



***EDSA Lecture  
Competition Spring 2021  
Book of Abstracts***



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# Foreword

Dear EDSA members,

Thank you for being so active in EDSA Lecture Competition this year. I would like to express my sincere congratulations to all participants for their hard work! Your passion and dedication, together with the high-quality papers and projects you presented, prove that dental research will continue to grow and evolve. I hope that you continue to embrace your creativity and utilize it in your work for as long as possible, and I look forward to seeing your future endeavours. Do not hesitate to apply for the next Lecture Competition during EDSA Summer Meeting 2021!

Yours sincerely,  
Yolena Gesheva, EDSA Research Officer 2020/21



# Scientific Jury



Assoc. Prof. Dr. Ilian Hristov, Bulgaria



Dr. Alina Gončarova, Latvia



Dr. Cristina Rizea, Romania

# Effectiveness Evaluation of Selected Muscles Relaxation Methods Modulating Neuromuscular Tension of Analog Astronaut's Masticatory System

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**Name:** Barbara Gronwald

**Year of study:** 1st year graduated

**University:** Pomeranian Medical University in Szczecin

**Authors:** Barbara Gronwald, Karina Kijak, Helena Gronwald<sup>\*\*\*</sup>, Danuta Lietz-Kijak<sup>\*\*\*</sup>

**Affiliations:** Department of Propaedeutics, Physical diagnostics and Dental Physiotherapy, Pomeranian Medical University, Szczecin, Poland

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## INTRODUCTION:

As isolation may induce stress leading to an increase of neuromuscular tension, a study was conducted to evaluate the effectiveness of the Trigger Point Therapy (TrPt) and yoga exercises on mandible abduction range of Analog Astronauts (AA).

## MATERIALS AND METHODS:

AA endured severe isolation conditions (no access to sunlight, no possibility to leave the facility, decreased physical activity, outside communication limited to an absolute emergency) for 14 days in limited space during consecutive AA missions at LunAres Research Station Habitat (Piła, Poland). Abduction measurements were conducted on the 3 groups of 5 Analog Astronauts: - Test groups: 1. AA who received Trigger Point Therapy; 2. AA who exercised yoga; - Control group: AA who did not receive Trigger Point Therapy nor exercised yoga. Trigger Point Therapy was performed in the area of the masseter muscle on the right and left side with closed mandible by trained medical officer. Yoga relaxation exercises were conducted by a certified yoga instructor. Maximum abduction measurements were made with electronic calliper (mm), i.e., placed between central incisors of maxilla and mandible.

## RESULTS:

- Average abduction range change in AA with TrPt: 5,09 mm increase of mandible abduction. - Average abduction range change in AA with yoga exercises: 0,93 mm increase of mandible abduction. - Average abduction range change in control group: 2,32 mm increase of mandible abduction. - The largest increase in abduction range was observed in the group receiving Trigger Point Therapy comparing to other groups.

## CONCLUSIONS:

1. Trigger Point Therapy effectively decreased neuromuscular tension of Analog Astronauts.
2. Yoga exercises do not sufficiently decrease neuromuscular tension in mastication muscles area.
3. Observations concluded in LunAres Research Station regarding stress-related neuromuscular tension can help identify effective therapeutic methods for circumstances of pandemic isolation.
4. The study should be continued and confirmed on a greater number of cases.

## ACKNOWLEDGEMENTS:

Leszek Orzechowski

**KEY WORDS:** isolation, stress, astronauts, neuromuscular tension, trigger point therapy



*1st place  
winner*

# Preventing Wrong Site Tooth Extraction: Implementation of a Computerised Safety Template in General Dental Practice

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**Name:** Oliver Jacob

**Year of study:** 2nd year graduated

**University:** Powys Teaching Health Board

**Authors:** Oliver Jacob, Heidi Thomas

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## INTRODUCTION:

Wrong-site tooth extraction (WSTE) is the most common serious patient safety incident in dentistry. Safety templates with pauses before critical steps have significantly reduced wrong-site surgery risk, although there is little research within dentistry.

