

Veerasathpurush Allareddy – Final Report to AAOF

Type of Award: Biomedical Research Award

Name of Principal Investigator: Veerasathpurush Allareddy BDS MBA MHA PhD MMSc
[Professor, Department of Orthodontics, The University of Iowa]

Title of Project: Patient Safety Indicator Events in Craniofacial Patients Undergoing Orthognathic Surgery

Period of AAOF Support: 07/01/2017 to 06/30/2018

Amount of Funding:

Summary/Abstract:

The last two decades have witnessed a burgeoning increase in patients with cleft and craniofacial anomalies. Due to advances in surgical techniques and delivery of care, these patients are living longer. Cleft lip with/without cleft palate and craniosynostosis constitute the most commonly occurring craniofacial congenital defects. Patients with cleft and craniofacial anomalies require multidisciplinary care (involving Orthodontists, Pediatric Dentists, Periodontists, Oral and Maxillofacial Surgeons, and the General Dental Practitioner) from birth to late adolescence. These patients suffer from severe maxillary/mandibular skeletal imbalances and need orthognathic surgeries. Orthodontists play a pivotal role in the continuum of craniofacial care and prepare the patient to undergo complex orthognathic surgical procedures. Patients with craniofacial anomalies present with a wide range of syndromic spectrums and co-morbidities and hence would be at a higher risk for peri-operative and post-operative adverse events while undergoing orthognathic surgeries. There are no estimates to date examining quality of care (as assessed by validated quality indicators) in craniofacial patients undergoing orthognathic surgeries. We used the Nationwide Inpatient Sample (NIS) for the years 2004 to 2014 to address the following specific aims –

1. To examine the incidence of occurrence of Patient Safety Indicator (PSI) events in craniofacial patients who underwent orthognathic surgeries in the United States during the years 2004 to 2014.
2. To examine the association between patient/hospital related factors and the incidence of PSI events.
3. To assess the impact of occurrence of PSI events on outcomes such as hospital costs and length of stay in hospitals.

We examined outcomes in 11,100 craniofacial patients that underwent an orthognathic surgery in the United States during the study period. Results of our study indicated that catastrophic PSI events such as in-hospital mortality are extremely rare. However, infectious events occur frequently with ranges from 0.5% for pressure ulcers to 3.1% for post-operative pneumonia. An infectious event occurred in 7.4% of patients. When these infectious PSI events occur, they are

associated with significant increases in hospital costs and length of stay in hospital. Our findings indicated that depending on type of infectious event, the increase in hospital costs on average is about \$80,000 and the overall increase in length of stay in hospital is about 7 days. Both these were statistically significant at $p < 0.0001$. Our study identified a mix of hospital and patient related factors that are associated with occurrence of PSI events. Age and co-morbid burden were significantly associated with patient safety events. With each year increase in age, the odds of a patient safety event reduced ($p < 0.05$) while each unit increase in co-morbid burden was associated with an increase in odds of a patient safety event ($p < 0.01$). Our study results will enable health care providers and health policy makers to better understand and identify processes of care areas that should be the focus of quality improvement initiatives and create pathways that lead to better outcomes for craniofacial patients undergoing orthognathic surgeries.

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 Journal of Oral and Maxillofacial Surgery (Citation is Metalwala Z, Okunseri C, Fletcher S, Allareddy V. Orthognathic Surgical Outcomes in Patients With and Without Craniofacial Anomalies. J Oral Maxillofac Surg. 2018 Feb;76(2):436.e1-436.e8. doi: 10.1016/j.joms.2017.09.023.).

One more manuscript is currently being prepared and will be submitted for publication in Orthodontics and Craniofacial Research. We will submit this manuscript following presentation of study findings in COAST meeting (September 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?

One more manuscript is currently being prepared and will be submitted for publication in Orthodontics and Craniofacial Research. We will submit this manuscript following presentation of study findings in COAST meeting (September 2018).

3. Have the results of this proposal been presented?

We will be presenting the results of our study findings during the COAST meeting in September 2018.

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

Data mining for Clinical Outcomes Research. Veerasathpurush Allareddy, Shayna Azoulay-Avinoam, Praveenkumar Gajendrareddy, Michael R. Markiewicz. COAST Meeting 2018. Scottsdale Arizona.

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 establishing my career as a Craniofacial Orthodontist with research expertise in Cleft and Craniofacial Outcomes Research and Big Data Analytics. With the support of AAOF, I have been successful in conducting large data set analyses of the Nationwide Inpatient Sample (datasets of the Healthcare Cost and Utilization Project by the Agency for Healthcare Research and Quality) to examine immediate post-operative and perioperative outcomes in patients with Craniofacial anomalies who underwent orthognathic surgeries. This has enabled me to create a niche in Big Data Analytics. In my new position as Department Head of Orthodontics and Brodie Craniofacial Endowed Chair at University of Illinois at Chicago, I will be taking the lead in the Big Data Analytics endeavor in Craniofacial clinical and translational research to bring the most advanced 21st century technology, leadership and innovative science to the Brodie Institute and accelerate discovery that brings novel treatments and interventions to patients in Chicago and around the world. The model of translational research is based on bioinformatics and to use massive repositories of clinical genetic data in order to identify patterns relevant to the delivery of clinical care. This would not have been possible without the support of AAOF during the early phase of academic career. I will be applying for NIH/NIDCR grants to further support my research endeavors in this area.