



**RESEARCH SYMPOSIUM 2020**

**Proceedings & Abstracts**



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## PRESENTATION

As the current President of the International Association for Disability and Oral Health (iADH), I am delighted to present the official abstracts book for the 2020 iADH Oral Health Research Symposium. iADH is a long-established global organisation offering support and sense of community and rich networks for more than 8000 members worldwide who are interested in promoting better oral health outcomes for people with disabilities, through dental education, advocacy, research and clinical practice in the discipline of Special Care Dentistry.

People with disabilities have poorer oral health than their non-disabled peers wherever in the world they are born. When they are able to access care, the outcomes of those interventions are also poorer than their non-disabled peers with reduced or limited treatment choices informed by low grade evidence. The evidence deficit is made worse by a reluctance on the part of researchers to include people with disabilities in clinical research. It's the easy choice, or maybe sometimes the mindless choice to automatically tick the box that excludes people with disabilities or medically complexity or any cognitive impairments from necessary research in oral health. There is therefore an urgent and pressing need for high quality research to inform dental care for people with disabilities.

IADH has long championed the need for evidence informed dental care amongst it's membership. Our most recent 2020 iADH Oral Health Research symposium brought together over 100 early career and established researchers interested in this emerging and important area. Central to the symposium were the IADH research competitions, with awards for basic and translational research, clinical research and education research.

I am so delighted to celebrate the work of this group of early career and established researchers, working in all areas in health and social care who chose the road less travelled. Those who took the time, effort and courage to design inclusive research taking account of communication, structural, environmental and medical barriers, to enable better clinical outcomes in those groups of patients that need it most. It is often reported that it takes at least 15 years for research in any field to translate into clinical outcomes, so we are at the beginning of our journey. Nevertheless, research symposia and rapid reporting of results facilitated through abstracts and extended abstracts such as this publication helps accelerate dissemination and translation of evidence.

IADH, is committed to promoting research in disability and oral health and in that regard during my term of presidency we will be looking for ways to foster and develop opportunities for our members to widen their research networks by collaborating with other professional research organisations and facilitate research contacts for international and multicentre projects. It's also time to lead by example with advocacy at the top of the list to remind funders and researchers to ensure inclusive co designed research criteria wherever possible so that no-one is left behind.

I hope that you find the work of the IADH valuable in this issue and take the time to read and digest the diversity and scope of possibilities offered by future research in this area.

Dr Alison Dougall

iADH President



## IADH 2020 BASIC AND TRANSLATIONAL RESEARCH AWARD

### Do periodontal disease and Alzheimer's disease share a background of genetic susceptibility?

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### Abstract

Periodontal disease and Alzheimer's disease (AD) are very prevalent in worldwide population. Inflammation is known to play an important role in both diseases, so there is growing evidence of an association between periodontitis and AD. The aim of this study is to investigate the shared genetic background between AD and periodontitis (PD). Our target sample includes 5,971 AD cases and 4,737 controls from the Genome Research at Fundación ACE (GR@ACE). We develop polygenic risk scores (PRS) for our target sample using the 6 single nucleotide polymorphisms (SNPs) ( $p < 5 \times 10^{-6}$ ) from the most recent PD meta-analysis. We found no significant difference in PD risk between AD cases and controls. The  $R^2$  change for the inclusion of PRS was 0.006. Despite previous reports of association, no evidence of association between AD and PD was found.

### Introduction

Alzheimer's disease (AD) is the most common neurodegenerative disease which courses with cognitive and

functional decline associated with age. Although AD disease is not classically considered an inflammatory disease, there is a chronic endogenous inflammatory reaction in the affected tissues. Chronic inflammation of the central nervous system produced by the increased levels of inflammatory mediators, such cytokines, and microglial activation stands out during the pathogenesis of AD (1).

Periodontitis (PD) is considered a chronic multifactorial inflammatory disease associated with dysbiotic plaque biofilms and characterized by progressive destruction of the supporting tissues of the tooth that eventually may result in tooth loss (2). PD is characterized by the release of inflammatory mediators and the introduction of periodontal pathogens into systemic circulation, contributing to exacerbate pre-existing systemic pathologies (3).

Several studies have shown the pivotal role of inflammation and bacteria associated with periodontal disease, serving as possible connecting link between PD and AD. The most recent study on the subject is the one conducted by Dominy in 2019, which identified the bacteria *Porphyromonas gingivalis*, one of the most important pathogens in periodontitis, in Alzheimer's disease brains (4). They showed that *P. gingivalis* increased the production of amyloid beta, a component of the amyloid plaques, whose accumulation contributes to AD.

An important index to study the existing comorbidity between two traits is the polygenic risk score (PRS). PRS is an estimate of an individual's genetic liability conferred by common variants of the studied trait or disease. To generate a PRS are required the summary statistics from a discovery sample, usually genome-wide association study (GWAS) data. PRS is calculated for each individual from the target sample and is defined as the sum of an individual's risk alleles weighted by their corresponding effect (5). This approach has been extensively applied to find shared genetic susceptibility among main psychiatric disorders (6). However, the association between a PRS based on PD risk and AD has never been analyzed. Given that the existence of a shared genetic susceptibility background between AD and PD has been proposed, single nucleotide polymorphisms (SNPs) implicated in PD may be shared with AD, contributing its onset and progression. Thus, we analyze role of PD common variants in this comorbidity using a polygenic risk score approach.

