

Veerasathpurush Allareddy – Final Report to AAOF

Type of Award: Biomedical Research Award

Name of Principal Investigator: Veerasathpurush Allareddy BDS MBA MHA PhD MMSc
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Title of Project: OUTCOMES OF SEVERE CLASS II DIVISION I MALOCCLUSIONS TREATED WITH NON-SURGICAL ORTHODONTIC TREATMENT APPROACHES: A PILOT STUDY TO EXPLORE THE VIABILITY OF ORTHODONTIC PRACTICE BASED RESEARCH NETWORKS

Period of AAOF Support: 07/01/2016 to 06/30/2018

Amount of Funding: \$30,000

Summary/Abstract:

Although Class II Division I malocclusions make up the great majority of Class II malocclusions and are one of the most frequently treated cases in orthodontists' offices, there is no uniform consensus in the orthodontic community on the best non-surgical treatment approach for treating patients with severe Class II Division I malocclusions. There is very limited information available on the long term stability after treating this type of malocclusions. Practice Based Research Networks (PBRN) are comprised of multiple group practices that are devoted to providing clinical care for patients, conducting research and dissemination of best practices, and are being increasingly recognized to improve quality of care delivered. PBRNs are in the forefront of leading an evidence-based practice of clinical care. The objectives of the proposed pilot study are to perform an exploratory analysis on how orthodontists across the Orthodontics Practice Based Research Networks (OPBRN) are treating patients with severe Class II Division I malocclusions and to explore the feasibility of having OPBRN to assess the outcomes and long term stability of severe Class II Division I malocclusion patients treated non-surgically. To achieve these objectives, we proposed the following three specific aims –

1. The primary objective of Aim # 1 is to describe the non-surgical treatment strategies currently employed by orthodontists in the OPBRN to correct severe Class II Division 1 malocclusions (overjet>6 mm, bilateral Class II molars). An exploratory secondary analysis will be conducted to determine if the rendered treatment is influenced by patient/practitioner characteristics.
2. The primary objective of Aim # 2 is to assess end-of-treatment outcomes following non-surgical treatment of severe Class II Division I malocclusions. An exploratory analysis will be conducted to determine the role of treatment related factors (treatment plan and biomechanical approach used by orthodontist) and patient factors (demographic factors and severity of malocclusion) on end-of-treatment outcomes.
3. The primary objective of Aim # 3 is to assess long term stability of correction of severe Class II Division I malocclusions. Secondary objectives are to: examine how different retention strategies, treatment plans, biomechanical approaches, and patient related

factors are associated with stability of occlusion; to examine patient and orthodontist satisfaction with orthodontic treatment; and to examine the quality of life of patients..

We enrolled a total of 46 subjects at UIOWA site (UIOWA resident clinic and 3 private practice clinics) and 40 subjects at Harvard School of Dental Medicine site (resident and faculty practice clinics). Headgears (63.6%), Functional Appliances (47.3%), Temporary Anchorage Devices (14.5%), and Extractions (54.5%) were most often used non-surgical treatment strategies. The treatment strategies used varies by center ($p < 0.0001$). Significant reductions in overjet (reduction of 4.9 mm, $p < 0.0001$), ANB angle (reduction of 1.8 deg, $p < 0.0001$), proclination of mandibular incisors (2.9 degrees, $p < 0.0001$) were observed between start of treatment and at debonding. Hawley appliances with fixed retainers and Hawley appliances in combination with clear retainers were most used retention appliances. 27.3% of patients reported not being compliant with recommended retention protocol. At time of retention check (at least 6 months post-debond), there was an increase in overjet by 0.6 mm ($p = 0.01$). The overall mean mandibular incisor crowding at retention was 0.6 mm (compared to 0.05 mm at time of debonding). The incisor crowding at time of retention check was 0.4 mm in those compliant (compared to 1.1 mm in those not compliant, $p < 0.0001$). The overall mean OHIP score was 20.64 (std. dev of 4.35) and CPQ score was 25.12 (std. dev of 6.14). Mean facial esthetic satisfaction scores ranged from 4.1 to 4.56 for each center. The mean occlusion satisfaction score ranged from 4.2 to 4.76 per center. 77.8% reported of never having mouth sores, never having difficulty eating cold/hot foods, 83.3% never had difficulty chewing foods, 86.1% never had difficulty saying words, 91.7% never had trouble sleeping, 83.3% were never upset, 83.3% never felt irritable/frustrated, 83.3% never felt shy, 75% were never concerned about appearance, 94.4% were never teased, 86.1% never had to avoid smiling/laughing, 83.3% never had to argue with other children/family members, 88.9% never felt of not wanting to speak/read loud in class.

