BDSA Research Summit 2024

Book of Abstracts

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Welcome to this years BDSA Book Of Abstracts!

We are thrilled to showcase the incredible research undertaken by dental students from across the UK. This booklet represents the hard work, passion and innovation of students who have pioneered their own research in a dental field of their choosing.

The return of the Research Summit this year saw great success. It brought together students and clinicians to explore new ideas, share insights, and spark conversations that will shape the future of dentistry. We had a plethora of wonderful and broad submissions, ranging from 'Decolonising the Dental Curriculum' to 'The interplay between Islam and Oral Healthcare', both of which are featured below. I am also proud to say that this year's Research Summit saw increased submissions, over triple that of the last Summit! Additionally, and we saw engagement from all 5 years, from various Dental Schools across the UK, making it a successful contribution from our current upcoming generation of young dental professionals.

This booklet not only celebrates the achievements of our peers but also encourages us all to continue learning from each other, fostering collaboration, and advancing the standards of oral healthcare. We hope that you find inspiration in these abstracts, and that they spark conversation, driving forward new ideas and advancements in the field of dentistry.

A special thank you to Curaden UK for their sponsorship and to the esteemed Professor Abigail Tucker and Dr. Sadia Niazi, from Kings College London for carefully handpicking our first place, and highly commended students.

On behalf of the BDSA, thank you for engaging in this year's Annual Research Summit!

Aliysha Rahman

BDSA Academic Officer 2023/2024

First Place - Jan Horackiewicz

Prognostic significance of blood results in oropharyngeal squamous cell carcinoma

University of Glasgow

Background:

Incidence of oropharyngeal squamous cell carcinoma is on the rise in developed countries due to an increase in HPV related carcinogenesis. Currently, the HPV+ OPSCC is associated with better long- term survival outcomes and there are ongoing trials on de-escalation treatment for this cohort but the impact of inflammatory blood markers is unknown. With little evidence behind the association between OPSCC, HPV status and inflammatory markers, this study aims to establish the effect of these on patient overall survival and potential clinical implications.

Methods:

All OPSCC patients presenting between January 2012 and March 2019 were identified from the West of Scotland Head and Neck Cancer multidisciplinary team database and data collected retrospectively from the electronic patient record. ROC curves were constructed and significant cut-off values obtained in respect to death and albumin, neutrophil-lymphocyte ratio, platelet-lymphocyte ratio, lymphocyte-monocyte ratio, systemic immune inflammation index, and age. Kaplan-Meier survival curves were constructed for the following variables and stratified by HPV status; median survival times were obtained. Univariate and multivariate analysis of patient survival has been run in respect to the above variables, their HPV status and AJCC TNM8 stage.

Results:

716 patients were identified of mean age 60.6 (SD=9.6), 76.1% being males. 51.0% of patients were current smokers whilst 28.6% and 12.3% reported current and previous excess alcohol use respectively. 28.9% of patients presented with AJCC TNM8 stage I, 16.5% with stage II, 20.0% with stage III and 33.0% with stage IV. 47.2% of patients were HPV- with average survival time of 28.6 months of which 75.7% were proclaimed dead at the time of data collection as compared to 52.8% of HPV+ patients with survival time of 44.6 months and 31.8% dead. ROC cut-off values were established to

be albumin=35.5g/L, NLR=3.1, PLR=205.1, LMR=2.2, SIII=820.2 and for age=62.5 years.

There was a significant difference in survival over time in relation to all the inflammatory blood markers for overall cohort and after stratification to HPV+ and HPV- groups. The median survival times also differed between groups.

Univariate hazard ratios for overall survival in respect to ROC cut-off values were:

0.277(95%CI:0.224-0.342) for albumin concentration, 2.246(95%CI:1.828-2.759) for NLR, 1.938(95%CI:1.561-2.405) for PLR, 0.440(95%CI:0.359-0.540) for LMR, 2.263(95%CI:1.841-2.782) for SIII.

In multivariate analysis, following variables were found to be independent predictors of survival in relation to their cut-off values: Age (HR=1.480, 95%CI 1.185-1.848), HPV status (HR=1.593, 95%CI 1.124-2.257), albumin concentration (HR=0.477, 95%CI 0.357-0.559), LMR (HR=0.703, 95%CI 0.539-0.918) and TNM8 stage – I vs II (HR=1.846, 95%CI 1.211-2.813), I vs III (HR=2.399m 95%CI 1.625-3.542), I vs III (HR=3.556, 95%CI 2.305-5.486).

Conclusion:

The data suggests that values of albumin concentration and LMR are independent variables that could possibly predict patient survival outcomes, aside from HPV status, age or disease stage. These are easily available blood indices that could affect the plan and intent of treatment for OPSSC patients leading to improved quality of care.