## Material and Methods

### Descriptions of Participating Studies

For the study of shared risk between PD and AD, we used the GR@ACE study (Genome Research at Fundació ACE) as the target sample. The GR@ACE comprises a total of 6093 AD cases and 4840 controls. Cases were recruited from the Fundació ACE, Institut Català de Neurociències Aplicades (Catalonia, Spain) and were diagnosed according to the Diagnostic and Statistical Manual of Mental Disorders-IV criteria for dementia and to the National Institute on Aging and the Alzheimer's Association (NIA-AA) 2011 guidelines (7). Controls were provided by Fundació ACE (Barcelona, Spain), University Hospital of Valme (Sevilla, Spain) and Carlos III DNA Spanish National DNA Biobank (University of Salamanca, Spain) ([www.bancoadn.org](http://www.bancoadn.org)). GR@ACE study was genotyped by the Centro Nacional de Genotipado-Universidade de Santiago de Compostela (CeGen-USC, Santiago de Compostela, Spain; <http://www.usc.es/cegen/>) using the Axiom Spain Biobank Array (ThermoFisher Scientific), a panel specifically designed for Spanish population. Target sample is described in more detail elsewhere (8).

We use the most recent PD meta-analysis of Munz *et al.* as discovery sample (9). Munz *et al.* meta-analysis consisted of case-control GWAS of German and Dutch AgP and of European American and German chronic periodontitis (CP) patients (9).

### Quality control and filtering

Quality control (QC) analyses were conducted on the target sample using PLINK v1.90 (<http://pngu.mgh.harvard.edu/~purcell/plink/>) (10). QC including removal of markers with missing call rates >2% and markers with genotypes not following the Hardy-Weinberg equilibrium ( $p < 0.0001$ ) or minor allele frequency (MAF) < 5%. Samples with missing genotype rate >2% were also excluded. Additionally, familiar relationship was evaluated by calculating pairwise identity-by-descent (IBD) and existence of stratification was explored by principal component analysis (PCA). One sample of each pair with familiar relationship (proportion of IBD  $\geq 0.125$ ) and individuals identified as outliers in the PCA were removed to eliminate close relatives and population stratification, respectively.

### Genotype imputation

To check the existence of genetic association between AD and periodontitis we carried out genotype imputation of variants associated at significant level  $p < 5 \times 10^{-6}$  with PD in the recent meta-analysis of Munz *et al.* (9), those that were not included in the Spain Biobank array. Imputation was conducted for each sample using the Michigan Imputation server (<https://imputationserver.sph.umich.edu/index.html>) (11), with 1000 Genomes Phase 3 b37 as reference set. We performed a post imputation QC filtering and only variants which passed the imputation quality (minimac rsq) cut-off of >0.8 were maintained.

### Composition of the Polygenic Risk Score

To test the contribution of PD to AD risk we performed predictive modelling using polygenic score based upon SNPs from meta-analysis of Munz *et al.* The individual PRS in the target sample were generated by PLINK v1.90 as sum of every risk alleles carried by an individual weighted by its corresponded effect size, measured as the logOR.

### Statistical analyses

The predictive power of the PRS was evaluated by multiple logistic regression using case-control status as dependent variable and sex and age as covariates. The first principal component (PC1), estimated using PLINK v1.9, were also included. Percentage of variance explained by each PRS, was estimated as the increase in Nagelkerke's pseudo- $R^2$  between a full model and a model without the respective PRS.

## Results

### Polygenic Risk Score

After QC procedures the target sample consisted of 5,971 AD cases and 4,737 controls. The PRS was generated from the six SNPs associated with PD in the Munz *et al.* meta-analysis discovery sample (9) (Table 1).

### Polygenic risk score prediction ability

Sex and age were significantly associated with AD status ( $p < 5.6 \times 10^{-03}$  and  $p < 2 \times 10^{-16}$ , respectively), confirming the need for adjustment for these covariates. However, the regression analysis reveals lack of significance for PRS ( $p = 0.33$ ). So, the PRS for PD is not able to predict AD/control status in GR@ACE study. In the same way, percentage of variance explained by the PRS was insignificant, 0.0057.

## Discussion

During periodontitis, the release of inflammatory mediators and the introduction of pathogens into systemic circulation activates the microglia, causing neuroinflammation (12). In the last decade, numerous investigations show a strong evidence of association between periodontitis and colonization by *P. gingivalis*, and Alzheimer's disease (4). This study was conducted to investigate the shared background of genetic susceptibility between AD and PD. Therefore, we analyze if a PRS composed of different periodontitis genetic risk variants predicted AD/control status in an AD cases and controls sample. According to the main regression analysis, the PRS generated can predict AD status.

To our knowledge there are only one study that investigated the genetic relationship between PD, specifically chronic periodontitis, and AD. In their study Sun *et al.* employed summary statistics from the latest and largest GWAS and Mendelian randomization (MR) approach (13). Unlike us, they found a weak association between the genetic liability to periodontitis and the risk of AD ( $p = 0.02$ ) using five SNPs in the meta-analysis of Munz

Table 1. SNPs in loci with suggestive association ( $p < 5 \times 10^{-6}$ ) with PD in the Munz *et al.* meta-analysis.

SNP	Location	Position (bp)*	Gene	EA	P-value (polled no NL)	OR	CI (95%)
rs16870060†	8q22.3	104098515	MTNDIP5	G	$3.69 \times 10^{-09}$	1.36	1.23-1.51
rs729876	16p13.12	13388778	LOC107984137	T	$9.77 \times 10^{-09}$	1.24	1.15-1.34
rs11084095	19q13.41	52127030	SIGLEC5-AC018755.18	A	$2.60 \times 10^{-07}$	1.16	1.10-1.23
rs2064712	6q26	161216608	ALI09933.3-AL391361.2	A	$5.29 \times 10^{-07}$	1.24	1.14-1.35
rs9982623	21q22.3	47691216	MCM3AP	C	$5.67 \times 10^{-07}$	1.24	1.14-1.35
rs9984417	21q21.1	23847110	MAPK6PS2-AP000959.2	T	$3.21 \times 10^{-06}$	1.15	1.09-1.23

SNP, single nucleotide polymorphism; bp, base pairs; EA, effect allele; OR, odds ratio; CI, confidence interval.

\*Chromosomal positions are based on hg19/GRCh37; † not imputed variant

*et al.* (9) but result was not confirmed when using the seven SNPs from the latest GWAS (14). Like them, we have used the SNPs of Munz *et al.*, but we performed a PRS generated from the six SNPs identified in the meta-analysis, and not just from five SNPs. In addition, a Spanish Alzheimer's sample was used as target sample.

