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AAO Foundation Final Report Form (a/o 1/3/2018)

In an attempt to make things a little easier for the reviewer who will read this report, please consider these two questions before this is sent for review:

- Is this an example of your very best work, in that it provides sufficient explanation and justification, and is something otherwise worthy of publication? (We do publish the Final Report on our website, so this does need to be complete and polished.)*
- Does this Final Report provide the level of detail, etc. that you would expect, if you were the reviewer?*

Please prepare a report that addresses the following:

Type of Award, e.g., Orthodontic Faculty Development Fellowship Award, Postdoctoral Fellowship Award, Biomedical Research Award, Center Award, Educational Innovation Award, Program Award, Research Aid Award

Name(s) of Principal Investigator(s): Niloufar Azami

Title of Project: The effect of Biologics on Retention in an Orthodontic Relapse Model

Period of AAOF Support (e.g. 07-01-18 to 06-30-19): 07-01-18 to 09-30-19

Amount of Funding: 5000

Summary/Abstract :

Background and Objectives: Orthodontic relapse is a physiologic process that involves bone and principle PDL fibers modeling and remodeling. Biologic intervention that aimed at inhibiting bone resorption and enhancing bone formation could be an effective method to enhance the stability of orthodontic treatment. Raloxifene is a selective estrogen receptor modulator that inhibits systemic bone loss in postmenopausal osteoporosis. In this study, we examined the effects of Raloxifene on alveolar bone modeling and orthodontic relapse in a rodent model.

Materials and methods: The efficacy of raloxifene was evaluated in 13 weeks old male Wistar rats, 8 in each group (Control, Raloxifene, Raloxifene + 7-day relapse, Raloxifene + 14-day relapse) for a total of 42 days. All procedures were approved by the UConn Health Institutional Animal Care and Use Committee. All animals had 14 days of orthodontic tooth movement with a closed NiTi coil spring tied from incisors to right first molar applying 10 g of force. On the day of appliance removal, impression was taken with silicon material and the distance between first molar and second molar was filled with light-cured adhesive resin cement for retention phase. Raloxifene, Raloxifene + 7-day relapse, Raloxifene + 14-day groups received 14 daily doses of raloxifene (2.0mg/kg/day) subcutaneously after OTM during retention. After 14 days of retention, the retainer was removed and right first molar was allowed to relapse for a period of 14

days. Raloxifene injection continued for the Raloxifene + 14-day relapse group during relapse phase. Control group received saline injections during retention. Animals were euthanized by CO₂ inhalation. The outcome measure included percentage of relapse, bone volume fraction, tissue density and histology analysis using TRAP staining and determining RANKL and OPG expression.

Results: Raloxifene + 14-day relapse group had significantly less ($P<0.05$) orthodontic relapse when compared to control group. There was significant increase ($P<0.05$) in bone volume fraction and tissue density in the rodents treated with the highest dose of raloxifene in comparison to saline treated group. Similarly, there was significant decrease in number of osteoclasts and RANKL expression in Raloxifene + 14-day relapse group. ($P<0.05$)

Conclusion:

Our results suggest that the raloxifene could decrease post orthodontic relapse by decreasing bone resorption and enhancing bone formation.

Response to the following questions:

1. Were the original, specific aims of the proposal realized? **Yes**
2. Were the results published? Submitted and under review
 - a. If so, cite reference/s for publication/s including titles, dates, author or co-authors, journal, issue and page numbers **NA**
 - b. Was AAOF support acknowledged? **Yes**
 - c. If not, are there plans to publish? If not, why not? **NA**
3. Have the results of this proposal been presented?
 - a. If so, list titles, author or co-authors of these presentation/s, year and locations **For Charley Schultz award at the 2019 American Association of Orthodontic Meeting**
 - b. Was AAOF support acknowledged? **Yes**
 - c. If not, are there plans to do so? If not, why not?
4. To what extent have you used, or how do you intend to use, AAOF funding to further your career?

The PI (Nilofar Azami) is currently in private practice and the mentor (Sumit Yadav) will these results to submit a NIDCR grant