We undertook a quality improvement project to develop and implement a computerised safety template optimised for oral surgery procedures under local anaesthetic in general dental practice to reduce the risk of WSTE.

## MATERIALS AND METHODS:

We developed a local best practice for tooth extraction record-keeping, using national guidelines and local safety standards for invasive procedures. We then retrospectively audited tooth extraction record-keeping against local best practice to generate baseline data. Our results highlighted deficiencies in current record-keeping protocols and were utilised to design a template to improve compliance with local best practice.

Eleven clinicians working at three general dental clinics within our region were provided with a computerised safety template which complied with local best practice. The template included a pre-operative safety check, a formal pause to re-confirm the surgical site before local anaesthetic delivery and a postoperative record-keeping proforma.

The template was linked to our record-keeping software for use during tooth extraction. We audited template completion and compliance with local best practice weekly for six weeks.

## RESULTS:

Use of a computerised safety template for tooth extraction in primary care demonstrates significant potential to improve patient safety by encouraging adoption of measures to prevent WSTE and standardising communication between clinicians. Template use by general dental practitioners should be encouraged.

## CONCLUSIONS:

Consumption of sugar is a key factor that causes dental caries. However, over the recent years the rise in dental Use of a computerised safety template for tooth extraction in primary care demonstrates significant potential to improve patient safety by encouraging adoption of measures to prevent WSTE and standardising communication between clinicians. Template use by general dental practitioners should be encouraged.

## ACKNOWLEDGEMENTS:

Many thanks to Drs. Eve Gough, Frances Eveleigh and Claire Totten for their assistance in optimising local best practice and collecting data.

**KEY WORDS:** Template Oral Surgery, Tooth Extraction, Patient Safety, Wrong-site Surgery, Template

# Comparison of Manual and Electric Toothbrush Use in Dental Plaque Removal

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**Year of study:** 4

**University:** Marmara University, Faculty of Dentistry, Istanbul, Turkey.

**Authors:** KAYHAN, \*Res. Asst. Dt. Elif ALKAN (1), \*Prof. Dr. Dilek TAGTEKİN (1), \*Prof. Dr Funda YANIKOĞLU (2), \*Can ILGIN (3)

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## CONCLUSIONS:

Manual toothbrush showed higher plaque and gingival index scores than the electric toothbrushes compared to the initial scores. Positive improvement was observed when switching from manual to electric in 1 week; negative change was observed in transition from electric to manual.

## ACKNOWLEDGEMENTS:

To volunteers.

**KEY WORDS:** Electric, Manuel, Toothbrush, Plaque, Fluorescence

## INTRODUCTION:

Aim was to detect effectiveness of manual and electric toothbrush on plaque, in vivo.

## MATERIALS AND METHODS:

Ten volunteers were divided into two groups according to the type of toothbrush they use. The first group used to use a manual toothbrush for 24 years, the second group used to use an electric toothbrush for 3 years. Initial plaque measurements (Quickley and Hein, the plaque index; Sillness and Löe, the gingival index) were taken 5 hours after brushing, photographs were obtained then (GC-Japan). Stained areas on buccal surfaces were recorded in the FluoreCam system (Daraza-USA). The first group started to use an electric toothbrush while the second group switched to manual during 1 week with daily routines. Plaque measurements were done as post-treatment clinical, fluorescence. Index records were evaluated with Mann-Whitney U-Test.

## RESULTS:

Both groups were statistically significant between initial and final plaque indexes ( $p < 0.05$ ). Significance was found in Group1 at initial and final ( $p = 0.0002$ ), while no significance in Group2 ( $p = 0.0589$ ) at gingival index. When groups were compared for plaque index at initial and final, significant results were obtained ( $p = 0.000$ ;  $p = 0.009$ ). While there was no difference between groups of initial gingival index ( $p = 0.8932$ ), a difference was found in finals ( $p = 0.000$ ). In fluorescence, a difference was found between two groups when size and intensity values were compared ( $p = 0.000$ ,  $p = 0.0200$ ). FluoreCam evaluations were recorded with “no-change” 21.66% in Group1 ( $n = 60$ ), 26.66% in Group2 ( $n = 60$ ); “Improvement” 61.66% in Group1, 30% in Group2; “worsening” 16.66% in Group1 and 43.33% in Group2.



