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A NOVEL DOMESTIC HYGIENIC POWDER FOR CLEANING REMOVABLE DENTURES: CLINICAL AND MICROBIOLOGICAL EVALUATION

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ABSTRACT

Background: Denture surfaces promote microbial adhesion and biofilm formation, increasing the risk of inflammatory oral diseases. Objective: To evaluate the clinical and microbiological effectiveness of a newly developed domestic hygienic powder for cleaning removable dentures compared with mechanical cleaning and Corega Bio Formula tablets. Methods: A comparative clinical study was conducted among patients wearing acrylic and nylon removable dentures. Microbial samples were collected at baseline, after 1 month, and after 3 months. Results: The novel hygienic powder demonstrated the most pronounced reduction in microbial load, including Streptococcus spp. and Candida spp. Conclusion: The developed powder provides superior antimicrobial efficacy and supports its implementation in prosthetic practice.

Keywords: Removable dentures; denture hygiene; biofilm; Candida spp.; antimicrobial activity; prosthetic dentistry.

INTRODUCTION

Removable dentures remain widely used in prosthetic dentistry, particularly among elderly patients. However, acrylic and thermoplastic denture base materials provide favorable conditions for microbial colonization. Accumulation

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of opportunistic microorganisms such as Streptococcus spp., Staphylococcus spp., and Candida spp. may lead to denture stomatitis. Mechanical cleaning is commonly used but often insufficient. Commercial cleansing agents exist, yet cost and long-term compliance remain concerns. The aim of this study was to evaluate the effectiveness of a novel domestic hygienic powder for denture cleaning.

MATERIALS AND METHODS

A comparative clinical and microbiological study was conducted over a three-month period. Patients wearing removable dentures were divided into three groups: Group I – mechanical cleaning; Group II – Corega Bio Formula; Group III – novel hygienic powder. Microbial assessment was performed at baseline, after 1 month, and after 3 months. Microbial counts were expressed in log CFU/ml. Statistical analysis was performed using variation statistics. Patients wearing removable dentures were divided into three groups: Group I – Mechanical Cleaning Daily brushing with toothbrush and toothpaste. Acrylic dentures (n=15) Nylon dentures (n=10) Group II – Corega Bio Formula Soaking dentures according to manufacturer instructions. Acrylic dentures (n=10) Nylon dentures (n=10) . Group III – Novel Hygienic Powder Cleaning according to the developed protocol. Acrylic dentures (n=10) Nylon dentures (n=10).

RESULTS

Baseline analysis revealed high microbial contamination of denture surfaces. After 1 month, mechanical cleaning showed moderate reduction, while Corega demonstrated improved antimicrobial activity. The novel hygienic powder showed the most significant decrease in microbial load. After 3 months, Streptococcus spp. and Candida spp. counts were significantly reduced in the powder group, with certain pathogens not detected.

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Table 1. Microbial composition of acrylic removable dentures (log CFU/ml, M±m)

Microorganism	Baseline	Mechanical (1 mo)	Mechanical (3 mo)	Corega (1 mo)	Corega (3 mo)	New Powder (1 mo)	New Powder (3 mo)
Streptococcus spp.	4.52±0.14	3.1±0.4	3.0±0.4	1.1±0.2	1.0±0.2	1.5±0.2	1.4±0.2
Staphylococcus spp.	2.76±0.13	2.1±0.3	2.0±0.3	0.5±0.1	0.4±0.1	0.6±0.1	0.6±0.1
Enterococcus spp.	0.82±0.08	0.6±0.1	0.5±0.1	-	-	-	-
Actinomycetes	2.18±0.12	1.6±0.2	1.5±0.2	0.4±0.1	0.4±0.1	0.5±0.1	0.4±0.1
Enterobacteriaceae	1.41±0.09	1.1±0.2	1.0±0.2	0.3±0.1	-	0.4±0.1	-
Klebsiella spp.	1.00±0.07	0.6±0.1	0.5±0.1	-	-	-	-
Pseudomonas aeruginosa	0.45±0.05	1.1±0.2	1.0±0.2	-	-	-	-
Candida spp.	2.34±0.11	1.6±0.3	1.5±0.3	0.8±0.2	0.65±0.2	0.9±0.2	0.45±0.2

Table 2. Microbial composition of nylon removable dentures (log CFU/ml, M±m)

Microorganism	Baseline	Mechanical (1 mo)	Mechanical (3 mo)	Corega (1 mo)	Corega (3 mo)	New Powder (1 mo)	New Powder (3 mo)
Streptococcus spp.	3.12±0.11	2.0±0.3	1.9±0.3	0.8±0.1	0.7±0.1	1.0±0.2	0.9±0.2
Staphylococcus spp.	1.56±0.09	1.0±0.2	0.9±0.2	0.3±0.1	0.2±0.1	0.4±0.1	0.3±0.1
Enterococcus spp.	0.35±0.04	0.2±0.0	0.2±0.0	-	-	-	-
Actinomycetes	1.14±0.07	0.8±0.1	0.7±0.1	0.2±0.0	0.2±0.0	0.3±0.0	0.2±0.0
Enterobacteriaceae	0.62±0.05	0.4±0.1	0.3±0.1	-	-	-	-
Klebsiella spp.	0.38±0.04	0.2±0.0	0.1±0.0	-	-	-	-
Pseudomonas aeruginosa	0.15±0.02	0.2±0.0	0.1±0.0	-	-	-	-
Candida spp.	1.24±0.08	0.8±0.2	0.7±0.2	0.3±0.1	0.2±0.1	0.3±0.1	0.2±0.1

DISCUSSION

The findings confirm that mechanical cleaning alone does not provide adequate microbial control. Although Corega tablets improve hygiene outcomes, the novel hygienic powder demonstrated superior and more stable antimicrobial activity

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across both acrylic and nylon dentures. These results support its clinical effectiveness and practical relevance. Microbiological analysis showed a reduction in denture biofilm contamination in all groups after 1 and 3 months; however, the degree of reduction depended on the hygiene method and denture material. In acrylic dentures, mechanical cleaning resulted in moderate decreases, with Streptococcus spp. remaining at 3.0±0.4 log CFU/ml and Candida spp. at 1.5±0.3 log CFU/ml after 3 months. Corega tablets demonstrated greater effectiveness, reducing Streptococcus spp. to 1.0±0.2 and Candida spp. to 0.65±0.2 log CFU/ml. The novel hygienic powder provided a stable and pronounced antimicrobial effect, decreasing Streptococcus spp. to 1.4±0.2 and Candida spp. to 0.45±0.2 log CFU/ml; several Gram-negative microorganisms were not detected after 3 months of use. A similar pattern was observed in nylon dentures, where mechanical cleaning showed limited efficacy, while Corega and the new powder significantly reduced microbial contamination. The lowest microbial values were recorded in the novel powder group, with Streptococcus spp. reduced to 0.9±0.2 and Candida spp. to 0.2±0.1 log CFU/ml. Overall, the developed domestic hygienic powder demonstrated the most consistent reduction of bacterial and fungal microflora compared with mechanical cleaning and Corega tablets in both acrylic and nylon removable dentures.

CONCLUSION

The newly developed domestic hygienic powder significantly reduces denture microbial contamination and demonstrates superior antimicrobial efficacy compared to mechanical cleaning. Its use is recommended in clinical prosthetic dentistry practice.

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