Digitizing a Unique and Historic Longitudinal Collection of Dental Casts

2020 Grants

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FollowUp Form

Award Information

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?*

Title of Project*

Digitizing a Unique and Historic Longitudinal Collection of Dental Casts

Award Type

Center Award (CA)

Period of AAOF Support

July 1, 2020 through June 30, 2024

Institution

Case Western Reserve University

Names of principal advisor(s) / mentor(s), co-investigator(s) and consultant(s)

Dr. Heesoo Oh and Dr. James McNamara

Amount of Funding

$75,000.00

Abstract

(add specific directions for each type here)

Respond to the following questions:

Detailed results and inferences:*

If the work has been published, please attach a pdf of manuscript below by clicking "Upload a file".
<u>OR</u>
Use the text box below to describe in detail the results of your study. The intent is to share the knowledge you have generated with the AAOF and orthodontic community specifically and other who may benefit from your study. Table, Figures, Statistical Analysis, and interpretation of results should also be attached by clicking "Upload a file".

All of the Bolton scanned casts have been added to the AAOF Legacy collection and are available online for free for all researchers. The funding was to scan the study casts to create an online database for researchers to use.

Were the original, specific aims of the proposal realized?*

Yes.
1. Scan each subject's dental cast to produce an STL file of the upper, lower and occlusion components.
2. Integrate scans with existing cephalograms for the same subject to create a unique 3D dataset. OrthoInsight software is needed to integrate the models with the cephalograms.

Were the results published?*

Yes

Have the results of this proposal been presented?*

Yes

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

AAOF funding has been critical to both my career and the AAOF Legacy project. Without the AAOF the Legacy Collection would not exist.

Accounting: Were there any leftover funds?

$0.00

Published

Citations*

You indicated results have been published. Please list the cited reference/s for publication/s including titles, dates, author or co-authors, journal, issue and page numbers

The following list of publications was extracted from Google Scholar, searching on the terms "AAOF Legacy Collection". While not complete, it represents a good sampling of the research publications making use of the AAOF Legacy Collection images and data. The majority of these publications used the radiographic data because the 3D study cast data has only recently been avialble. But this gives you some idea of the use of the Legacy Collection data. In the future I expect that the study cast data will find wide use.

