ISSN NO: 2770-2936
Date of Publication:20-09-2022

Results of Microbiological Study of Sterility of Domestic Osteoplastic Material "OSS.UZ"

Khabilov Bekhzod Nigmon ugli
Associate Professor of the Department of Faculty Orthopedic Dentistry
Tashkent State Dental Institute

Abstract: Air is one of the most significant factors of microbial pollution. Usually, mechanical particles that pollute the air are carriers of microflora. The results of microbiological study of osteoplastic material after radiation exposure are considered equal. Prior to sterilization, the osteoplastic material was packaged. Research has revealed the best dosage of radiation to sterilize both components Oss.uz

Keywords: sterilization, radiation, osteoplastic material, microbiological studies.

Infection control procedures have become an integral part of modern dentistry and have had a huge impact on all clinical practice. Current research on infection control procedures aimed at reducing the number of microbes on dental materials consisting of powder and liquid is not very much devoted to work. There is also little research data on the radiation method of sterilization, which often leads to satisfactory results.

The aim of the study was to find the best dosage for sterilization of Oss.uz, a domestic osteoreplacement material. During the course of the study, special attention was paid to the prevention of seal failure of the packaged test materials. After the introduction of strains into Eppendorf tubes, all experimental procedures were carried out in an anaerobic chamber, which guaranteed an optimal environment for the growth of the three bacterial species mentioned above. The task was to study the effectiveness of the radiation sterilization procedure for dental material consisting of powder and liquid extracted from the factory packaging for the presence of bacteria.

Radiation radiation was carried out at the Institute of Nuclear Physics M.Yu.Tashmetov. In the present study, 15 grams divided into 3 vials of 5 grams and 15 ml of liquid into 3 vials of 5 ml were used. All vials were placed in sealed bags for 12 minutes and subjected to steam treatment in radiation sterilization at 1*106 Rad, 1.5*106 Rad and 2*106 Rad at a temperature in the irradiation zone of 20 0C. (Fig 1 and 2)

Sterility studies were carried out in the management of the Tashkent Center for Sanitary and Epidemiological Welfare and the State Health Service under the Ministry of Health of the Republic of Uzbekistan. The sterility of finished medicinal products was tested by direct inoculation or membrane filtration using liquid thioglycol (mercaptoacetic) medium for bacteria isolation and liquid Sabouraud medium for fungal detection.

Rice. 1. Radiation devices UIM2-2D, DKG-02U

ISSN NO: 2770-2936
Date of Publication:20-09-2022

Rice. 2. Sterilized materials in sealed packaging.

Determining the number of bacteria

The sterility test is carried out under aseptic conditions, in boxes, preferably under sterile laminar air flow, in sterile antistatic clothing. 2 hours before the start of work in the box, bactericidal lamps were turned on to disinfect the air and surfaces. The air in the box was regularly checked for microbial contamination. To do this, Petri dishes with MPA, Sabouraud medium and thioglycol (mercaptoacetic) medium are left open for 15 minutes, then closed and kept in a thermostat at 370 C for 48 hours. There should not be more than 5 colonies on the dish, more of them indicate a high contamination of the box . There should be no mold and yeast fungi in the air of the box. Work in boxing is done in sterile gowns and slippers.

The pre-sterilized powder was scattered over the entire surface of the cup with M009 medium at 32 0C and M013 at 20-22 0C and incubated for seven days, and then their contents were examined for the presence of bacteria.

To determine microbial contamination, non-injectable medicinal products are subjected to bacteriological examination in order to determine the number of saprophytic bacteria, yeasts and molds in them, as well as the presence of bacteria of the genera Enterobacteriaceae, species Staphylococcus aureus, Pseudomonas aeruginosa.

The crops were checked daily. In the absence of microorganisms in all test tubes, a conclusion was made about the sterility of the dental material, with signs of microflora growth in test tubes, the material was considered not sterile.

For each of the samples, the average number of colony-forming units (CFU) per 1 milliliter of solution (CFU/ml) was calculated. Multiple linear regressions were used to compare the effectiveness of different radiation doses. Differences at $p < 0.05$ were considered statistically significant.

