

**МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ  
БУКОВИНСЬКИЙ ДЕРЖАВНИЙ МЕДИЧНИЙ УНІВЕРСИТЕТ»**



## **МАТЕРІАЛИ**

**104-ї підсумкової науково-практичної конференції  
з міжнародною участю  
професорсько-викладацького персоналу  
БУКОВИНСЬКОГО ДЕРЖАВНОГО МЕДИЧНОГО УНІВЕРСИТЕТУ  
06, 08, 13 лютого 2023 року**

Конференція внесена до Реєстру заходів безперервного професійного розвитку,  
які проводитимуться у 2023 році №5500074

**Чернівці – 2023**

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## **PULP EXPOSURE MANAGEMENT IN VITAL PERMANENT TEETH WITH UNFINISHED ROOT FORMATION**

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**Introduction.** Therapeutic strategies focussed on the pulp preservation, are important when managing vital teeth with deep caries and an exposed pulp, especially in teeth with unfinished root formation (Duncan Henry F., 2022). Preservation of pulpal vitality in immature permanent teeth is essential to enable further root development and apical closure (Tong Huei Jinn et al, 2022). Studies have shown that the retention rate of endodontically treated teeth is significantly lower than that of vital teeth. With the progress of the concept of tissue regeneration and the development of biological materials, dentists are searching for new endodontic treatments to increase the retention rates (Wang Ziyang; Zuo, Enjun, 2022). One of them is vital pulp therapy (VPT).

**The aim of the study** to evaluate the evidence regarding the efficacy, presented clinical success of techniques and materials used for pulp exposure management in vital immature permanent teeth.

**Materials and methods.** Bibliosemantic, content analysis by using search databases (Medline, Scopus, Web of Science, Embase). Materials used in VPT should have special properties, such as the ability to induce mineralization and normal root development, to create an adequate seal and to eliminate bacteria (D. Witherspoon, 2008). Nowadays, Ca(OH)<sub>2</sub> and mineral trioxide aggregate (MTA) are the materials of choice according to different studies (D. Witherspoon, 2008; D. Witherspoon et al, 2018; L. Sawicki et al, 2017; E. Sirén et al, 2018). Calcium hydroxide has been regarded as the “gold standard” for direct pulp capping as a method of VPT for a long time. To date, according to the literature the success rates of Ca(OH)<sub>2</sub> pulp-capping in a review of 19 clinical studies, including over 2,400 cases, were about 50% to almost 90%, but only if carried out by an experienced clinical dentists.

**Results.** Most studies illustrated comparable pulp cap outcomes of MTA and Ca(OH)<sub>2</sub>. In a study using 22 permanent teeth after VPT was possible to observe better pulp healing was demonstrated in MTA groups versus Ca(OH)<sub>2</sub> groups. After extraction of teeth histological evaluation at 6 month intervals revealed less pulpal hyperemia, less inflammation and necrosis, and more predictable and consistent dentinal bridge formation in the MTA-treated teeth (M. Aeinehchi et al, 2013). Similar results have been reported by other investigators (L. Bjørndal et al, 2010; F. Leye Benoist et al, 2010; J Mente et al, 2013; T. Naito, 2010; A. Nowicka et al, 2018). The 5-year success rate direct pulp capping with Ca(OH)<sub>2</sub> in permanent teeth was about 59-69% and for MTA was 78-98%. MTA appears to be more effective than Ca(OH)<sub>2</sub> for maintaining long-term pulp vitality after direct pulp capping (J Mente et al, 2013; T. Naito et al, 2020). In addition, the wide-open apices and high vascularity of immature permanent teeth enhance the successful outcome of direct capping techniques (P. Aguilar, P. Linsuwanont, 2015).

**Conclusions.** Thus, in minimally invasive treatment, healthy dental pulp should be retained as far as possible as well as preservation of the integrity of residual dental hard tissues. Preservation of vital pulp is important to both immature permanent teeth and mature permanent teeth. It can help to improve prognosis and increase the retention rates. Mineral trioxide aggregate appears to be more effective than Ca(OH)<sub>2</sub> for maintaining long-term pulp vitality after different methods of vital pulp therapy in particular direct pulp capping.