The most important limitation of our study is the impossibility of generating a true PRS based on all genetic variants currently associated with PD. Therefore, the PRS evaluated in our study could be account for only small amount of variation of periodontal disease.

In conclusion, we did not find any evidence of shared genetic susceptibility between AD and PD. Given that GWAS of periodontitis up to date failed to identify consistent SNPs, larger GWAS of PD with validated definition of the trait are needed to understand the relationship between periodontitis and other diseases. Then, further PRS studies using these novel GWAS as discovery sample may investigate the potential role of periodontitis in various diseases, such as AD.

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## Conflicts of interest

All authors are required to provide a signed statement of their conflicts of interest as part of the author statement form.

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## IADH 2020 CLINICAL RESEARCH AWARD

### The use of Tele-dentistry in the Covid-19 Era for patients with inherited bleeding disorders

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#### Abstract

At the best of times people with bleeding disorders (PWB) experience multiple barriers in accessing timely dental care as invasive dental treatment requires multi-disciplinary collaboration between patients and their teams. This study evaluated the use of tele-dentistry in to support PBD experiencing dental problems during 8 weeks of Covid-19 imposed lockdown in Ireland. 73 telephone/video dental consultations were conducted during 8 weeks of data collection. Significant impacts of dental problems on relationships, sleep, nutrition or mood were reported by 29/73. 35 scripts were issued remotely for patients not managing their dental pain adequately. 8 patients were tutored in the self-placement of temporary fillings. Dental extractions were arranged for 26 patients of which 10 were carried out locally by general dentists via tele-mentoring. Online meetings with haemophilia treaters enabled timely safe local care to be provided using optimal factor regimes. The use of tele-dentistry offers the possibility to reduce many barriers to care for PBD and the teams that treat them long after the pandemic has ceased.

#### Introduction

At the best of times people with bleeding disorders (PWB) experience multiple barriers in accessing timely dental care as invasive dental treatment requires multi-disciplinary collaboration between patients and their teams to ensure proper risk assessment and management strategies (1–5). PWB are less likely to have a regular primary dental home as providers are often unfamiliar with their condition or are unwilling or too anxious to accept

PWB as patients (2,6). Urgent options limited to extractions in the presence of local infection or inflammation carry higher morbidity and mortality for PWB (7). There is also anecdotal evidence that PWB who are in severe pain have at times opted not to disclose their condition to a dentist in order to receive necessary emergency or urgent dental care. By so doing they place themselves at risk to adverse bleeding or other consequences that may follow (4).

In March 2020, strict public health measures were introduced in Europe to reduce the spread of COVID-19. An eight-week lockdown was implemented in Ireland resulting in a drastic curtailment of dental services. Dental treatment was restricted to emergency and urgent care provided in clinics equipped with the required levels of personal protective equipment (PPE) and environmental modifications (8,9). The unprecedented changes imposed on Irish dentistry required a rapid response to maintain access to dental services for PWB. This involved embedding tele-dentistry into a multi-disciplinary telehealth initiative which aimed to support PWB experiencing health problems during the pandemic (10).

This observational study evaluated the use of tele-dentistry exploring four outcomes:

- (1) Identification of urgent dental problems and appropriate provision of care for PWB
- (2) Support for patients with oral health related stressors impacting on their psycho-social wellbeing
- (3) Prevention of mouth bleeds and hospital admissions related to dental surgery
- (4) Support for colleagues working in community or remote locations via tele-mentoring

#### Methods

Together with physicians, nurses, physiotherapists, psychologists and social workers, the special care dental team at the National Coagulation Centre (NCC) moved swiftly to take advantage of previously under-utilised functions within the existing telehealth platform to ensure continued access to oral healthcare for patients. A set of online resources to educate PWB about self-management of dental emergencies was developed for the patient portal and also placed on a dedicated hub on the patient support and education websites belonging to the Irish Haemophilia Society and the European Haemophilia Consortium (11).

Resources included information to aid self-diagnosis of common dental problems, a short film clip describing how

to take good intra oral selfies using a cell phone, preparatory information required prior to a teleconsultation together with a patient facing pain scale (Andrea Mankoski Copyright © 1995, 1996, 1997) (12), an oral health related quality of life (OHRQOL) measure (OHIP14) (13), and

a pain diary. Additionally an algorithm was developed to aid patients in understanding and co-ordinating their dental care pathway (Figs 1 and 2) This included scenarios providing detailed and specific information for their teams to be able to navigate four recognised urgent or

