# AAO Foundation Award Final Report

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| Principal Investigator | Dr. Manuel Oscar Lagravere Vich |
| Co-Investigator | Dr. Paul Major |
| Secondary Investigators | Dr. Giseon Heo |
| Award Type | Orthodontic Faculty Development Fellowship Award |
| Project Title | Skeletal and Dental Changes with a Tooth-Borne Hyrax Maxillary Expansion Appliance compared with Damon system of archwire/bracket expansion assessed through Digital Volumetric Imaging |
| Project Year | 2012 |
| Institution | University of Alberta, Orthodontic Graduate Program |
| Summary/Abstract (250 word maximum) | **Objectives:** Compare tooth anchored versus Damon system in terms of the skeletal and dental effects in maxillary expansion using three-dimensional imaging (cone beam computed tomography - CBCT). **Methods:** CBCTs from 32 patients treated for maxillary expansion were used. These patients were randomly assigned to one of two groups (15 Hyrax; 17 Damon System). CBCTs were analyzed using the software platform AVIZO®. Landmarks were chosen and the coordinates were analyzed using linear and angular measurements. Ten images were analyzed three times to determine the reliability and measurement error of each landmark using intraclass correlation coefficient (ICC). Descriptive statistics was done using SPSS statistical package to determine any relationships. **Results**: ICC values were excellent (>0.992) for all landmarks in all axis having the highest measurement error of 1.38 mm in the y-axis for the left infraorbital foramen landmark. Paired sample test and ANOVA show that there were no statistical significant differences between the two treatments to expand the maxilla. Descriptive statistic showed that the tooth anchored technique had a difference of 7mm between the distance right and left U6 pulp chamber, 6mm between the right and left U6 mesial buccal root and alveolar bone around the root while Damon system had a difference of 3mm for all three values. **Conclusion:** The tooth anchored technique demonstrated higher expansion values in the maxilla. Both treatment techniques showed no difference in terms of dental angulation changes in terms of expansion in the posterior sections. Thus, both techniques could be used when expanding the maxilla. |
| Were the original, specific aims of the proposal realized? | Aims are being accomplished; we are still in the patient recruitment phase where we have 87 patients. 32 are in retention phase and rest are in current treatment.<br>The principal investigator has assisted courses on learning the treatment technique and on image analysis. Principal investigator has also presented some work on 3D image analysis and expansion to |

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| | build collaboration with work with several Universities (University of Pennsylvania, University of North Carolina, University of Indiana) in US, Mexico and Brazil. Recently, collaborations with the University of Varese, Italy has been started in terms of expansion 3D trials. Principal investigator has also assisted specialized courses on improving CBCT 3D analysis.<br>Economic load was relieved with this award giving the principal investigator more focus on research and teaching matters. |
| Were the results published? If not, are there plans to publish? If not, why not? | Results have not been published since we are still recruiting sample. |
| Have the results of this proposal been presented? If so, when and where? If not, are there plans to do so? If not, why not? | Preliminary results are being presented in IADR 2017 and AAO 2017 and EOS 2017 (respective abstracts have been submitted and acceptance for presentation is still in process).<br>A presentation of the results has been done in a three day conference as an invited speaker in Brasov, Rumania. Results have also been presented in Varese, Italy also as an invited speaker. The help of the AAOF has been acknowledged extensively in the presentations as well in the future presentations. |
| To what extent have you used, or how do you intend to use, AAOF funding to further your career? | The AAOF has been helpful in opening opportunities to assist specialized courses on 3D imaging and Damon system technique. Once recruitment and treatment is done to all the proposed sample, analysis of the data will be able to be done in a more efficient and accurate way. Thanks to the AAOF I could use my experience to teach and talk with dental students to what to look forward if they decide to proceed with a Faculty career. This has brought results in terms of having a significant number of undergrad and postgrad students helping with research. |