Highly Commended - Erica Aammton

Oral Health Knowledge, Attitude, Practices and Dietary Habits Among Secondary School Students in Brunei Darussalam

University of Glasgow

Background:

In Brunei Darussalam, the Ministry of Health has implemented strategies focused on oral health promotion in the country which includes collaborating with the Ministry of Education to integrate oral health education into school subjects, regular toothbrushing sessions and annual dental screenings. However, these toothbrushing sessions and dental screenings only occur in selected government primary schools and their impact has not been fully studied. Furthermore, there has been a lack of research studies focusing on the dental health of secondary school students, particularly concerning their oral health knowledge, practices and dietary habits.

Methods:

his is a cross-sectional study conducted on 9 secondary schools randomly selected from all districts in Brunei Darussalam, between November 2020 and February 2021. All the Year 7, 9 and 10 students were invited to participate where they completed a questionnaire addressing their oral health knowledge, attitude, behaviour, practices, and dietary habits.

Results:

722 students (66.5% response rate) participated in this study. Female students attained higher marks (7.02) than their male (6.69) counterparts (p = 0.13). Students from the youngest age group (11-12 years old) scored more marks (7.41) than the older students aged 13-14 (6.87) and 15-16 years (6.49) (p = 0.04). Only 28.5% of students have regular dental visits. More students from the youngest age group visit their dentists regularly, which is more than the older age groups (p = 0.01). 92.8% of students brush their teeth at least twice daily with most (44.0%) brushing for at least 2 minutes. More female students (95.7%) brush their teeth at least twice a day than the male students (88.5%) (p = 0.02). Most students have low rates of consumption of chocolate/candy (75.2%) and soft drinks (77.4%)

Conclusion:

This study has demonstrated that most students have satisfactory knowledge, attitudes, behaviour and practices on oral health and hygiene, with low rates of consuming sweetened foods and beverages. Interestingly, students from the youngest

age group had better results than the older students. This may be explained by annual dental screenings at most primary schools and the success of oral health promotion programmes such as the Daily Fluoridated Tooth Brushing programme.

Kiran Sahota

Decolonising the Dental Curriculum

University of Bristol

Background:

In 2020 the GDC recognised the dental curriculum is largely informed by Western and Eurocentric. thinking and stated a need for decolonising the dental curriculum. However, there has been little in the way of understanding what decolonising means and how changes can begin to be implemented to make dental education more inclusive to support dental students and staff in working more confidently and competently with diverse patient populations. This paper will present findings from mixed method research including focus groups, individual interviews, and an all-school survey. Additionally, diverse speakers from marginalised communities were invited to share patient experiences. The study sought to understand decolonising both from the perspective of changes to curriculum and as barriers faced by minoritised students accessing the course. The aim was to make recommendations towards a change of culture within the school to make it more inclusive and to make dental services more accessible to minority communities. This paper will present early findings.

Methods:

Dental students were recruited as co-researchers and led focus groups with their respective year group. All student co-researchers received anti-racism and research training by the study lead in preparation to undertake the focus groups. Research questions were devised to draw out details on differences of individual experiences of non-white and white students and explore how racism, white privilege, and decolonisation are perceived within the school and explore ideas on how to create more inclusive practices. In addition, individual interviews with key teaching staff and professional services staff as well as an all-school online survey were held as part of this study. Overall, there were 111 respondents across the study. Thematic analysis was undertaken of the qualitative data.

Results:

The study found differences in experiences between non-white and white students. Students of colour were more likely to feel minority experiences were underrepresented in teaching materials, and shared experiences of bias and microaggressions which they felt were not always understood by white staff. There were also differences in participation, with greater numbers of non-white students

participating in the focus groups. This contrasted with staff participation, where more white staff participated in the research compared to non-white. Students felt more comfortable discussing race than staff. Although there was some scepticism about how and whether decolonisation could be achieved, students and staff overwhelmingly expressed support of a more inclusive curriculum. Evaluations of the external speakers found all staff and students attending gained new knowledge.

Conclusion:

This study found even small changes such as having speakers from minoritised communities share lived experiences benefited staff and students' knowledge and practice. Student experiences differ across white and non-white students, and it is essential to acknowledge and address this to ensure all students have an equitable experience. Findings highlighted the impact of bias on learning experience for students. Training and understanding of antiracism for dental staff and students is a key step towards decolonising the curriculum and could help future dental professionals deliver oral health care that meets the needs of all patients

Mohammad Khalfan

Ergonomic Measures to Prevent the Development of Work-related Musculoskeletal Disorders in Dentistry: A Systematic Review.

University of Glasgow

Background:

Work-related musculoskeletal disorders and pain (WMSDs) carry a high prevalence in dentistry. Although WMSDs are multi-factorial in origin, they are often linked to the method of treatment delivery (i.e., the use of vibrating instruments while adopting an awkward posture for lengthy appointments). The repeated and cumulative exposure to such training places undesirable stress on several regions of the body, such as the forearm and wrist, neck, shoulders, lower back, knees, and ankles. Untreated effects of WMSDs can evolve into degenerative and inflammatory processes like tendinitis and carpal tunnel syndrome and also influence one to have an early retirement to avoid further health implications. This literature review aims primarily to collate and evaluate available evidence on the impacts ergonomic measures possess on the working posture and WMSDs of dental professionals.