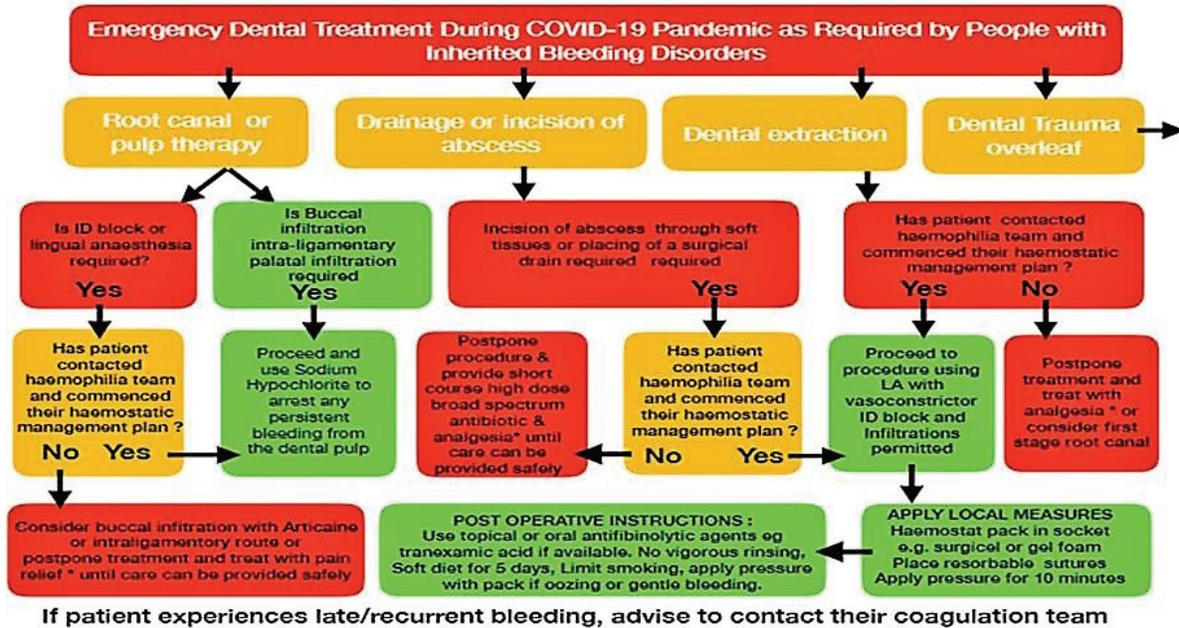
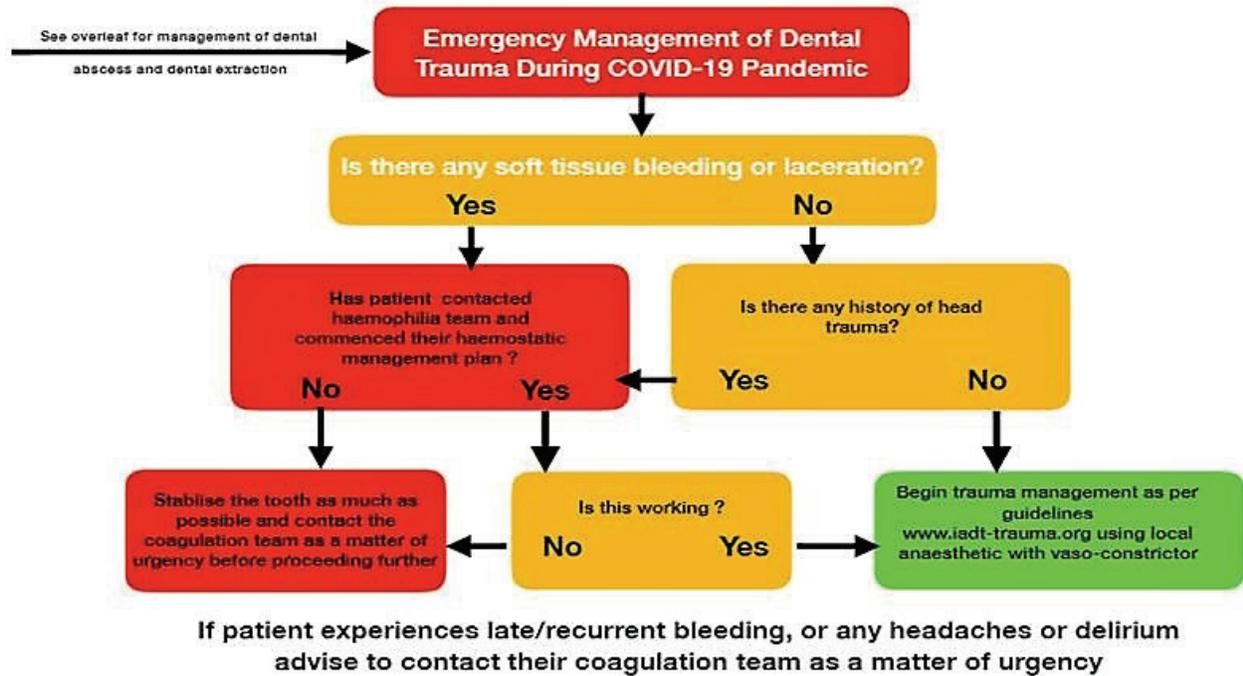


Fig. 1. Algorithm to guide emergency care.



Emergency Dental Algorithm prepared by Dr Alison Dougall and Dr Kirsten Fitzgerald for the Irish Haemophilia Society

Fig. 2. Algorithm to guide emergency care (overleaf).

emergency dental scenarios(14): dental extraction/surgery; first stage root canal or vital pulp therapy; drainage or incision of dental abscess and dental trauma. Each scenario was completed with post-operative instructions and disease specific advice on how to manage post-operative dental pain (1,15). Scenarios followed a logical route via a traffic lights system of red amber and green indicating the relative risk related to (1) the invasiveness of the procedure and (b) the route of local anaesthesia. Tele-dentistry was configured for fixed site or offsite delivery via a telemedicine programme by a consultant dental surgeon and trained dental nurse working remotely. The tele health platform (Blue Eye) fulfilled all data protection requirements (RedZinc Services Limited, Guinness Enterprise Centre, Taylor's Lane, Dublin 8, Ireland) and was supported by an electronic patient record and remote prescribing facility. Over an eight week period all PWB with dental problems contacting the haemophilia services were offered a choice of telephone or video consultation according to their preferences. Prior to the specialist tele-consultation verbal consent was obtained from all patients who were first screened and mentored by the dental nurse to ensure they were well-prepared and understood the benefits but also the limitations of a remote consultation. PWB were asked to describe their presenting complaint and to photograph their dental problem if appropriate and upload it via their phones to the secure platform. Additionally, they provided a pain rating (Table 1) and an OHRQoL score to aid decision making. Telephone consultations were carried out using a combination of speaker phones or noise cancelling headsets. Video communications connected to the patient's smartphone used a secure web-based platform sent via individual SMS or email link. Data were collected directly from patients and added onto their electronic record. Dentists contacting the haemophilia services were offered tele-mentoring by telephone or video consultation.

## Results

Over eight weeks there were N=858 hits on the dental pages of the website and patient portal. N=102 calls were logged to the dental helpline from PWB living with a variety of bleeding phenotypes (Table 2). Information and/or reassurance was provided to all callers.

