ASSESSMENT OF ANTIBACTERIAL PROPERTY OF SILVER COATED STAINLESS STEEL ORTHODONTIC BRACKETS AGAINST STREPTOCOCCUS MUTANS, LACTOBACILLUS ACIDOPHILUS AND PORPHYROMONAS GINGIVALIS – AN IN VITRO STUDY

Abstract:

Introduction:

Fixed orthodontic treatment is the preferred and most common method for treating malocclusion. Oral environment with fixed orthodontic appliance provides conducive conditions for colonization of microorganisms as a result of their inherent morphologic irregularities. White spot lesions and gingivitis are most common sequelae of fixed orthodontic appliance therapy. Studies have revealed that silver nanoparticles have antimicrobial property against bacteria, fungi and protozoa.

Aim:

To assess antibacterial property of silver coated stainless steel orthodontic brackets against S. mutans, L. acidophilus, P. gingivalis.

Method:

This study was done on 120 specimens of stainless steel orthodontic brackets. The specimens were divided into three control groups and three experimental groups. Each group consisted of 20 specimens. The groups containing uncoated stainless steel brackets acted as control group for their respective experimental group, containing coated stainless steel brackets. Group 1A (Control), Group 1B (Experimental) were tested against S. mutans. Group 2A (Control group), Group 2B (Experimental) were tested against L. acidophilus.
Group 3A (Control group), Group 3B (Experimental group) were tested against P. gingivalis. Silver coating of orthodontic brackets was carried out by Magnetron sputtering method. Brackets were then subjected to microbiological tests for assessment of the antibacterial property. Anti bacterial property of silver coated and uncoated brackets were assessed by counting Colony Forming Units (CFUs) for S. mutans, L. acidophilus. Anti bacterial property of silver coated and uncoated brackets were demonstrated by spectrophotometry for P. gingivalis. Reduction in optical density was measured.

**Results:**

The groups containing silver coated brackets showed statistically significant decrease in the survival rate of S. mutans and L. Acidophilus when compared to groups containing uncoated Brackets. The groups containing silver coated brackets showed statistically significant decrease in optical density when compared to groups containing uncoated Brackets for P. gingivalis.

**Conclusions:**

Silver coating of stainless steel orthodontic brackets can be used to prevent development of dental plaque, thereby controlling the dental caries and periodontal disease.

**Keywords:**

Orthodontic Brackets, Antibacterial properties, Silver coating, Streptococcus mutans, Lactobacillus acidophilus and Porphyromonas gingivalis, Colony Forming Unit.