Methods:

Electronic databases (Google Scholar and PubMed) were searched for the question of interest. The search terms consisted of "Dental professionals/personnel", "Ergonomics"., "Ergonomic interventions", "(primary) Prevention", "Musculoskeletal pain", "Musculoskeletal disorders". These were used with adjuncts of "or" as well as "and". Additional papers were identified by reviewing the bibliographic lists of the original papers. The last search was performed on June 13th, 2023.

Eligibility criteria:

observational studies such as cohort studies and randomised controlled trials (RCTs) that are published in English after January 2005 to the present date were included in the review. Case reports and systematic reviews were excluded from the literature search.

Results:

The literature search has identified a total of nine papers (n = 9).

Conclusion:

Ergonomic measures are cost-effective and associated with improved WMSDs symptoms and working posture. This is because they magnify the visual field of the teeth and gingiva, resulting in clearer vision and supporting the lumbar region when performing dental procedures, which allows for maintaining the natural curvature of the lower back. Therefore, we recommend early implementation of such measures during the preclinical studies, delaying the development of WMSDs. Larger longitudinal studies are warranted to investigate the role of cognitive and organisational ergonomic intrusions on WMSDs.

Hafsah Hayat

Interplay between muslim faith and oral healthcare

University of Cardiff

a. Background and aims

Practitioners' religious competence can enhance the public perception of dentistry. The literature regarding Islam-sensitive oral healthcare is limited. This paper aims to address gaps concerning the Islamic perspective towards health, barriers to care Muslims face, and interventions that cater to the aforementioned. The aim is to minimise the dissonance between patient-practitioner expectations and facilitate a more patient-centred, holistic approaches to health promotion. Additionally, the reader will feel more confident in managing the patient and giving belief-tailoured advice.

b. Methods

A narrative literature review of published journal articles following PRISMA guidelines.

c. Results

The search strategy procured 39 studies, which were then divided into five subgroups: Islamic attitudes to and understanding of health and illness; Miswak; Ramadan; health inequalities, discrimination, and barriers to care; proposed interventions and accommodations. Only one paper discussed in detail many of the above identified themes and thus remained uncategorised. Most of the studies reviewed Islamic influence on health and in the health sector in general, with a minority focusing on oral health. Assessing the influence of Islam in isolation was made challenging by the confounding impact of cultural beliefs, race and ethnicity as well as lack of religiosity measures.

d. Discussion

Following identification of gaps in the research, this paper proposes that development of measures of religiosity would allow for more rigorous, targeted studies. This would facilitate quantitative studies to evidence the effectiveness of any proposed interventions tailoured to Muslims, intending their reflection in national guidelines, thus enabling their widespread implementation

Radhika Sharma

Do we need more Medical Education for our Dental care – The Implications of Polypharmacy

Background:

While there's a significant emphasis on dental care and promoting improved oral health, it remains that many individuals in the community and primary care settings are unaware of the importance of communicating medication information to their dentists. Despite the growing attention to Oral Health Instruction (OHI) and the recent surge in people seeking aesthetic improvements in oral health, it is crucial to ensure that patients comprehend how their medications can impact oral health. Improving diet, quitting smoking, and enhancing brushing techniques are undoubtedly valuable preventative measures, but patients should be well versed in medications and the impact they can have on their oral health.

The objective is to assess the societal knowledge about the potential implication of medications on oral health and determining whether there is a need for improvement in this regard within the dental profession and educating our patients on this topic.

Method:

In this cross-sectional study, the data collection approach involved having participants complete a questionnaire to express their confidence levels in understanding the implications and influences of medications on oral health. The study transpired throughout January 2024, with results documented on paper from a diverse group of participants. A pharmacist supervised the data collection, and participants were chosen randomly using a non-biased method to prevent result skewing. Furthermore, the data was collected within a specific locality to ensure a study cohort with a similar socioeconomic background, minimizing potential external influences on the results.

Results:

150 participants completed the questionnaire

- 34% said 'Not very confident at all (I didn't know they could have an effect on my oral health'
- 32.7% said 'I have very little understanding, but I know there must be some effect'.
- 14% said 'I know there is a link, but I do not know how'.

- 10.7% said ‘I am confident in knowing that medications can affect my oral health, but I am not sure which medications can or what they do’.

- 8.6% said ‘I have a complete understanding on medications and the impact they can have on my oral health’.

Conclusion:

The study indicates that a significant majority of participants were unaware of the potential impact of medications on their oral health. Despite the increasing awareness and promotion for oral health in recent years, the dental profession appears to have overlooked a crucial aspect of educating patients on understanding the implications of medication on oral health. This study underscores the importance of educating our patients on this matter, aiming to prevent potential oral health issues in the future. By enhancing patient awareness of how medications can affect them, we empower them to take proactive measures, reducing risks and better equipping them to manage and anticipate potential effects.