N=73 patients were scheduled for telephone or video consultations with a specialist dentist with 59% (43/73) choosing video consults via mobile phone or computer and 41% (30/73) choosing phone consults as their preferred mode of communication. There were 2/43 no-shows for the video consults who subsequently recontacted the service citing problems with rural internet connection. Fourteen individual dentists contacted the message desk with queries or sent e-referrals regarding management of PWB.

Pain scores of 6 or above were reported by 32% (23/73) of patients with 12 reporting scores of 8 and above. Impacts of dental problems on relationships, sleep, nutrition or mood were reported by 40% (29/73) of PWB.

Pain relief was provided through n=35 prescriptions for cox-2 inhibitors to patients who were not managing their dental pain adequately. Twelve scripts for antibiotics were prescribed for those with swelling who were unable to proceed with timely interventions to achieve drainage because of their bleeding condition. Eight patients were tutored on self-placement of temporary fillings using kits from local pharmacies.

Dental extractions were arranged for 26 patients of which 16 were carried out in a single tertiary care setting for those who required hospital administered haemostatic measures. A further 10 were carried out under anti-fibrinolytic cover or self-administered factor replacement therapy and involved tele-mentoring of general dentists at a distance.

There was no incidence of bleeding from the mouth requiring a hospital visit for additional post-operative haemostatic measures during the 8 week period.

Table 1. Bleeding Phenotypes of 102 PWB who called the helpline and scheduled consultations.

Bleeding Disorder	Number of consults n=102
Severe/Moderate Haemophilia <5% factor level	08
Mild Haemophilia > 5% level	34
Von Willebrand Disease (all)	31
Platelet Function Defects	21
Bleeding Disorder of Unknown Aetiology and rare bleeding disorders	08

Table 2. Mankoski Pain Scale (Mankoski Copyright © 1995, 1996, 1997 Andrea Mankoski).

0	Pain Free	No medication needed
1	Very minor annoyance-occasional minor twinges.	No medication needed.
2	Minor Annoyance occasional-strong twinges.	No medication needed.
3	Annoying enough to be distracting.	Mild painkillers are effective.
4	Can be ignored if you are really involved in your work, but still distracting.	Mild painkillers relieve pain for 3-4 hours.
5	Can't be ignored for more than 30 minutes.	Mild painkillers reduce pain for 3-4 hours
6	Can't be ignored for any length of time, but you can still go to work and participate in social activities.	Stronger painkillers (Codeine, narcotics) reduce pain for 3-4 hours.
7	Makes it difficult to concentrate, interferes with sleep. You can still function with effort.	Stronger painkillers are only partially effective. Strongest pain killers relieve pain
8	Physical activity severely limited. You can read and converse with effort. Nausea and dizziness set in as factors of pain.	Stronger painkillers are minimally effective. Strongest painkillers reduce pain for 3-4 hours
9	Unable to speak. Crying out or moaning uncontrollably near delirium.	Strongest painkillers are only partially effective.
10	Unconscious. Pain makes you pass out.	Strongest painkillers are only partially effective.

## Discussion and Conclusions

Tele-dentistry enabled urgent dental problems to be identified and addressed efficiently, effectively and safely using a patient centred and team approach. The number of dental extractions carried out during the eight week period was twice the number carried out during the same period in the previous year and reflected the significant reduction in treatment options imposed by the pandemic. It is acknowledged that medical or dental teams are rarely able to confidently risk assess dental procedures appropriately for PWB, often over estimating the risk of many dental procedures and adding additional barriers to care preventing optimal or timely outcomes (5,16). Tele-mentoring of previously anxious dentists, unfamiliar with haemophilia dental protocols alongside multi-disciplinary online meetings with haemophilia treaters enabled safe local care to be provided using optimal factor regimes and minimal travel. The average bleed rate for well managed dental extractions in patients with bleeding disorders is estimated at 11% (17). The zero bleed rate during service evaluation attests to the success of the algorithm and the tele-mentoring in enabling management and minimisation of the inherent risks. This is particularly relevant as the financial and personal costs of a single hospitalised bleed, had it occurred, would have far outweighed the set up costs of equipment and training for the introduction of the teledentistry programme.

During the pandemic, dental problems for PWB impacted on quality of life exacerbated by reduced access to care and sub-optimal painregimes. It was significant

that due to risks from GI bleeding PWB were not able to self-medicate using over the counter non-steroidal anti-inflammatories. They were also largely un-aware of the efficacy of Cox-2 inhibitors for relieving toothache although these are routinely recommended for people with inherited bleeding disorders to manage either joint and dental pain in contemporary protocols.

It was noted that majority of people with dental problems during the pandemic were those with milder forms of haemophilia, von Willebrand Disease and a number of platelet defect functions. This suggest there is a need to focus on better oral health promotion within their care pathway to enable local preventive care through a blended model of both face to face and tele-dentistry.

There are many well-documented barriers to oral health for people with special health care needs and it is envisaged that tele-dentistry will strengthen existing networks and enable individualised accessible care which is flexible and adaptable long after the pandemic has ceased.

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## IADH 2020 EDUCATIONAL RESEARCH AWARD

### Impact of sign language communication training on dental students' empathy, learning experiences and attitudes towards people with disabilities

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#### Abstract

This study investigated the impact of the Sign Language Communication (SLC) training program on dental students' empathy and attitudes towards people with disabilities, and participants' perceptions of their learning experiences.

Method: Twenty-eight dental students answered the validated Toronto Empathy Questionnaire (TEQ) and the Attitude Towards Disabled People (ATDP) survey, before and after undertaking the 14-hour SLC module. Quantitative data were analysed via T-test (significance level  $p < 0.05$ ). Qualitative data were analysed via thematic analysis.

Results: Participants demonstrated a significant increase in total mean empathy score, total mean ATDP score and individual mean scores for 9 (out of 16) items of the TEQ. Students perceived to have acquired disability awareness, personal and professional development skills as well as positive values/beliefs.

