples of Biomaterial Marked as Number 26 Were Used, Which Were Examined Using a Scanning Electron Microscope to Study the Microscopic Structure of Tooth Tissue.

Figure 1 Shows the Biomaterial Sample 26.



Figure 1 – Biomaterial Sample

The Analysis Revealed the Presence of Numerous Depressions and Cracks in the Enamel, Indicating Intense Mechanical Wear. Visual Changes in the Tooth Structure, Such as Enamel Loss and Deepening on the Tooth Surface, Confirm Typical Abrasion Manifestations. Scanning Electron Microscopy (SEM) Allows Detailed Observation of the Damaged Surface Structure with High Resolution, Providing Accurate Data on the Degree of Tooth Tissue Wear [4].

Additionally, Microscopic Analysis Found That Key Factors Contributing to Abrasion Development Include Not Only Incorrect Tooth Brushing Technique, But Also the Use of Hard Toothbrushes and Abrasive Pastes, Which Is Supported by the Research Data (Figure 2).

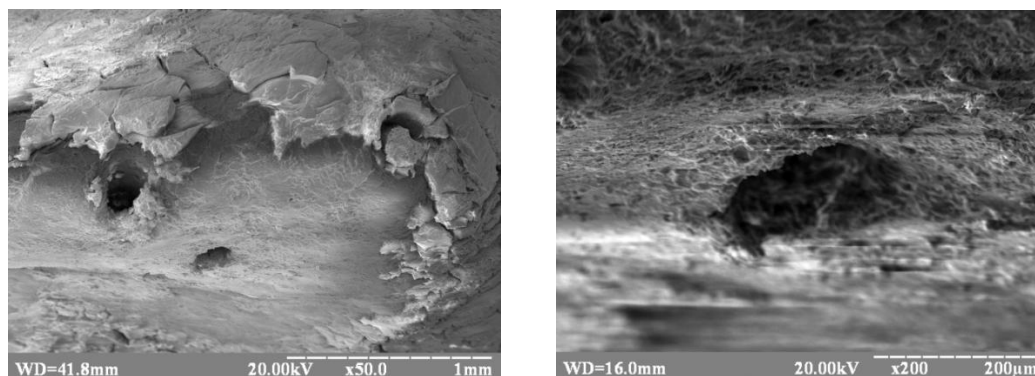


Figure 2 – Microscopic changes in dental tissue.

It is important to note that the research results not only confirm the existence of the abrasion problem but also reveal the mechanisms of its development, which forms the basis for further study and improvement of preventive measures.

Conclusions: Microscopic analysis of tooth hard tissue abrasion is an essential tool for identifying the typical signs of tooth wear, which have a significant impact on oral health. The use of scanning electron microscopy (SEM) in dental practice ensures accurate diagnosis of abrasion and other non-caries lesions at early stages. This, in turn, allows for the development of effective treatment and prevention methods. Preventive measures such as educating patients on proper tooth brushing techniques and using soft toothbrushes are recommended, as they significantly reduce the risk of abrasion and improve the overall condition of the oral cavity.

REFERENCES

1. Materials Science and Dental Equipment. Educational and Methodological Guide for Practical Classes on Materials Science for 2nd Year Students of the Dental Faculty. 2nd Edition / S.B. Kostenko, P.A. Hasyuk, A.I. Foros, A.T. Kenyuk, I.V. Penzylyk – Uzhhorod: PP "AUTDOR-SHARK," 2019 – 143 p.
2. Fundamentals of Biomaterials Science: Educational Guide / O.V. Savvova, H.K. Voronov, O.I. Fesenko, O.I. Pylypenko; Kharkiv National University of Urban Economy named after O.M. Beketov. – Kharkiv: KhNUUE named after O.M. Beketov, 2023. – 202 p.
3. Korol, M.D. "Materials Science in Dentistry." Educational Guide for Students of Dental Faculties. – Vinnytsia: NOVA KNYHA. – 2008. – 240 p.
4. Antonyuk V.S., Tymchyk H.S., Bondarenko Y.Y. Methods and Tools of Microscopy: Kyiv: NTUU "KPI," 2013. – 336 p.