# Planned and Achieved Position of Teeth by Clear Aligner System Treatment

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**Name:** Peter Lariš, Michaela Lepišová

**Year of study:** 5th

**University:** Palacký University Olomouc

**Authors:** Students: Peter Lariš, Michaela Lepišová; Coordinator: MUDr. Marie Štefková CSc

**Affiliations:** University Hospital Olomouc - Department of Dentistry, Czech Republic

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## ACKNOWLEDGEMENTS:

Many thanks to MUDr. Marie Štefková CSc. and MDDr. Petra Vyhlídalová for their guidance and advices in our scientific research. We also thank Mgr.Langová for statistical analysis of our measured data.

**KEY WORDS:** Aesthetics, Invisalign, cephalometric analysis, clincheck, lower incisor

## INTRODUCTION:

The first clear aligner systems were used only for retention after orthodontic treatment, but in the modern orthodontics they become an alternative to fixed appliances. These days aesthetics during the treatment is more important for the patients than in the past, so these invisible aligners and attachments in colour of tooth are getting more popular. Although therapy with fixed appliances is very effective, they include metal brackets, wires and bands, which are uncomfortable for some patients. In our work we have rated the efficiency of the most common aligner system in the world - Invisalign.

## MATERIALS AND METHODS:

Scientific research included files of 40 patients, averaged age was 31 years, 9 men and 31 women. Cephalometric X-rays, intraoral pictures and ClinCheck analysis were acquired from three independent sources, Dr. Mohammad, Dr. Velká and database of Orthodontic Department University Hospital Olomouc. We have compared measured values in cephalometric analysis before and after the alignment treatment and planned position of the lower incisor in ClinCheck software. The data were statistically processed by Mgr. Langová in Department of Medical Biophysics Faculty of Medicine.

## RESULTS:

The average measured difference between movement of the lower incisor in analysis of cephalometric X-rays and planned movement in ClinCheck software was 0,78mm. Correlation between this difference and patient's age or gender was not proved. We have determined from the intraoral pictures, that the majority of cases ended in the first Angle class.

## CONCLUSIONS:

Invisalign system allows to achieve planned position of the lower incisor, so the results were aesthetic, functional and stable. Small discrepancies from the treatment plan were caused by patient's imperfect compliance.

# May an autogenous demineralised dentin graft help for the regeneration of the alveolar bone

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**Name:** Casto Maciá Rico

**Year of study:** 4th

**University:** University of Salamanca

**Authors:** Casto Maciá Rico; Dr. Javier Flores Fraile; Dr<sup>a</sup>. Leticia Blanco\*

**Affiliations:** Surgery Department; University of Salamanca; Salamanca; Spain

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## ACKNOWLEDGEMENTS:

I will be eternally grateful to DDS Javier Flores for his blind rely on me for new development of future research in dentistry, here in Salamanca. In addition to that, I would like to acknowledge him for becoming my mentor, by doing that he gave me the golden opportunity I have been looking for since I started Dentistry four years ago. On the other hand, I would like to highlight DDS Leticia Blanco figure for introducing me to the precise labor of Oral Surgery. Last but not least important, I'm indebted with my best friend René Carrillo for encouraging me to actively participate and standing out from the average and also with my parents and my sister, Amanda, for their unconditional support.

**KEY WORDS:** Dentin graft, Bone regeneration and Guided bone regeneration

## INTRODUCTION:

The demineralized dentin graft emerges as an alveolar preservation autologous alternative, in order to reduce the healing time and some amount of new bone formation, as some authors affirm nowadays. This project seeks to evaluate the clinical and histological results of alveolar preservation using autologous dentin graft.

## MATERIALS AND METHODS:

This trial was based on a bibliographical review, using Pubmed's Database® and scientific publications of KometBio®, and a demonstration through a clinical case. The keywords used in Pubmed were "Dentin graft", "Bone regeneration" and "Guided Bone Regeneration". The articles whose publication dates between 1993-2019 were selected.