Conclusions: The SLC training program is effective in improving dental students' empathy and attitudes towards people with disabilities, while providing positive learning experiences in various aspects.

#### Introduction

People with hearing and/or speech impairments (HSI) demonstrate poor oral health status, a high degree of unmet treatment needs and low dental attendance (1). With regard to these dental care deficiencies, this patient population has identified communication barriers as one

of the challenges to achieving satisfactory oral health (2). Moreover, patients with HSI and their caregivers perceive dentists as lacking empathy during the course of treatment (2).

Dental students, on the other hand, have expressed discomfort with the management of patients having special needs, including those with HIS (3). Upon closer examination, it has been found that clinical exposure and education at the undergraduate level were inadequate to prepare these students to manage patients with HSI and other types of disabilities (3).

In order to improve the quality of care they provide these individuals, dental professionals must learn an effective method of communicating with them. One such method is sign language (4), which has been previously associated with improved dental attendance and treatment provision (4,5).

While training in sign language communication has been advocated around the world (4,6), the value and impact of such an intervention on dental education has not been widely explored. This study was undertaken to determine dental students' perceptions of the Sign Language Communication (SLC) training program, and its impact on participants' empathy and attitudes towards people with disabilities.

#### Materials and Methods

A group of 28 first-year dental students were randomly selected to undertake a 14-hour SLC program, developed by a Special Care Dentistry specialist and Deaf trainers. The first part of the program involved a classroom-based learning module, where students undertook hands-on workshops and lectures, delivered over 7 weeks. This was followed by a visit to a special education school for Deaf children, where participants conducted oral health educational activities in sign language. Participants answered the validated Toronto Empathy Questionnaire (TEQ) (7) and the Yunker's Attitudes towards Disabled People (ATDP) (8) survey, before and after the program. They also wrote a reflective journal to note their learning experiences while undertaking the training program. Quantitative data were analysed via paired T-test (significance level  $p < 0.05$ ) using the Statistical Package of Social Sciences (SPSS) software. Qualitative data were analysed via thematic analysis.

## Results

### Sociodemographic characteristics

All participants (100%, n=28) completed pre- and post-intervention surveys that made use of the TEQ and ATDP questionnaires, and submitted their reflective journals within one week after the program ended. Program participants consisted of 75% (n=21) females and 25% (n=7) males.

### Impact on students' levels of empathy

Following the program, participants demonstrated a significant increase in the total mean empathy score of the TEQ ( $p=0.002$ ; 95% CI of mean difference -8.219, -2.138).

#### Mean score for individual items of the TEQ

Following the program, participants demonstrated a significant increase in individual mean scores for 9 (out of 16) items of the TEQ ( $p<0.05$ ). The nine items with a significant increase in mean empathy score are depicted in Table 1.

#### Impact on students' attitudes towards people with disabilities

Participants demonstrated a significant difference in ATDP score before [mean=62.5 (+13.51)] and after [mean=68.0 (+7.13)] the program ( $p=0.048$ ; 95% confidence interval of mean difference 11.020, -0.051).

#### Students' perceptions of the learning experience

Students opined that the program had a positive impact in many respects, as categorised into the following themes.

#### - Theme 1: Enhancement of disability awareness

Most students noted that the hands-on workshops, lectures and community engagement program had provided them with new experiences and first-time exposure to people with disabilities, particularly the Deaf community.

##### • Subtheme 1: Awareness of Deaf culture and disability issues

'I learned to understand the dos and don'ts in the life of Deaf people. For example, how to "call" them and where to touch them to alert them. This is very important for us future dentists to know'.

'Learning sign language will naturally connect us to Deaf people and give us a better understanding of the challenges that the individuals face'.

##### • Subtheme 2: Empowerment of disability advocacy

'I have never met anyone with a disability before, so the visit was really an amazing and touching experience for me. I feel like I want to join more volunteer programs, as I want to be able to understand and help them more'.

'I would use this experience to reach out more to the special needs community to provide my services, to help those who feel disadvantaged to meet healthcare providers due to communication barriers'.

#### - Theme 2: Acquisition of skills essential for professional development

Besides learning a new language, participants also noted that they had acquired new skills during the entire program.

Table 1. Individual items of the TEQ with significant increase in mean empathy score.

Item Number	Item description	Pre-test score (SD)	Post-test score (SD)	Mean difference (95% CI)	t statistics (df)	p value
2	<i>Other people's misfortune does disturb me a great deal</i>	2.46 (0.64)	3.00 (0.67)	-5.36 (-0.89, -0.18)	-3.07 (27)	0.005
5	<i>I enjoy making other people feel better</i>	3.50 (0.51)	3.79 (0.42)	-0.29 (-0.54, -0.03)	-2.30 (27)	0.030
6	<i>I have tender concerns for people less fortunate than me</i>	3.11 (0.74)	3.54 (0.64)	-0.43 (-0.75, -0.11)	-2.71 (27)	0.011
9	<i>I find that I am 'in tune' with other people's moods</i>	2.36 (0.87)	2.86 (0.76)	-0.50 (-0.92, -0.09)	-2.47 (27)	0.020
10	<i>I feel sympathy for people who cause their own serious illness</i>	2.64 (1.03)	3.29 (0.66)	-0.64 (-1.06, -0.23)	-3.20 (27)	0.003
11	<i>I do not become irritated when someone cries</i>	2.43 (1.00)	3.11 (0.57)	-0.68 (-1.14, -0.22)	-3.02 (27)	0.005
12	<i>I am not really interested in how other people feel</i>	2.89 (1.03)	3.43 (0.50)	-0.54 (-1.00, -0.07)	-2.36 (27)	0.026
13	<i>I get a strong urge to help when I see someone who is upset</i>	3.04 (0.88)	3.50 (0.51)	-0.46 (-0.85, -0.08)	-2.46 (27)	0.021
14	<i>When I see someone being treated unfairly, I do not feel very much pity for them</i>	3.39 (0.63)	3.68 (0.48)	-0.286 (-0.54, -0.05)	-2.30 (27)	0.030
<i>TOTAL</i>		47.11 (6.99)	52.29 (4.88)	-5.18 (-8.22, -2.14)	-3.50 (27)	0.002

- Subtheme 1: Communication skills

‘Previously, I do not have the experience with people with disability. After the program, I am glad that I get to experience communicating and interacting with them. I feel more confident now if I were to meet another deaf kids again’.