Yasmin Keyhanian

Quantification and Morphological Analysis of Candida albicans growth on different culture media: A Comparative Study of SDB and RPMI with or without 10% FBS

University of Cardiff

Background:

Candida albicans is a commensal fungus that colonises the oral cavity and can cause Candida stomatitis which affects up to 70% of denture wearers. Whilst the aetiology of this disease is not yet fully understood, mechanical denture stress combined with the imbalanced, reduced oral microbiome diversity attributed to old age are conditions that appear to favour the colonisation and reversible transformation of Candida morphology from the unicellular yeast stage to filamentous hyphal form characteristic of fungal pathogenesis. Understanding the impact of growth media on C. albicans behaviour is integral to effectively studying its pathogenesis and can contribute to the development of improved antifungal therapies.

Methods:

Planktonic phase yeast growth patterns and morphological features of C. albicans in four different media (sabouraud dextrose broth (SDB), SDB with 10% fetal bovine serum (FBS), RPMI 1640, advanced RPMI 1640 with 10% FBS) were compared using colony-forming unit (CFU) counting and confocal laser scanning microscopy (CLSM) imaging to quantify and visualise fungal growth.

Results:

As SDB media has a higher glucose content (20g/L) than RPMI 1640 medium (2g/L), it facilitated copious growth of C. albicans in planktonic culture. The addition of FBS, a supplement to culture media rich in proteins and growth factors, further enhanced the efficacy of both. RPMI 1640 medium heightened hyphal formation the most and therefore may have the potency required to initiate in vitro biofilm development.

Conclusion:

Although this data indicates that more attention should be paid to the choice of laboratory culture media used in experiments involving Candida albicans, further investigations into their biofilm forming potential is necessary for cross comparison purposes; before substantive conclusions on a choice medium can be reached, as there is no consensus recommendation yet.

Amir Mukhtar

Plant-derived Nanoparticles Guiding Stem Cells to promote Bone Regeneration

University of Liverpool

Background:

A novel approach to promote bone regeneration is via plant-derived nanoparticles. We have previously shown how poly (l-lactide-co-ε-caprolactone) (PLCA) scaffolds functionalised with RG-I (rhamnogalacturonan-I) pectin isolated from potato, can modulate inflammation, and promote bone regeneration both in vitro and in vivo. We also observed that RG-I and galectins, particularly Galectin-3 (LGALS3) are hampering the inflammatory response from immune cells. In this study, we aim to identify how the use of RG-I might affect individual genes and/or pathways using an in-silico analysis in addition to the reduced expression of LGALS3

Methods:

Potato RG-I was enzymatically modified to shorten arabinose side chains to produce RG-I dearabinated (PA) that has been used for surface coating. Human mesenchymal stem cells were isolated from bone marrow of patients over 60 years old and cultured on PA coated and control (uncoated) tissue culture polystyrene surface (TCPS). Transcriptomic profiling (Illumina) identified 43 genes differentially expressed (DE) between control and PA coating with false-discovery rate (FDR) >0.1. Ingenuity pathway analysis (IPA) was performed to identify pathways and gene networks in relation to LGALS3.

Results:

Pathway enrichment analysis for diseases and functions of the DE genes showed implication for organismal disorders-abnormalities, connective tissue disorders, immunological and inflammatory diseases, inflammatory response and skeletal muscular disorders. Three networks were identified by IPA with genes involved in: (1) organismal injuries and abnormalities, cancer, cellular assembly, and organisation; (2) cellular function and maintenance, growth and proliferation; (3) DNA replication, recombination and repair. Networks 1 and 2 showed high, similar scores and focus molecules however LGALS3 gene was only expressed in Network 1. Upstream regulators within this analysis involved genes like IFN-α/β, DYSF, MYBL1, ADAR and SNORD21 with p-values <0.05 but it was not possible to predict whether they were activated or inhibited due to the small number of genes in the study.

Conclusions:

In silico analysis highlighted the involvement of several genes including LGALS3 cellular, inflammatory, and immunological functions. Although this is only prediction modelling, it is important to further investigate the different molecular and/or cellular pathways to establish the significance of using the functionalised RG-I PA scaffolds.

