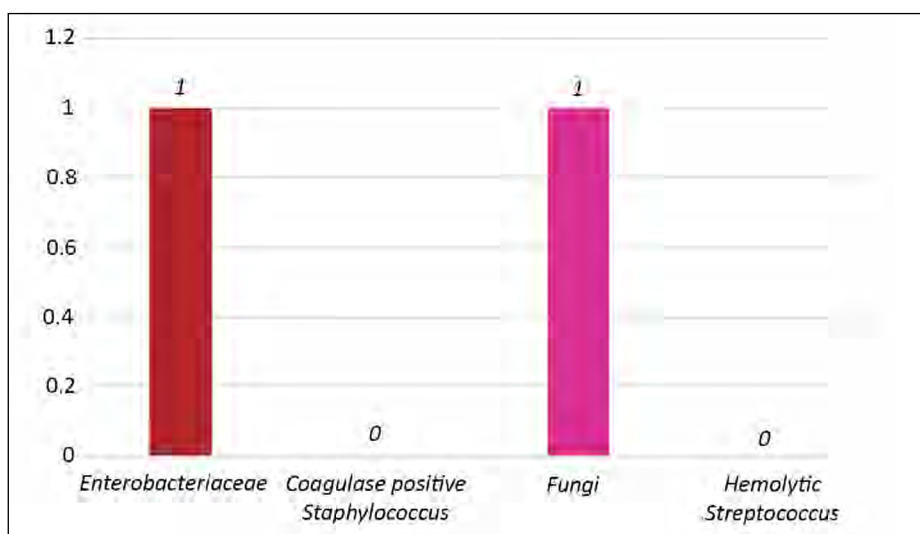


**FIGURE 6.** Microbial distribution according to the number of patients after the fourth stage of the treatment session (after rinsing with ethyl alcohol based mouth wash)



**FIGURE 7.** Microbial distribution according to the number of patients after the fourth stage of the treatment session (after rinsing with cetylpyridinium chloride mouthwash).

The results obtained from this study are in agreement with the results obtained in other studies regarding the effect of chlorhexidine (15-18), ethyl alcohol (19-21) or cetylpyridine chloride (22-24) on the control of bacterial contamination of the brackets in patients undergoing orthodontic treatments with fixed appliances.

### CONCLUSIONS

These auxiliary elements used in orthodontics and dentofacial orthopedics, which are the metal brackets, cemented on the teeth, represent extremely retentive elements for the dental microbial plaque, therefore, in addition to the regular specialized consultation, it must be performed for the professional scaling and brushing, at predetermined time intervals.

All mouthwashes, regardless of the basic substance (chlorhexidine, ethyl alcohol, cetylpyridinium chloride), have proven their effectiveness in a similar way over all categories of isolated microorganisms.

It is necessary to insist on the fact that, due to their toxicity and aggressiveness, these disinfectant substances that enter the composition of the mouthwashes and which are part of the categories of disinfectants already established (biguanides, alcohols, quaternary ammonium salts), will be gradually replaced with certain herbal compounds, which have strong antiseptic properties: sage, pot marigold, peppermint, chamomile, sea buckthorn etc.

All patients with fixed dental appliances should be trained very effectively by the orthodontic and dentofacial orthopedic staff, in maintaining proper hygiene, through proper self-cleaning techniques.

It is necessary a permanent training of specialized medical personnel, regarding the appearance and use of new specific materials on the Romanian market of dental products.

## Acknowledgement

In this article, all the authors have equal contribution with the first author.