- Subtheme 2: Thinking and memorising ability

‘We have to memorise each word, in order to sign it. And it’s not just the hand signs, you need to look at the posture and facial expression, and put everything together in order to understand the context. It can be challenging but exciting’.

‘It was not easy to remember the signs for each word, which demands good memories and consistent practice. It gives my brain a good workout’.

- Subtheme 3: Teamwork

‘Everyone was committed and contributed well when planning and preparing for the visit. It was a good experience working together, although we are just in the first year and barely know each other’.

- Theme 3: Improvement of personal values or beliefs (e.g. self-gratitude, empathy)

Participants found the educational visit to be an eye-opener, and many expressed the development of self-gratitude, empathy and respect for others.

‘This experience makes me feel very humble and grateful for the things I have’.

‘I believe that being a doctor or a dentist requires you to be more kind and empathetic towards other people, especially those with special needs’.

## Discussion

Successfully managing the care of individuals with HSI requires practitioners to have effective communication skills in addition to knowledge and competence in meeting patients’ oral health needs and demands, which may be limited by factors that need to be individually assessed (9). In addition, dental professionals need to possess positive attitudes, and they must be comfortable in managing this patient cohort; such sensitivities can be fostered not only through adequate exposure during university training, but also through encounters had during professional practice or life experiences (10).

The SLC communication training program in this study provided students with a positive experience in a number of ways. For instance, participants demonstrated an improved level of empathy, which was previously reported to decline among dental students as they progress through their studies (11). Participants also perceived that they acquired a better understanding of disability issues and Deaf culture, which they had never been exposed to prior to the program. Significant improvement in students’ personal values, beliefs and attitudes towards people with disabilities after the learning activities further

justify the positive impact of this program in preparing dental students for managing patients with a disability.

The acquisition of communication and teamwork skills, as perceived by student participants following the program, would be beneficial to developing the abilities essential for personal, educational and professional growth (12). The practice of dentistry involves a high degree of communication, and successfully engaging with patients can be a challenge when interacting with those who have HIS (2). Furthermore, effective communication and teamwork is essential if practitioners aim to champion the practice of comprehensive and holistic patient management, which thrives on the principle of multidisciplinary collaboration and interprofessional care (13). Involving first-year students in this program is therefore a wise approach, as it provides them with early exposure to developing specific competencies, including thinking and memorising skills, that are crucial for survival and success during their training and subsequent career development.

While dental schools around the world aim to prepare their graduates with adequate knowledge and skills in managing patients with special needs (10), training in SLC could be a potential avenue for providing students with value-added skills that may be useful for future employment (14). Besides this, learning SLC has been deemed an act of promoting disability inclusion (15), a move that is in line with the concept of professionalism (12), and should be supported by all healthcare practitioners.

The positive impact of SLC training reported in this study provides key implications for its establishment and inclusion in the undergraduate or postgraduate educational program in Special Care Dentistry. Collaboration with external organisations could provide dental schools with opportunities for program development, while encouraging social integration between the dental profession, the Deaf community and the society at large.

In conclusion, the SLC training program is effective in improving dental students’ empathy and attitudes towards people with disabilities, while providing learning experiences that are beneficial to improving patient care and personal development.

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#### Conflicts of interest

The authors declare that there is no conflict of interest. All authors are required to provide a signed statement of their conflicts of interest as part of the author statement form.

#### Ethics

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## iADH 2020 - EDUCATIONAL RESEARCH AWARD

### Impact of clinical training on the attitudes of undergraduate dental students towards people with special needs

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#### Abstract

The aim of this study was to determine how access to clinical practices in real scenarios affects the attitudes and behaviors of undergraduate students with respect to the dental care of individuals with special needs. A survey for measuring attitudes and intended behaviors towards disability was applied to fifth-year undergraduate dental students at the University of Santiago de Compostela (Spain). The survey was administered at 3 separate times: T0, at the start the academic year; T1, upon completion of the theoretical training + 60 hours of practical training; and T2, upon completion of 120 hours of practical training. Our results indicated that limited practical training increases the students' reserves for treating certain patients with special needs, especially those with mental and/or behavioral disorders. By increasing the duration of practical clinical training, the students' self-sufficiency is increased in all of the planned scenarios.

#### Introduction

Studies in the 1970s have shown that the educational experiences of dentistry students (especially their exposure to clinical situations, classroom teaching and participation in multidisciplinary teams) were closely related to the students' degree of acceptance of patients with disabilities after graduation (1). Since then, numerous studies have confirmed the hypothesis that specific dental education in treating patients with special needs has a substantial effect on dentistry students' attitudes and the subsequent behavior

of practitioners in providing dental care to this group (2-4). The International Association for Disability and Oral Health (iADH) has published directives for designing an undergraduate curriculum in Special Care Dentistry (SCD), which covers the knowledge, skills, attitudes and behaviors for learning required by properly qualified dentists in the field of SCD (5). Since then, educators have had a tool for standardizing the teaching and for assessing the acquisition of knowledge; however, it is difficult to determine whether this teaching has had an impact on the attitudes and behaviors of future practitioners of dentistry. The "iADH Toolbox" was designed with this objective in mind, a validated battery test to assess the attitudes of dental students towards people with disability and people in marginalized groups (6).

The aim of this study was to determine, by applying the iADH Toolbox, how access to clinical practices in real scenarios affects the attitudes and behaviors of undergraduate students with respect to the dental care of individuals with special needs.