## RESULTS:

Regarding the clinical case, it was about a 55 years old patient hoping to receive a complete rehabilitation of the posterior jaw with implants. Initially, dental extractions were performed and after preparing the autologous graft, a demineralized dentin graft was placed in the third quarter. After 10 months, a biopsy was collected for histological analysis. The dentin graft, analysed after 12 months through CBCT, showed enough stability, allowing us to rehabilitate the patient with dental implants in the grafted area. Furthermore, the histological results confirmed positive outcomes in relation to the brand- new amount of bone formation.

## CONCLUSIONS:

Treatments with demineralized dentin grafts have been the purpose of many miscellaneous studies with quite conclusive results. They seem to have a greater swiftness of bone maturation, lower cost and also a greater volume of new bone formation compared to actual allografts. However, further research is needed to better evaluate the behaviour over time of this type of graft.

# Periodontal Regenerative Effect of Enamel Matrix Derivative under Diabetic Conditions

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**Name:** Laura Elena Narita

**Year of study:** 5th

**University:** University of Medicine and Pharmacy "Iuliu Hațieganu" Cluj-Napoca, Romania

**Authors:** Laura Elena Narita 1, Maria Ioana Onicas 2, Alexandru Mester 3

**Affiliations:** 1,2 - Students, Faculty of Dentistry, „Iuliu Hațieganu” University of Medicine and Pharmacy Cluj-Napoca , Romania; 3 - Lecturer, Department of Oral Health, Faculty of Dentistry, „Iuliu Hațieganu” University of Medicine and Pharmacy Cluj-Napoca , Romania

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## CONCLUSIONS:

Consumption of sugar is a key factor that causes dental caries. However, over the recent years the rise in dental caries has been hypothesised to be due to increased intake of sweetened juices. They are likely to be consumed more regularly leading to a greater overall intake and consumed over a longer period with more intervals, leading to it spending more time in the oral cavity. Dental caries can progress more rapidly due to the frequency of consumption, which snacking can increase. In the future, teaching about oral health education is essential as we are moving towards prevention strategies.

## ACKNOWLEDGEMENTS:

The first and second author greatly acknowledge Alexandru Meșter, lecturer at Department of Oral Health, Faculty of Dentistry, „Iuliu Hațieganu” University of Medicine and Pharmacy Cluj-Napoca, for his helpful guidance in the elaboration of the article.

**KEY WORDS:** Enamel matrix, EMD, diabetes, periodontal regeneration

## INTRODUCTION:

Diabetes is a lifelong metabolic and endocrine syndrome, characterized by the presence of hyperglycemia. People with this condition are prone to infections and impaired healing. Enamel matrix derivative (EMD) is a protein aggregate extracted from the porcine fetal teeth that has been demonstrated to enhance angiogenesis and to influence wound healing by downregulating inflammatory genes, while upregulating growth and repair-promoting genes. The objective of this review was to determine a potential connection between enamel matrix derivative and diabetes.

## MATERIALS AND METHODS:

PubMed database was searched for relevant articles. The inclusion criteria used: (i) articles written in English; (ii) articles using a commercial source of EMD, (iii) in vitro/in vivo studies, (iv) association of EMD with diabetes. The exclusion criteria used: (i) metaanalysis (ii) letters to editors (iii) conference papers (iv) unpublished data (v) studies published in a language other than English.

## RESULTS:

Of the 75 articles resulted in this search, 8 were selected and only 3 of them related EMD therapy in subjects with diabetes. The selected articles were published between 2002 and 2020. Due to limited studies of periodontal tissue regeneration in patients with diabetes, more data is required to sustain the positive effects of EMD therapy on diabetic patients.