Ariela Veizaj

Periodontal Ligament Stem Cells in Periodontium Regeneration: A Critical Review of Properties, Translational Approaches, and Future Prospects

University of Kings College London

Background:

The periodontium comprises highly specialized tissues, including the periodontal ligament (PDL) which is crucial for supporting teeth, masticatory function, and occlusal loading. Periodontitis, a highly prevalent inflammatory condition, is widespread and results in the gradual and irreversible deterioration of periodontal tissues, emerging as the leading cause of adult edentulism. The primary objective is reinstating the physiological function of the periodontal tissues and particularly, the periodontal ligament (PDL). Regrettably, existing treatments can merely impede the advancement of the disease. Mesenchymal stem cells (MSCs) residing in the periodontal ligament, identified as periodontal ligament stem cells (PDLSCs) by Seo et al. (2004), show self-renewal and differentiation capabilities, holding promise for future application in periodontium regeneration. However, the available evidence regarding clinical applications of PDLSCs in regenerative therapy is inconclusive. A comprehensive review of PDLSC properties and translational approaches would be valuable to succinctly summarize the existing understandings and provide guidance for forthcoming studies.

Methods:

Extensive literature searches were conducted utilising the databases of Google Scholar, PubMed and Scopus to gather relevant in vivo and in vitro studies. Papers were filtered using keywords along with inclusion/exclusion criteria in order to select those written in English pertaining to PDLSC characteristics, isolation methods and experimental approaches with resultant effects on PDL regeneration described. Data was extracted from each paper and compared, and statistically significant differences between experimental and control groups were regarded as $p<0.05$ where relevant.

Results:

Studies were categorised into three different translational approaches which were critically analysed, including: cell sheets, scaffold fabrication techniques and computer aided scaffold design. PDLSCs exhibit notable regenerative potential, demonstrating

self-renewal and multilineage differentiation capabilities. Various isolation techniques have been proposed, and experimental studies highlight the potential of PDLSCs in promoting periodontal tissue regeneration. However, challenges such as standardization of isolation protocols, understanding the optimal conditions for differentiation, and ensuring long-term efficacy in clinical settings need to be addressed.

Conclusion:

In conclusion, the properties of periodontal ligament stem cells (PDLSCs) hold significant promise for a novel clinical approach to treating periodontal disease and regenerating periodontal tissues. The encouraging features of PDLSCs have been demonstrated in various studies, showcasing the potential success of PDLSC-based therapies. However, by 2024, the author is aware of only one human randomized controlled trial. Although the contributions of Chen et al. (2016) did indeed validate the safety of regenerative therapy based on PDLSCs, they did not attain statistically significant results endorsing the regeneration of the periodontium with PDLSCs. It is important to note that we have not reached a stage where these therapies can be commercially accessible, and the author proposes that this likelihood may not materialize in the near future. Importantly, additional investigations are essential to explore PDLSC therapy in humans, encompassing extended observations over the long term.

Jemimah Chhoa Sheau Min

Undergraduate Students Can Play a Role in Multi-Centre Dental Trials: My Experience in the ENHANCE-D Trial

University of Glasgow

Introduction:

Clinical research and development in dentistry has yielded significant improvements in dental care. Dental care costs represent approximately 6% of the healthcare budget spend. However, the research activity and funding in dentistry represents less than 1% of the health care research spend. Therefore, there is disproportionately low research spend and activity in dentistry compared with other specialties.

To meet the ever-increasing challenges of dental health care delivery, there is an urgent need for a re-think of dentists' involvement in research.

Aim:

To identify potential opportunities for undergraduate dental students to gain clinical research experience as part of an NIHR funded, multi-centre clinical trial.

Methods:

I sought appropriate training and skills development so I could be part of a clinical trial running at the University of Glasgow Dental School. ENHANCE-D is a large, multi-centre randomised controlled trial led by Newcastle University. The trial is funded by NIHR and aims to research the effectiveness of three different dental health advice packages, offered by a dental professional, and whether these packages have a beneficial outcome for general dental health and for saving the NHS money. The University of Glasgow Dental School is one of six UK hubs working on this trial. The trial is recruiting patients receiving care in the undergraduate student dental clinic.

I obtained Good Clinical Practice (GCP) Training via an NIHR online course. This provided GCP certification for two years. I received training from the study team through participation in meetings, shadowing on patient recruitment on clinics, and attending patient questionnaire and interview sessions.

Results:

Undergraduate students can play a role in dental research. As an undergraduate student I was able to provide a conduit for patient recruitment. I was able to screen patients attending a variety of student clinics. In this trial, the patient interviews often took place either before or after student treatment is carried out. The timing of these arrangements allows students to attend these interviews. Active participation in research facilitates skill acquisition and exposure to the research

world, paving way for potential future engagement in research and contributing to the community.

Conclusion:

Undergraduate student roles in research can be mutually beneficial to both student and research teams. There is arguably potential for student-specific roles to be established in clinical trials. This opportunity has effectively bridged the gap between my student academic life and the research realm, enabling me to learn technical research skills and developing soft skills in teamwork. Establishing student-specific research roles is essential to both the immediate benefit of the research team and the longer-term development of the workforce.

The study is funded by the National Institute for Health and Care Research (NIHR) [Health Technology Assessment (NIHR129780)]. The views expressed are those of the author(s) and not necessarily those of the NIHR or the Department of Health and Social Care.