Good end of treatment outcomes can be realized with non-surgical orthodontic treatment approaches in patients with severe Class II Division I malocclusions. However, poor retention compliance can lead to lack of long term stability of occlusion. The overall quality of life and satisfaction (assessed during retention check visits) is high following non-surgical orthodontic correction of Class II Division I malocclusions. A vast majority of subjects reported that there were never concerned about their appearance, teased, or had to avoid smiling/laughing following orthodontic treatment.

1. Were the original, specific aims of the proposal realized?

Yes. The original specific aims proposed for our study were realized.

2. Were the results published?

a. If so, cite reference/s for publication/s including titles, dates, author or co-authors, journal, issue and page numbers

Yes. One manuscript has been published in Progress in Orthodontics (Citation is Daniels S, Brady P, Daniels A, Howes S, Shin K, Elangovan S, Allareddy V. Comparison of surgical and non-surgical orthodontic treatment approaches on occlusal and cephalometric outcomes in patients with Class II Division I malocclusions. Prog Orthod. 2017 Dec;18(1):16. doi: 10.1186/s40510-017-0171-3.)

Two more manuscripts are currently being prepared and will be submitted for publication in American Journal of Orthodontics and Dentofacial Orthopedics and in Orthodontics and Craniofacial Research. We will submitting these manuscripts following presentation of study findings in IADR meeting to be held in July in London (2018).

b. Was AAOF support acknowledged?

Yes. We have acknowledged the support of AAOF in the publication.

c. If not, are there plans to publish? If not, why not?

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3. Have the results of this proposal been presented?

We have presented our study findings at the 47th Annual Meeting of the AADR. One poster will be presented at the IADR meeting to be held in London (July 2018). I have also been invited to present the study findings at the AAO meeting to be held in Los Angeles (2019).

a. If so, list titles, author or co-authors of these presentation/s, year and locations.

1. Lina Alsibae, Oscar Reyna-Blanco, Mohamed I. Masoud, Nile Eckermann, Kyungsup Shin, Veeratrishul Allareddy, Veerasathpurush Allareddy. End-of-Treatment, Retention, and Stability: Class II Division I Malocclusions. Oral Presentation at the 47th Annual Meeting of the AADR. Fort Lauderdale, Fla., USA - March 21-24, 2018.
2. Oscar Reyna-Blanco, Lina Alsibae, Mohamed I. Masoud, Nile Eckermann, Kyungsup Shin, Veeratrishul Allareddy, Veerasathpurush Allareddy. Quality of Life and Patient Satisfaction: Interim Results from OPBRN Study. Oral Presentation at the 47th Annual Meeting of the AADR. Fort Lauderdale, Fla., USA - March 21-24, 2018.

b. Was AAOF support acknowledged?

Yes. We have acknowledged the support of AAOF.

4. To what extent have you used, or how do you intend to use, AAOF funding to further your career?

The support from AAOF has been pivotal for furthering my research in practice based research network settings. The data from the AAOF supported Class II study will be used to apply for an R-01 grant via the investigator initiated studies through the National Dental Practice Based Research Network (Dental PBRN). The Class II study concept and research protocol have already been approved by the executive committee of the Dental PBRN. The R-01 application will be submitted as soon as the investigator initiated individual study RFA is released by NIH/NIDCR.