# Image Processing Techniques for Optical Coherence Tomography Imaging in Endodontics

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**Name:** Christa Serban

**Year of study:** 4th

**University:** Victor Babes University of Medicine and Pharmacy Timisoara

**Authors:** SERBAN (1), Helmine SERBAN (2), Meda Lavinia NEGRUTIU (1), Florin Ionel TOPALA (1), Virgil Florin DUMA (3), Cosmin SINESCU (1), Adrian Gh. PODOLEANU (4)

**Affiliations:** (1) Victor Babes University of Medicine and Pharmacy, (2) Simon Fraser University, (3) Polytechnic University of Timisoara, (4) University of Kent

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OCT analysis through contrast enhancement and segmentation algorithms is challenging but produces useful results. Although no single process can be uniformly applied to all images, common steps can be taken to enhance the original image to aid in the evaluation of root canal filling voids. The techniques presented in this study can be useful for future studies aimed at understanding where defects are mostly to occur in a root canal fillings.

**ACKNOWLEDGEMENTS:**

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**KEY WORDS:** Optical coherence tomography, image processing, voids, endodontics, image segmentation

## INTRODUCTION:

The optical coherence tomography (OCT) is a non-ionizing, non-destructive, and non-invasive imaging method. It is an indispensable tool in ophthalmology and other fields of medicine. In dentistry, the OCT is an emerging tool as numerous studies have successfully demonstrated the potential of the OCT for dental applications. In endodontics, the OCT has been proposed for imaging voids in the obturation material and sealer. However, OCT images inherently contain noise which degrades the quality of the image and creates limitations in the diagnostic capabilities of the OCT. The aim of this study is to implement image processing techniques for OCT images that enable better evaluation of voids occurring in root canal fillings.

## MATERIALS AND METHODS:

Images from OCT scans of 25 extracted teeth with root canal fillings were selected. The images were obtained from an OCT system working in Time Domain mode at 1300 nm. The images were subjected to image processing techniques commonly used in medical imaging using Matlab R2018b software. The techniques applied were contrast enhancement, edge detection, and image segmentation through k-means clustering algorithm.

## RESULTS:

Contrast enhancement was useful in improving the quality of the images. Edge detection did not provide much benefit in the case of OCT images due to the noise present in the images. Image segmentation using k-mean clustering algorithm was successful in detecting the boundaries of voids occurring in the sealer or obturation material.

## CONCLUSIONS:

Consumption of sugar is a key factor that causes dental caries. However, over the recent years the rise in dental



# Maximising Special Dental Services: A 3 Year Retrospective Re-Audit

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**Name:** William Timmis

**Year of study:** 5th

**University:** Cardiff University

**Authors:** William Timmis 1, Adele Cunningham 2 and “Grace Kelly 3” (BDS Student 1, Specialist in Special Care Dentistry 2 and Clinical Senior Lecturer and Honorary Consultant in Special Care Dentistry 3)

**Affiliations:** Dental Hospital, University Hospital Wales, Cardiff and Vale University Health Board

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## ACKNOWLEDGEMENTS:

I would like to thank Ms. Kelly for all of her advice and guidance throughout this Service Evaluation. Additionally, I am very grateful to Mr. Peck for providing all of the necessary patient files.

**KEY WORDS:** Special Care Dentistry, Waiting Times

## INTRODUCTION:

To measure the waiting times of new patient referrals (NPR) to University Dental Hospital Wales, Special Care Dentistry (SCD) department between November 2017 and October 2018, in accordance to the Welsh Government’s 26 and 36 week standards for assessment and treatment waiting times. To determine the proportion of appropriate referrals, and staff compliance with BDA Case Mix Scoring and proforma completion. Additionally, to compare assessment and treatment waiting times to Audit Cycle 1 and Cycle 2 in assessing the effect of implemented changes to staff and service provision over a 3 year period (2016-2018). To develop tailored recommendations to facilitate compliance with standards to help maximise Special Care Dental services.

## MATERIALS AND METHODS:

Reviewed referral letters, day sheets, completed proformas and 157 patient files for data collection.

## RESULTS:

In total, 32% of NPR had their first assessment within 26 weeks, whilst 33% had first treatment within 36 weeks. Government standards were not met. The majority (98%) of NPR were appropriate, 72% had a Case Mix Score recorded and 61% had proformas completed.

## CONCLUSIONS:

Patients requiring SCD services often have multiple health conditions or disabilities. Therefore, access barriers, appointment failures or cancellations, resulted in increased waiting times. Changes to staff and service provision greatly impact SCD patient waiting times. Increasing clinic frequency and/or staffing number would reduce waiting times. Further workforce planning and refinement of shared care and referral pathways is necessary to achieve the agreed standards.