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Affiliations: University of Glasgow, National Institute for Health and Care Research (NIHR)

Shuning Li

Periodontal Disease and Cardiovascular Care: a Mixed Methods Review

Kings College London

Background:

Although a link between periodontitis and cardiovascular disease (CVD) has been reported for many years, there is limited evidence on whether periodontal treatment (PT) may be able to reduce cardiovascular risk. The objective of this narrative review is to investigate the effects of PT on CVD risk for both primary and secondary outcomes. A total of 18 studies were included, each evaluating the effect of PT and CVD biomarkers.

Methods:

Electronic databases Pubmed, Embase and Cochrane Library were searched with terms including “cardiovascular disease”, CVD”, “periodontal disease”, “inflammatory biomarkers”, “periodontal treatment” alone and in combination from 2016 to 2020. Papers referenced in randomised trials and systematic reviews were checked to ensure any relevant papers were not missed. Randomised clinical trials and controlled clinical trials that investigated at least one of the following periodontal treatments were included: non-surgical PT involving oral health instruction and SRP, surgical PT or adjunct therapies such as chlorhexidine gel and antibiotics. Only studies that reported on human subjects presenting with periodontitis (pocket depth >3mm) were included, whilst animal studies and studies in vitro were excluded. Due to the nature of this study, patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Results:

Since the last consensus report on PD and atherosclerotic CVD, no prospective randomised controlled periodontal intervention studies on the primary prevention of CVD have been conducted. However, observational evidence has suggested that oral health intervention such as basic oral hygiene habits including tooth brushing and increased dental visits reduced the incidence of ACVD events There is only one pilot, multicentre randomised controlled study on the secondary prevention of AVCD events which reported no significant difference in the rate of CVD events between patients who had PT versus patients who had community care. Several methodological limitations regarding study design such as too stringent PD level requirements and a too small sample size means that there is insufficient evidence to

test the hypothesis that PT can reduce the incidence of secondary cardiovascular events.

Conclusion:

Overall, although there is a large body of evidence that shows that PT can reduce levels of CVD biomarkers, more research is needed to determine whether improvement in CVD biomarkers by PT is directly linked to reducing CVD risk.

Sahba Adhababaei

Nanotechnology in Dentistry

Kings College London

Nanotechnology is the development of molecular structures that have dimensions in the nanometre range. This state of art platform has a vast range of potential applications in dentistry. This review will focus on how this technology can be used to minimise the occurrence of white spot lesions in orthodontic dentistry. White spot lesion is a prevalent condition which puts the patient's oral health at risk and leads to lower patient satisfaction post orthodontic treatment. The following hypothesis will be analysed: 'Will the use of nanoparticles in orthodontic backers, minimise the occurrence of white spot lesions during orthodontic treatment, without negatively effecting the shear bond strength of brackets?'. The report will assess the three different types of nanoparticles that have the potential to reduce the prevalence of white spot lesions, due to their antibacterial properties, during orthodontic treatment. Different study results for each individual nanoparticle will be compared. The use of the three different nanoparticles will each be analysed and the limitations of each will be discussed. To find reliable resources, I mainly used databases such as PubMed and Elsevier, to find English language primary research papers. To gain a better understanding of the topic, I identified several, systematic reviews. The keywords for this research were based on 'nanotechnology', 'nanoparticles', 'orthodontic treatment', 'antibacterial properties' and 'white spot lesions', I used up to date papers from reliable sources. Furthermore, to note any changes in research over time, I also utilised older papers. Both silver and NACP nanoparticles have proved to be effective to be used on orthodontic brackets. In a different study, AgNPs was incorporated into NACP composite. In comparison to the control, the colony formation unit (CFU) counts, and lactic acid production was reduced. Therefore, this novel combination, greatly reduced biofilm viability and the metabolic activity of the bacteria(Cheng et al., 2012). Just like AgNPs, TiO2 nanoparticles have effective antibacterial properties, without compromising the shear bond strength. However, different studies have shown that the use of AgNPs can lead to the formation of dark stains. Even though, some studies have suggested the use of certain concentrations of AgNPs, minimises this effect, the use of TiO2 nanoparticles, takes away the aesthetic concern associated with AgNPs(Heravi et al., 2013b). Even though it is more likely for white spot lesions to appear on maxillary incisors, currently, most of the research is carried out on premolars and molars. Due to the current research showing promising effects, there is an imminent need for more extensive, long term, in-vivo research to be carried out, to better assess the antibacterial properties of nanoparticles on orthodontic brackets. The application of nanotechnology and the

incorporation of these nanomaterials results in remineralisation, acid neutralisation and antibacterial capabilities which would enhance the quality of patient care provided and result in high patient satisfaction, post treatment process(Cheng et al., 2015)..

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Dihya Flitti

An Assessment of the Reporting of Orthodontic Studies Conducted Using Animal Models

Kings College London

Background:

The ARRIVE 2.0 guidelines were introduced to improve the reporting of animal studies. The aim of this study was to assess the reporting adherence of animal studies published in orthodontic journals in relation to ARRIVE 2.0 guidelines. Associations between the reporting score and study characteristics were explored.

