

The relationship between bone mineral density (by DEXA scan) and oral health status in Iranian women older than 30-year-old

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Background:

As skeletal bones and teeth are tissues with similar structures and origins, it is possible that both can be affected by similar metabolic disturbances and the same process could lead to bone loss and dental problems. Therefore, we aimed to evaluate dental and periodontal condition in relation to bone mineral density (BMD).

The objective of this study was to evaluate the effect of different thermomechanical treatments on the mechanical behavior of rotary files under bending and torsion conditions using finite element analysis. Fractures of the orbit are a common occurrence following facial trauma. However, not all require surgical repair. Criteria for repair currently vary, depending on CT appearances, clinical features and patient's preferences. This study looks at those patients attending Northwick Park Hospital oral and maxillofacial surgery department with orbital fractures in the last 3 years and their subsequent management. To evaluate the effect of an experimentally prepared nano-hydroxyapatite (NHAP) and commercially available amorphous calcium phosphate (ACP) remineralizing agents on the chemical analysis of bleached enamel.

The aim of this study was to evaluate the effect of three different concentrations of Guava extract on *Streptococcus* and *Lactobacillus* bacteria

Methods:

Fifty-nine women older than 30 that had undergone dual-energy X-ray absorptiometry during 2016-2017, in Shiraz, Iran, were given dental (decayed, missing, filled teeth/DMFT) and periodontal examination (periodontal disease index/PDI, oral hygiene index/OHI). Their BMD based on T-score and Z-score was also recorded. Data were statistically analyzed using SPSS (22). Chi-square, independent samples t-test, regression test and ANOVA were used and $P < 0.05$. A geometric model of a file (25/.06) with triangular cross section was created. The file FE model was built using CAD software. The same FE file model was used to create four models with different material properties, the data for the M-wire, CM wire, R-phase and NiTi alloys were obtained from the literature. The mechanical behavior of the four models under bending and torsion was analyzed mathematically in solid works software package.

Data was collected retrospectively from 01/01/2015 to 22/11/2018. All patients within the Trust who had CT and X-Ray facial bones, CT orbits and MRI orbits were included.

From this data, patients who had orbital fractures were identified. The hospital records were then reviewed, noting which patients had surgical management, the reasons for repair and timing of repair. Non-surgical cases and post operative complications were also recorded. Thirty-five upper anterior bovine teeth were prepared for this study. The teeth had their roots removed at the Cemento-Enamel Junction (CEJ), and the pulp chambers were sealed using acrylic-resin. The teeth were randomly divided into two main groups; the control group ($n=7$), which did not receive any bleaching treatment (baseline), and the experimental group ($n=28$); which was further divided into two subgroups ($n=14$) representing the photo-activated and chemically-activated in-office bleaching agents that were applied to the enamel surface according to their manufacturer instructions. Each subgroup was further divided into two divisions ($n=7$) receiving the experimentally prepared NHAP and the commercially available ACP remineralizing agents. The chemical analysis of the calcium and phosphorus ion levels was performed using an environmental energy dispersive x-ray analysis (EDX). Guava extract was prepared by extracting it from the plant leaves in the laboratory of Faculty of Pharmaceutical Department and three concentration was obtained (1%, 0.5%, 0.25%). Plaque and salivary samples were obtained from volunteer's children patients and *Streptococcus mutans* and *Lactobacillus* bacteria was assessed. The efficacy of the three concentrations was evaluated against those bacteria through a well-diffusion method employing 10 ml of each solution per well.

Result:

There was a negative correlation between DMFT and T-score of spine and femur ($r=-0.280$, $p=0.032$ and $r=-0.284$, $p=0.029$ respectively). No association was found between PDI and T-scores or Z-scores for BMD ($p > 0.05$). Also, there was a significant negative correlation between number of missing teeth and T-score of both femoral and spinal regions ($r=-0.277$, $p=0.034$ & $r=-0.390$, $p=0.002$ respectively); however, such an association was not found with Z-scores ($p=0.430$ and $p=0.081$ respectively). Additionally, a strong positive correlation was observed between OHI and DMFT. ($r=0.440$, $p=0.008$).

The results showed that both photo-activated and chemically-activated in-office bleaching systems had slightly affected the chemistry of enamel surface. There was no statistically significant difference between both bleaching agent groups.

Our results showed that there was a significant difference on

using the extracts on *Streptococcus mutans* diameter inhibition zone in 0.25% and 1% concentrations. While on using the 0.5% concentration, there was no significant difference. Regarding the *Lactobacillus* diameter inhibition zone, there was a significant inhibition zone after using guava extract in different concentration including 1% and 0.25% while the 0.5% concentration showed no significant difference.

Conclusion:

In this investigation, a negative association between BMD and oral health condition was found. It suggests that inadequate bone mass could coexist with a worse oral health condition; nevertheless, further studies are required to confirm that. Thermomechanical treatment of rotary instruments resulted in improving the flexibility and the torsional resistance of these files.

Currently, there are no rigid and evidence based guidelines that enable us to clearly decide management for orbital fractures. Practices may vary widely and should be based on risk benefit analysis. Our results will illustrate our departmental guidelines and may help others attain a clear idea of how often and when to repair orbital fractures. The application of the experimental NHAP remineralizing agent following bleaching procedures did not significantly alter the calcium and phosphorus ion levels in the bleached enamel surface.

1% of guava extract showed the highest mean of bacterial inhibition zone followed by 0.5% while the lowest value was found at (0.25%).