# The Effect of Hydroxyapatite Toothpastes on Caries Prevention: A Review

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**Name:** Theoklitos Tsaprazlis

Year of study: 3rd

**University:** National and Kapodistrian University of Athens, Faculty of Dentistry

**Authors:** Theoklitos Tsaprazlis

**Affiliations:** Ioannis Fourmousis Assistant Professor of Periodontology UoA

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## INTRODUCTION:

Dental caries is a slow multifactorial disease, the development of which is mainly caused by the production of acids by the bacteria that inhabit the tooth surfaces, as a result of the metabolism of carbohydrates that the host receives through its diet. At an early stage, dental caries is a dynamic and reversible process, as in the oral environment there are continuous cycles of demineralization and remineralization of hard dental tissues. In the event that the pathological factors dominate and compensate the protective mechanisms and the process of relapse does not occur, the lesions develop and gradually require clinical intervention. Various ways of preventing caries damage have been proposed over the years, based on helping tissue remineralization through specific ions. One of the most immediate and patient-friendly ways of remineralization is the use of specific toothpastes during brushing.

## MATERIALS AND METHODS:

Scientific articles were downloaded for the keywords: enamel, hydroxyapatite toothpastes, fluoride toothpastes, demineralization and remineralization from PubMed, Cochrane Library, Google Scholar and ScienceDirect. Of the 918 articles submitted, 11 were selected to be included. These articles were published from the year 2000 onwards and refer to the effect of hydroxyapatite toothpastes on the prevention of carious cavities compared to fluoride toothpastes.

## RESULTS:

Hydroxyapatite toothpastes have shown satisfactory results in the prevention of carious cavities.

## CONCLUSIONS:

Within the limits of this study, no statistically significant differences were observed regarding the effect of hydroxyapatite toothpastes on the prevention of carious cavities compared to fluoride toothpastes.

## ACKNOWLEDGEMENTS:

We would like to thank Athens Dental Students Association (ADSA) for their support.

**KEY WORDS:** Enamel, hydroxyapatite toothpastes, fluoride toothpastes, demineralization, remineralization

# Role of High Fructose Corn Syrup in Dental Caries

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**Name:** Nirthika Balakumar

**Year of study:** 5th

**University:** King's College London

**Authors:** Nirthika Balakumar

**Affiliations:** -

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## INTRODUCTION:

Caries is the most common chronic disease of childhood and the fourth most expensive disease, causing great public health concern. It not only causes pain but also speech disorders and loss of confidence. We are evaluating the role that HFCS plays in this, as it is a liquid sweetener used in most packaged foods and many soft drinks.

## MATERIALS AND METHODS:

There has been no study that has specifically conducted research to evaluate the impact of HFCS on caries therefore, I have evaluated HFCS as a sugar. There was a longitudinal study with 1702 subjects. Food consumption was measured through the questionnaire. The aim was to focus on a long-term diet so small variations were unlikely to have significant impacts. DMFT is used as the key measure of caries experience in dental epidemiology.

## RESULTS:

It was found that compared to the frequency of sugar intake, the quantity of sugar was more associated with caries levels. This is due to the coefficient for frequency not being statistically significant however, DMFT has increased by 0.09 units for an increase of 10g of sugar. It was found that frequency and amount of sugar intake was a positive linear correlation to dental caries.

## CONCLUSIONS:

Consumption of sugar is a key factor that causes dental caries. However, over the recent years the rise in dental caries has been hypothesised to be due to increased intake of sweetened juices. They are likely to be consumed more regularly leading to a greater overall intake and consumed over a longer period with more intervals, leading to it spending more time in the oral cavity. Dental caries can progress more rapidly due to the frequency of consumption, which snacking can increase. In the future, teaching about oral health education is essential as we are moving towards prevention strategies.

## ACKNOWLEDGEMENTS:

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**KEY WORDS:** HFCS, Caries, Soft drinks, Sugar