Materials and method:

A search of five leading high impact orthodontic journals was undertaken to identify animal studies published between 1st January 2018 and 31st July 2023. Data extraction was performed in duplicate and independently. Descriptive statistics and frequency distributions for the responses to each checklist item were calculated. Mean values for adequate reporting per checklist item and a summary score was calculated by adding the responses (0=not reported, 1=inadequate reporting, 2= adequate reporting) per item question and sub-questions (maximum score 72). On an exploratory basis, univariable and multivariable linear regression between summary score and the study characteristics was implemented.

Results:

Eighty-one studies were analysed. Variability in the adequate reporting of the ARRIVE 2.0 guideline items was evident. Overall, the mean reporting score for the sample was 49.6 (SD 6.2 and Range 35-61). A non-significant, trend of slightly improved reporting across the study timeframe was evident. Slightly higher scores were evident if the article had been reported in relation to ARRIVE guidelines. In the multivariable analysis, journal title was the only significant predictor of the reporting score ($P<0.01$). Continent of corresponding author, stated reporting in relation to ARRIVE, centre, involvement of statistician, year of publication and number of authors were not significant score predictors.

Conclusions:

Reporting of studies utilising animal models published in high impact orthodontic journals, are sub-optimal in relation to the ARRIVE 2.0 guidelines. Adequate reporting of items pertaining study methodology, results and interpretation were lacking.

Greater awareness and reporting adherence to the ARRIVE 2.0 guidelines is required to reduce research waste involving animal models.

Sarah Al Chalabi

From Prevention to Restoration: Optimising Tooth Wear Management

Kings College London

Background

Tooth wear, the loss of dental hard tissue by chemical or mechanical processes without bacteria, encompasses attrition, abrasion, erosion and abfraction, with lifestyle habits accelerating the process. The 2009 national survey revealed that 2% of adults had severe tooth wear, 15% had moderate wear and 77% exhibited some level of wear. Therefore, it is imperative for clinicians to understand the tooth wear management due to its significant prevalence among patients.

Methods

Research from PubMed, the Wiley Library and Google Scholar yielded reliable, up to date information, focusing on indirect and direct management of tooth wear. Given the limited research, the most robust and relevant data was critically selected for review.

Results

Physiological tooth wear (where the severity matches expectations for the patient's age) does not require management. However, pathological tooth wear (where severity exceeds expectations for the patient's age, or the patient presents aesthetic concerns, symptoms, or a poor tooth prognosis) necessitates a tailored plan after confirming a diagnosis from preliminary investigations. Management is split into prevention and restoration.

Prevention considers the aetiological nature of tooth wear and is not limited to any step of the management process, nor to any degree of tooth wear. It can be simplified into counselling (patient education, launching a prevention-based programme, and identifying risk factors) and monitoring (measuring severity and progress using index scores or casts and digital 3D images, and observing the patient's co-operation with advice provided).

Orthodontic interventions like the "Dahl concept" may be required to create interocclusal space for restorations and to treat severely worn anterior teeth. This approach is biologically conservative and can reverse alveolar compensation. Tooth

heigh consideration is crucial; a minimum of 50% of the original structure is needed, otherwise crown lengthening becomes vital.

Direct composite resin is encouraged for aesthetic, conservative and reversible results, despite the material being brittle and prone to frequent fractures and replacement. Indirect restorations (crowns, veneers, bridges, and prosthetic treatments) are low maintenance and durable, although they are irreversible and less preservative. Therefore, they may be used if composite restorations have a high risk/frequency of failure for the given case, or if over half of the crown is lost and operative crown lengthening is contraindicated.

Removable prosthodontic techniques may be integrated into management if the patient has severe generalised tooth wear, is partially dentate, prefers having removable prostheses, or is not suited to fixed prosthodontic treatment. It is imperative to provide patients with excellent oral hygiene instruction, otherwise plaque will accumulate, and complications may develop.

Conclusion

Pathological tooth wear demands management, and a robust diagnosis is pivotal for success. Management involves prevention and restoration and is tailored to the patient's needs and the aetiology of their wear. Prevention may include altering lifestyle habits based on identified risk factors, whereas restoration includes direct and indirect restorations, orthodontic intervention, and removable prosthodontics. Regardless of the proposed plan, counselling and monitoring through digital images and casts are integral to review management effectiveness. Further research is required to understand long-term survival of restorations.

Emily Swift and Claudia Kirby

Measuring Progress: Revisiting the LiveSmart Programme in Cape Town After Five Years

Kings College London

Background:

The LiveSmart programme was introduced in Cape Town to address oral health issues in children. The programme runs in two townships, Mfuleni and Khayelitsha, where access to general dental services is extremely limited. It is delivered by "toothbrushing mamas" from the local community, who go into nurseries and schools to deliver supervised toothbrushing daily. In 2018, an audit was conducted by King's College London's elective students to assess the program's efficacy and identify areas for improvement. The audit found that many children only brushed their teeth at school, indicating the need for upstream and downstream interventions. For this re-audit, a standardised data set was used to establish a 5-10% improvement in brushing frequency since the last audit.