## REFERENCES

- Burlibaşa M, Dumitru SG, Tănase G, Sfarighiu L. Flora cavităţii bucale – element de contaminare directă și indirectă în reabilitarea implantato-protetică. În: Trăistaru T, Burlibaşa M, Ionescu I. Progrese în medicina dentară, Vol. III, Bucureşti: Ed. Ars Docendi, 2012: 48-63.
- Burlibaşa M, Ionescu I, Bodnar D et al. Aspecte teoretice și practice ale formării, dezvoltării și combaterii biofilmelor microbiene în medicina dentară. *Medicina Modernă*. 2008; 15(10):544-547.
- Burlibaşa L, Burlibaşa M, Ionescu I. Microflora cavităţii bucale – posibil factor de risc infecțios în practica stomatologică. *Sibiul Medical*. Ianuarie-Martie 2003; 14(1):43-45.
- Lazăr V. Aderența microbiană. Bucureşti: Ed. Academiei Române, 2003.
- Nolte AW. Oral Microbiology with Basic Microbiology and Immunology 4th Edition. St. Louis: CV Mosby Company, 1982.
- Burlibaşa M, Muntianu L, Tănase G et al. Study on microbial contamination of biomaterials in medical practice. *Metalurgia International*. 2010; 15 (Spec Issue)(2):163-166.
- Tănase G, Burlibaşa M, Muntianu L et al. Testing the antibacterial potential of biomaterials in medical practice. *Metalurgia International*. 2010; 15(Spec Issue)(2):160-162.
- Burlibaşa M, Tănase G, Muntianu L et al. Quality of life, a multidisciplinary concept with economic and social impacts in medical practice. *Metalurgia International*. 2010; 15 (Spec Issue) (4):88-90.
- Ispas DC, Eftene OA, Burlibaşa M et al. Implications of titanium in orthodontics and dental facial orthopedics. *Metalurgia International*. 2011; 16(10):72-74.
- Burlibaşa M, Cernuşcă-Mițariu M, Burcea CC et al. Halogen compounds – theoretical, physiological and practical aspects regarding the decontamination, disinfection and sterilisation of instruments and biomaterials in dental medicine practice. *Metalurgia International*. 2012; 18(Spec Issue 3):54-57.
- Burlibaşa M, Cernuşcă-Mițariu M, Cernuşcă-Mițariu S et al. Theoretical and practical aspects related to biomaterials decontamination in dental medicine (with reference to dental prosthetics). *Metalurgia International*. 2013; 18(4):261-267.
- Burlibaşa L, Domnariu C. Epigenetic landscape of human diseases. *Acta Medica Transilvanica*. 2018; 23(2):33-37.
- Bodnar DC, Burlibaşa L, Vârlan C et al. Mercury, biocompatibility and its impact on environment. *Metalurgia International*. 2009; 14:95-100.
- Cristache CM, Burlibaşa M, Cristache G et al. Zirconia and its biomedical applications. *Metalurgia International*. 2011; 16(7):18-23.
- Samar MAB, Mona AA, Ahmet SB et al. Effects of chlorhexidine (gel) application on bacterial levels and orthodontic brackets during orthodontic treatment. *J.Oral Scien*. 2016; 58(1):35-42.
- Juricic S, Kozomara D, Juric H et al. The influence of different types of brackets and efficacy of two chlorhexidine mouthwashes on oral hygiene and the incidence of white spot lesions in adolescents during the orthodontic therapy. *Psychiatr Danub*. 2016; 28 (Suppl 2): 247-252.
- Enita N, Dzemidzic V, Tiro A, Hadzic S. Antimicrobial activity of chlorhexidine in patients with fixed orthodontic appliances. *Brazilian Journal of Oral Sciences*, 2015: 10(2), 79-82.
- Shah SS, Nambiar S, Kamath D et al. Comparative Evaluation of Plaque Inhibitory and Antimicrobial Efficacy of Probiotic and Chlorhexidine Oral Rinses in Orthodontic Patients: A Randomized Clinical Trial. *Hindawi Intl J Dent*. 2019.
- Omidkhoda M, Poosti M, Sahebhasagh Z et al. Effects of three different mouthwashes on the surface characteristics of nickel-titanium and Stainless steel archwires in orthodontics. *Journal of Dental Materials and Techniques*, 2017; 6(1):19-26.
- Santana W, Tahar B, Mardiaty E, Salim J. The effect of alcoholic mouthwash, non-alcoholic mouthwash and artificial saliva towards the power chains force decay. *Padjadjaran Journal of Dentistry* 2017; 29(3):195-201.
- Haas AN, Pannuti CM, Andrade AK et al. Mouthwashes for the control of supragingival biofilm and gingivitis in orthodontic patients: Evidence-based recommendations for clinicians. *Braz Oral Res*. 2014 Jul 11;28(spe):1-8.
- Pahwa N, Kumar A, Gupta S. Short term clinical effectiveness of a 0.07% cetylpyridinium chloride mouth rinse in patients undergoing fixed orthodontic appliance treatment. *Saudi Dent J*. 2011 Jul;23(3):135-41.
- Albert-Kiszely A, Pjetursson BE, Salvi GE et al. Comparison of the Effects of Cetylpyridinium Chloride With an Essential Oil Mouth Rinse on Dental Plaque and Gingivitis – A Six-Month Randomized Controlled Clinical Trial. *J Clin Periodontol*. 2007; 34(8):658-667.
- Yang SJ, Han SH, Lee AR et al. Evaluation of antimicrobial effects of commercial mouthwashes utilized in South Korea. *BMB Rep*. 2015;48(1):42-47.