EFFECT OF MOBILE PHONE USE WITH AND WITHOUT EARPHONES ON SALIVARY NICKEL ION RELEASE FROM FIXED ORTHODONTIC APPLIANCES – A CROSS OVER TRIAL

ABSTRACT

Background: Due to the enormous increase in their usage throughout the world, the effect of cell phone radiation on human health has been an area of recent interest. Mobile phones emit electromagnetic radiation in the microwave range which may be harmful to human health. Based on the proximity of mobile phones to the oral cavity, during the conversation period and the presence of the metallic orthodontic appliances in the mouth, there might be a serious risk of exposure of these appliances to the radiofrequency electromagnetic radiations emitted by the mobile phones, leading to the release of toxic corrosion products into the saliva.

Aim: To evaluate the effect of exposure to radiofrequency electromagnetic fields emitted by mobile phones when used with and without earphones on the level of nickel in saliva.

Materials and Methods: 20 subjects who have been undergoing fixed orthodontic treatment for at least 2 months and no more than 4 months were selected for the study. The patients were asked to refrain from cell phone use for 1 week. They were then divided into 2 subgroups of 10 subjects each viz Subgroup A: Group using mobile phones placed directly against the ear and Subgroup B using mobile phones only with earphones during the second week. During the third week, the participants were again asked to refrain from cell phone use. In the fourth week participants of Subgroup A and Subgroup B were exchanged. They were then instructed to use their cell phones (with and without earphones) for the same number of minutes that they had used in the second week of the study. Saliva samples were collected at the end of weeks 1, 2, 3 and 4 for analysis of nickel ion levels using inductively coupled plasma mass spectrometry. Mann Whitney test, Wilcoxon Signed Rank test and Spearman’s Rank Correlation tests were used to analyse the data.
**Results:** Statistical analysis showed that there was a significant reduction in the mean level of salivary nickel ions on using earphones with mobile phones when compared to using mobile phones directly placed against the ear.

**Conclusion:** The use of ear phones helps in reducing the release of nickel ions from fixed orthodontic appliances when exposed to mobile phone radiation.