The results of the study of the sterility of the components of the domestic osteoreplacement material Oss.uz Tables 1 and 2

Tab 1
The number of recognizable bacteria on samples with different proportions of radiation exposure, CFU / ml

Study groups	Components of osteoreplacement material	
	Powder Liquid	Powder Liquid
Strelization was carried out under irradiation 1*106 Rad	28f	45f
Strelization was carried out under irradiation 1.5*106 Rad	20f	Of
Strelization was carried out under irradiation 2*106	Of	Of

*According to the results of the study, after intentional contamination, on samples that were exposed to irradiation of 1 * 106, a significantly larger number of bacteria was detected than on other samples.

ISSN NO: 2770-2936
Date of Publication:20-09-2022

The results of identification and counting of colonies of microorganisms after sterilization of osteoreplacement material Oss.uz

№	Microorganisms after sterilization	КОЕ/г		
		$1*10^6$ рад	$1,5*10^6$ рад	$2*10^6$ рад
1	enterobacteriaceae,	$0,6*10^4$	$0,4*10^3$	abs
2	Staphylococcus aureus	abs	abs	abs
3	Pseudomonas aeruginosa	$0,3*10^3$	$0,2*10^2$	abs

The results of the study revealed a significantly lower number of bacteria on samples that underwent a purification procedure equal to 2 * 106 rad. However, in samples with a purification dose of 1 and 1.5 * 106 rad, no bacteria of the genus Staphylococcus aureus were found.

Multiple linear regression analysis did not reveal significant differences in samples with recognizable bacteria after undergoing purification procedures. The level of statistical significance was 0.02. The average bacterial reduction achieved after the above cleaning procedures can be expressed as a percentage. For samples with an irradiation dose of 1*106 rad, this figure was 94.4%;

Conclusions

The results of this study indicate that differences in the dosage of radiation have an impact on the effectiveness of sterilization, while the liquid of the object under study more often demonstrates the complete absence of bacteria, compared with the powder of the bone substitute material. The best sterilization efficiency results for both parts were observed using 2*106 rad radiation.

References

1. Atlas R. M. Handbook of Microbiological Media. London: CRC Press Inc, 1993.
2. Block S. Disinfection, Sterilization and Preservation. 5th edn. Philadelphia: Lea & Febiger, 2001.
3. Houghton D. S. President's Comments. Australian Dental Association News Bulletin. September, 2003.
4. National Health and Medical Research Council of Australia. Infection Control in the Health Care Setting. Canberra: Australian Government Publishing Service, 2002.
5. Акбаров А.Н., Зиядуллаева Н.С., Хабилов Б.Н. Использование костнопластических материалов для восстановления полостных дефектов челюстно-лицевых костей. "Stomatologiya" научно-практический журнал Узбекистана, 2019, №2-С.107-110.
6. Стерилизация медицинских изделий. Микробиологические методы. ГОСТ от 19 декабря 2012 г., № ISO 11737-1-2012.
7. Хабилов Б.Н. Технологические параметры получения пастообразного остеопластического материала. Eurasian journal of academic research Volume 2 Issue 5, May 2022, p 457-460
8. ПРЕИМУЩЕСТВА ВРЕМЕННЫХ НЕСЪЕМНЫХ ФРЕЗЕРОВАННЫХ И ПОЛИМЕРИЗОВАННЫХ ПЛАСТМАССОВЫХ ПРОТЕЗОВ НА ИМПЛАНТАТАХ АН Акбаров, ХБ Нигманович, ХД Нигманович… - БАРҚАРОРЛИК ВА ЕТАКЧИ ТАДҚИҚОТЛАР …, 2021
9. ПРЕИМУЩЕСТВА ВРЕМЕННЫХ НЕСЪЕМНЫХ ФРЕЗЕРОВАННЫХ И ПОЛИМЕРИЗОВАННЫХ ПЛАСТМАССОВЫХ ПРОТЕЗОВ НА ИМПЛАНТАТАХ АН Акбаров, ХБ Нигманович, ХД Нигманович… - БАРҚАРОРЛИК ВА ЕТАКЧИ ТАДҚИҚОТЛАР …, 2021