Methods:

The re-audit adhered to the same methodology as the previous study by asking a standardised set of questions; however, the number of questions was reduced from fourteen to nine. This modification aimed to hone the focus of the re-audit on permanent questions capable of measuring program improvement. Addressing the translation challenges identified in the prior audit, where children struggled to comprehend all questions in English, the re-audit involved posing questions to students as a class, with teachers assisting in translation. The questions were all made to have yes or no answers to simplify them for the students. This approach streamlined the process and minimised the risk of misunderstanding. Data were gathered from 129 school children, a notable increase from the 75 children included in the previous audit.

Results:

Firstly, concerning the frequency of daily brushing, our results reveal a significant improvement since the last audit. Previously, 36.7% of school children reported brushing only once a day. In the current audit, only 10% of school children reported brushing once daily, with a notable increase to 90% reporting brushing at least twice a day. Another noteworthy finding from our re-audit is that just under a third of school children reported experiencing bleeding during brushing. Consistent with previous audit results, 100% of school children responded with a "yes" to the question, "Do you like the Toothbrush Mamas coming to your school?"

Conclusions:

It is encouraging to observe that the implemented changes following the previous audit have resulted in a notable improvement of over 10% in brushing frequency. This success can be attributed to the strategic provision of at least one toothbrush for every school student, both at school and at home. By ensuring that these children have access to resources and receive education on oral health, the program has successfully integrated toothbrushing into their daily routines. The positive feedback from both teachers and school children serves as a strong affirmation of the program's significant impact. It is evident that the children not only embrace toothbrushing with enthusiasm but also view it as an enjoyable part of their school day.

Alexander Scott Ribera-Edwards

Does the addition of remineralising agents make fluoride varnishes bioactive?

Barts & The London School of Dentistry

Introduction:

Varnishes are an effective tool in caries prevention by maintaining fluoride in direct contact with the tooth surface for an extended period. A new bioactive fluoride varnish was recently launched which contains a bioactive glass (BAG) and sodium fluoride to promote remineralisation. BAGs release beneficial ions such as Ca^{2+} and PO_4^{3-}, inducing the formation of an apatite-like phase. The dissolution of BAG results in the neutralisation of the local pH, thereby potentially preventing demineralisation, as well as promoting remineralisation. Additionally, the presence of fluoride in the varnish, results in the formation of fluorapatite, which is more resistant to acid dissolution than hydroxyapatite alone.

Objectives:

The aim of this study was to investigate the bioactive properties (i.e., apatite formation and fluoride release) of the newly developed product FluoroDip bioactive (FD) (Prevest DenPro, Jammu, India) containing bioactive glass and 5% sodium fluoride (22600ppm). For comparison, two additional varnishes were also characterised, Copal F (CF), which contains only 5% sodium fluoride (22600ppm) and is produced by the same company as FD, and, Clinpro White Varnish (CW) (3M, Minnesota, USA), which contains both 5% sodium fluoride (22600ppm) with Tri-Calcium Phosphate (TCP).:

Methods:

For this study, the fluoride varnishes FD and CF were provided by the company, whereas, CW was purchased. 180mg of each fluoride varnish was applied onto 22mmx22mmx1mm glass coverslips, allowed to dry and weighed at various time points to ensure that any solvent within the varnish had evaporated completely. Each coverslip was then placed in a remineralisation solution (AS7, pH7), which contains calcium and phosphate ions, for 2, 6 and 24 hours in a shaking incubator at 37°C. Care was taken to ensure that the coverslips were placed with the varnish side up, to allow for maximum exposure of the varnish to the solution. At each time point, the slides were removed, dried and characterised using X-ray powder diffraction to detect remineralisation. The supernatant solutions were characterised, using a fluoride ion selective electrode, to determine the fluoride concentration.

Results:

There was an increase in fluoride concentration, on immersion, for all three varnishes, up to 6 hours. CW exhibited the highest fluoride concentration (0.26ppm), followed by FD (0.13ppm), and CF (0.05ppm). A reduction of fluoride concentration was seen in CW and FD over 24 hours, with the final fluoride concentration of CW and FD being 0.14 ppm and 0.09 ppm respectively. However, CP remained stable after the initial increase at 6 hours (0.05 ppm). The XRD diffraction pattern revealed changes in fluorine containing crystals inside the varnishes during the immersion over 24 hours.

Conclusion:

The availability of fluoride was expected to aid in the conversion of hydroxyapatite to fluorapatite for caries prevention. However, in terms of bioactive properties, there was no substantial difference between the three varnishes limited to the conditions of this study.

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