Assessment of dental, skeletal, and soft tissue changes following mandibular advancement with Invisalign in skeletal Class II H Al Subaie, G Alturki, F Alsulaimani, S Ghoneim… - The Saudi Dental …, 2024 - Elsevier… Also, the records of the control group collected from the AAOF Legacy Collection differ from those in the treatment group. Recruiting participants with similar backgrounds and …
Residual Mandibular Growth in Different Facial Growth Patterns N Ghaffari - 2024 - tspace.library.utoronto.ca… Methods: Untreated subjects with Class I characteristics from the AAOF Growth Legacy Collection were categorized into three growth pattern groups based on their change in the Yaxis
Evaluation of mandibular growth in a prepubertal Class I and Class II population: a longitudinal analysis L Pozzan, D Guerra, G Ulian, G Checchin… - European Journal of …, 2024 - academic.oup.com … From the original samples available in the AAOF Craniofacial Legacy Collection, 83 Class I … According to the guidelines of the AAOF Legacy Collection, a magnification factor of 10%
AggregateNet: A deep learning model for automated classification of cervical vertebrae maturation stages SF Atici, R Ansari, V Allareddy… - Orthodontics & …, 2023 - Wiley Online Library … The CVM classification techniques were developed using the AAOF collection, and the …the AAOF legacy collection. The area of predicting AI growth and development needs to
ASSESSING TREATMENT EFFECTS OF INVISALIGN FIRST COMPARED TO MAXILLARY EXPANDERS AND FIXED APPLIANCES IN MIXED DENTITION PATIENTS P Moravedje Torbaty - 2023 - scholarlycommons.pacific.edu Methods: The study included 80 mixed dentition patients, with 40 in each group (IFS and
RME) and 40 controls from the AAOF Legacy Collection. We analyzed skeletal and dental …
CLASS II MALOCCLUSION CORRECTION WITH INVISALIGN: A RETROSPECTIVE STUDY S Moon - 2023 - scholarlycommons.pacific.edu… (AAOF) legacy collection. Thirteen cephalometric measurements and molar relationships
on the digital casts at pre-treatment (T1), end -of-active-treatment (T2) for the treatment group
Prediction of the post-pubertal mandibular length and Y axis of growth by using various machine learning techniques: A retrospective longitudinal study T Wood, JO Anigbo, G Eckert, KT Stewart, MM Dundar… - Diagnostics, 2023 - mdpi.com … The data for this retrospective study consisted of digital cephalometric radiographs acquired from the AAOF Craniofacial Legacy Collection, which houses images from subjects from the …
Age-Related Changes to Frontal Sinus Traits and Implications for Forensic Identification. N Abdulrazak, LN Butaric… - … (University of Florida), 2023 - search.ebscohost.com… The authors would like to thank the AAOF Legacy collection's curators and supporters for
providing collections online, as well as the reviewers whose comments greatly enhanced this …
Short- and Long-Term Prediction of the Post-Pubertal Mandibular Length and Y-Axis in Females Utilizing Machine Learning M Parrish, E O'Connell, G Eckert, J Hughes, S Badirli… - Diagnostics, 2023 - mdpi.com
Second, given the limited information on subjects provided in the AAOF Legacy Collection, developmental stage was based on chronological age in lieu of other developmental …
Can artificial intelligence-driven cephalometric analysis replace manual tracing? A systematic review and meta-analysis J Hendrickx, RS Gracea, M Vanheers… - European Journal of …, 2024 - academic.oup.com
Objectives This systematic review and meta-analysis aimed to investigate the accuracy and efficiency of artificial intelligence (AI)-driven automated landmark detection for cephalometric
Prediction of Pubertal Mandibular Growth in Males with Class II Malocclusion by Utilizing Machine Learning G Zakhar, S Hazime, G Eckert, A Wong, S Badirli… - Diagnostics, 2023 - mdpi.com First, the sample size was

relatively small due to the constraints of the available records in the AAOF Legacy Collection. It is worth noting that when employing ML techniques, a larger

The effect of vertical skeletal proportions on overbite changes in untreated adolescents: a longitudinal evaluation M Ferrillo, N Pandis, PS Fleming - The Angle Orthodontist, 2024 - meridian.allenpress.com... No ethics approval was needed for this study as it used data from the AAOF Craniofacial Growth Legacy Collections Project. Participants were selected according to the following criteria...

Radiographic evaluation of mandibular asymmetry in twins with III skeletal class E Bottone, M Horodynski, F Roticiani, M Caso... - DENTAL ..., 2023 - iris.uniroma1.it... Frontal telecranium in postero-anterior projection of 4 couples of twins were analyzed thanks

to the permission of AAOF Craniofacial Growth Legacy Collection and Forsyth Institute. RX ...

Artificial Intelligence and Machine Learning for Automated Cephalometric Landmark Identification: A Meta-Analysis Previewed by a Systematic Review S Rauniyar, S Jena, N Sahoo, P Mohanty, BP Dash - Cureus, 2023 - ncbi.nlm.nih.gov Digital dentistry has become an integral part of our practice today, with artificial intelligence (AI) playing the predominant role. The present systematic review was intended to detect the ...

Analyzing longitudinal growth data in orthodontics YK Tu, JY Hsu, YH Chang, B Tang, H He, F Hua... - Seminars in ..., 2023 - Elsevier... We use data of 42 children on the mandibular length obtained from the archives at the AAOF Craniofacial Growth Legacy Collection for demonstration. Our analyses showed that ...

Influence of the force magnitude of fixed functional appliances for class II subdivision 1 treatment—a cephalometric study H Sabbagh, A Sabbagh, MJ Rankovic, C Huber... - Journal of Orofacial ..., 2023 - Springer... Two control groups were matched from the American Association of Orthodontists Foundation (AAOF) Craniofacial Growth Legacy Collection for comparison with the two treatment ...

