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Application of ozonotherapy in the treatment of primary smooth surface caries. Case study

Ozone is a light blue gas with a characteristic smell, present in the stratosphere surrounding our planet. Ozone is created from oxygen as a result of atmospheric pressure discharges and some chemical reactions. Ozone used in medicine is characterized by strong bactericidal, fungicidal, and virucidal properties. It activates the immune system by producing cytokines which perform the function of an immune response mediator. Oxidizing properties of that gas have also been used in fighting cariogenic bacteria and their metabolites. The effective ozone action consists in protein oxidation, which leads to the destruction of cariogenic bacteria in dental cavities. Ozone also causes the oxidation of bacterial metabolites and precludes the use of such metabolites by developing bacterial flora. Ozonotherapy used in dentistry enables the destruction of cariogenic bacteria, facilitates remineralization of dental tissues, abolition of tooth neck hypersensitivity, abolition of hyperalgesia, disinfection of dental cavities and disinfection of root canals (1–5).

Current tendencies in dentistry corresponding with up-to-date trends propagated by the Academy of Minimally Invasive Dentistry and European Society of Preventive Dentistry, aimed at using treatment methods maximally preserving dental tissues, incline dentists to take advantage of ozone therapy.

The aim of the study was to evaluate the effectiveness of ozone application to the treatment of primary dental caries located on dental smooth surfaces.

CASE STUDY

The study presents the case of the patient S.W., aged 12, with subsurface demineralization in the incisors and canine teeth of the lower and upper jaws (13, 12, 11, 21, 22, 23, 33, 32, 31, 41, 42, 43). The depth of the cavities was diagnosed with the use of the diagnostic laser DIAGNOdent, made by KaVo company, which measures fluorescence of dental hard tissues induced by laser beam, which allows to assess the progression of dental caries. Prior to the examination, professional cleaning of the teeth was conducted. Depending on DIAGNOdent indications ozone was applied on the labial surfaces of the teeth with lesions using HealOzone system by KaVo company. That device doses ozone in a controlled manner, which makes the operation 100% safe. HealOzone takes oxygen from the air and converts it into ozone which is subsequently applied to a tooth with caries wrapped in a special, sterile, silicone, tight hood. The duration of ozonotherapy was from 40 to 60 seconds. The therapeutic session ended with rubbing the liquid initiating remineralization in the tooth surfaces. The liquid contains the compounds of fluorine, calcium, phosphorus and xylitol. Then, the patient was informed how to use the remineralization set. Simultaneously, oral hygiene

instruction was conducted. The follow-up examination was performed after the period of six months and documentation was prepared at the same time (Table 1).

Table 1. Indications of DIAGNOdent during following visits

Tooth	Indications of DIAGNOdent		
	Visit 1	Visit 2	Visit 3
13	5	3	2
12	13	8	6
11	16	5	6
21	23	18	7
22	15	11	8
23	2	3	2
33	3	2	2
32	5	9	4
31	7	4	5
41	4	5	4
42	5	6	4
43	3	2	2

DISCUSSION

In professional literature there are already reports on the effectiveness of ozonotherapy in many clinical cases comprising the treatment of primary dental caries and primary root caries. Ozone is also used in the treatment of medium and deep caries as a complement to the traditional (mechanical) method of cavity preparation (1–3).

In the described case of active caries present on the surfaces of many teeth of the young patient, the application of ozone allowed to inhibit the process of dental hard tissue disintegration, which was reflected by a decrease in DIAGNOdent indications during the following visits. That laser device enabled to monitor the progress in remineralization of dental tissues of the treated patient. Similar observations of inhibiting carious lesions were also made by Składnik-Jankowska et al. when using HealOzone on masticating surfaces of teeth with caries (6). Practical advices of ozonotherapy Wojtkowska-Wośko also observed applying HealOzone in carious cavities among children (7).

CONCLUSIONS

Controlled ozonotherapy proved the effectiveness of the applied method in the presented case, which encourages further observations.

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SUMMARY

The study presents the case of a patient with subsurface demineralization in the front teeth. The depth of the cavities was diagnosed with the use of the diagnostic laser DIAGNOdent, made by KaVo. Ozone was applied using HealOzone. The described method of the application of ozone allowed to inhibit the process of dental hard tissue disintegration.

Zastosowanie ozonu w leczeniu pierwotnych zmian próchnicowych powierzchni gładkich

W pracy przedstawiono przypadek pacjenta ze zmianami typu podpowierzchniowa demineralizacja, obecnymi na zębach przednich. Do diagnostyki głębokości ubytków użyto lasera diagnostycznego DIAGNOdent firmy KaVo, zaś w leczeniu zastosowano ozonoterapię, stosując HealOzone. Zastosowana metoda lecznicza pozwoliła na zahamowanie procesu rozpadu twardych tkanek zębów.