The Impact of Normal Growth on the AP Relationships of the Jaws and Incisors to the Forehead: A Serial Cephalometric Analysis of Untreated Individuals AJ Rudmann Dr - 2024 - researchrepository.wvu.edu... Serial lateral cephalograms of 74 untreated growing individuals (3 female, 39 male) from the Oregon, Iowa, and Bolton-Brush Growth Studies were obtained from the AAOF Legacy ...

Multilevel modeling techniques to study the impact of environmental changes on human face development M Amorim, J Godinho, T Oliveira - 8 th Conference ..., 2023 - repositorioaberto.uab.pt... Convenience sampling was performed using lateral cephalograms available through the AAOF Craniofacial Growth Legacy Collection. Inclusion criteria included patients with pre-...

Estimating mandibular growth stage based on cervical vertebral maturation in lateral cephalometric radiographs using artificial intelligence SA Shoari, SV Sadrolashrafi, A Sohrabi... - Progress in ..., 2024 – Springer ... American Association of Orthodontics Foundation (AAOF) growth centers was assessed and... are in the archives of the AAOF Craniofacial Growth Legacy Collection as it is provided free ...

Retrospective investigation of the 3D effects of the Carriere Motion 3D appliance using model and cephalometric superimposition CU Schmid-Herrmann, J Delfs, L Mahaini... - Clinical Oral ..., 2023 - Springer... AAOF Legacy Collection. The inclusion criteria for the control group were no history of past orthodontic treatment and the presence of two lateral cephalograms of good quality at similar ...

Effects of eruption guidance appliance in the early treatment of Class III malocclusion G Velásquez, A Aliaga-Del Castillo... - The Angle ..., 2024 - meridian.allenpress.com... The sample was obtained from the American Association of Orthodontists Foundation (AAOF) Craniofacial Growth Legacy Collection Website. From the 35 AAOF subjects available ...

A Comparison of Inferior Turbinate Hypertrophy in Pediatric Patients with Cleft Lip and Palate J Sun - 2023 - search.proquest.com... with complete cleft compared to the AAOF group. Kappa test was ... with complete cleft than the AAOF subjects. Conclusions: ... study (AAOF) in the "Condensed Legacy Collection Inventory...

Comparison of individualized facial growth prediction models based on the partial least squares and artificial intelligence JH Moon, HK Shin, JM Lee, SJ Cho... - The Angle ..., 2024 - meridian.allenpress.com ... (AAOF) completed the AAOF Craniofacial Growth Legacy ... Presently available on the AAOF website are about 20,000 ... and freely available on the AAOF website, it is envisioned that ...

A Novel Continuous Classification System for the Cervical Vertebrae Maturation (CVM) Stages Using Convolutional Neural Networks SF Atici, MH Elnagar, V Allareddy, O Suhaym, R Ansari... - 2023 - researchsquare.com ... The AAOF legacy collection comprises longitudinal records collected from growth studies. Adequate-quality cephalometric radiographs used in this study provide clear visibility of the ...

Application of Artificial Intelligence (AI) in a cephalometric analysis: a narrative review M Kiełczykowski, K Kamiński, K Perkowski, M Zadurska… - Diagnostics, 2023 - mdpi.com… Cephalometric analysis was conducted on 110 cephalographs obtained from the AAOF
Legacy Denver medical database. Sixteen points were identified with both methods. The …
Skeletal and dental effects of function-generating bite appliance compared to rapid palatal expander and untreated controls M Tepedino, G Montaruli, R Esposito… - Orthodontics & …, 2024 - Wiley Online Library…
of the American Association of Orthodontists Foundation
…

Was AAOF support acknowledged?

If so, please describe:

Yes. Support was acknowledged and that is how the list of publications was created.

Presented

Please list titles, author or co-authors of these presentation/s, year and locations:*

I presented the results to the AAOF BOT on Feb 23, 2024.

Was AAOF support acknowledged?

If so, please describe:

Yes. I went over all the mechanics of the Legacy Collection and the addition of the study casts eith the BOT.

Internal Review

Reviewer Comments

Reviewer Status*

File Attachment Summary

Applicant File Uploads
No files were uploaded