#### Methods

The study group consisted of fifth-year undergraduate dental students at the University of Santiago de Compostela (Spain). All participants were administered the iADH Toolbox for measuring attitudes and intended behaviors (iADH 2015), after translation and cultural adaptation to Spanish. The survey consists of 5 clearly differentiated parts with a total of 222 questions. In the present study, we only analyzed the blocks for Section 3, which evaluated "Attitudes regarding oral health" (13 questions), and Section 4, which evaluated "Expected behavior". In Section 4, four differentiated scenarios were chosen: 1) a patient with physical disability; 2) a patient with schizophrenia; 3) an elderly patient with Alzheimer's disease who cannot leave their home; and 4) an individual who did not speak the native language of the survey and who was of a different ethnicity than that of the student.

The survey was administered at 3 separate times: T0, at the start the academic year; T1, upon completion of the theoretical training + 60 hours of practical training; and T2, upon completion of 120 hours of practical training. The results were analyzed with the SPSS program, applying the Wilcoxon test and Student's t-test.

## Results

The participants included a total of 40 students, 22–23 years of age; 13 of whom were men (32.5%), and 27 were women (67.5%). When evaluating the results of the measurement (T1) with respect to baseline (T0), the respondents considered that patients with special needs “should be treated by specialists” ( $p=0.000$ ) (Figure 1). There was also a clear need to perform “rapid, effective treatment, preventing anxiety” in the patient with schizophrenia ( $p=0.019$ ). The predisposition to treat patients with Alzheimer’s disease decreased ( $p=0.001$ ), and there was an increase in the number of students who thought that “the treatment is extended” with foreign patients ( $p=0.039$ ). Upon completing the practical training (T2), the students considered that they were “more qualified” to treat patients with special needs ( $p=0.002$ ) and that they “had sufficient training” to do so without having to refer to specialists ( $p=0.003$ ) (Figures 2 and 3). The students also

considered it important to perform and successfully complete the treatment, detracting importance from other objectives of the dental practice, especially in the case of patients with schizophrenia ( $p=0.040$ ) and patients with Alzheimer’s disease ( $p=0.004$ ).

## Discussion

In this study, we analyzed the impact of theoretical-practical teaching on the attitudes and behaviors of a group of students in their last year of their dentistry degree towards individuals with disability and other marginalized groups. This study is not exempt from a number of limitations that require that the results be interpreted with caution, which include 1) the enormous size of the questionnaire (iADH Toolbox, 2015), thereby limiting its applicability; 2) a certain degree of subjectivity in interpreting the questions depending on the scale of personal values; 3) the small number of participants due to the use of a convenience sample (although the sample size provided acceptable statistical power); 4) during the implementation of the practical training, each student had access to patients of various typologies, which did not necessarily agree with the scenarios included in the survey; 5) the possible responses were closed, with no option provided for personal impressions; and 6) the respondents could have felt that it was advisable to provide socially acceptable responses regarding their levels of comfort/discomfort in treating marginalized populations (7).

Our results show that after completing the theoretical training and practical training limited to 60 hours, the respondents reflected a clear tendency to believe that the dental care of patients with special needs consumes more time and resources and that more training is required to be able to manage these patients. The students were therefore inclined to believe that these patients should be treated by specialists. These results are in keeping with those found by Mac Giolla Phadraig *et al.* (8) who, after applying a comprehensive mixed teaching program to third-year dentistry students, which included conferences, experimental workshops and access to comprehensive electronic learning resources (such as online tutorials for small groups) but without practical clinical training, observed no improvement in the students’ approach to individuals with disabilities.

However, increasing the number of hours of clinical practice to 120 resulted in a decrease in the number of respondents who considered more specific training necessary and those who thought that patients with special needs should be treated by specialists. In this respect, it has been suggested that for clinical educational programs to be effective they should go beyond minimal exposure to different populations (8,9), given that intensive clinical experience (especially in an environment that provides

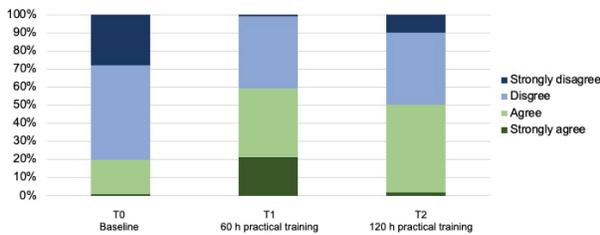


Fig. 1. Question 3.12: “Should patients with disability always be treated by specialist practitioners?”.

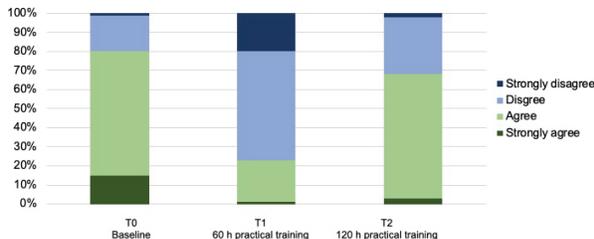


Fig. 2. Question 3.4: “Is the treatment of patients from marginalized groups too time-consuming?”.

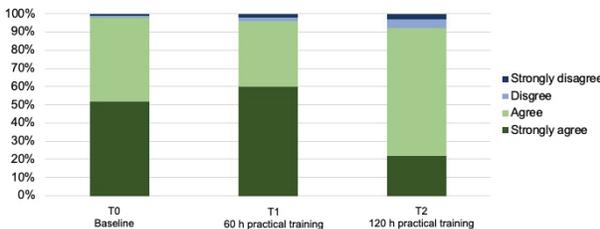


Fig. 3. Question 3.7: “Is more training needed to prepare dental practitioners to provide care for patients with disability?”.

supervision and guidance) allows students to feel more comfortable during the care of marginalized groups (10). In similar studies performed at the King Abdulaziz University (Jeddah, Saudi Arabia) and in the Tufts University School of Dental Medicine (Boston, MA), researchers found that the more experience dentistry students had in managing individuals with disability, the more positive the students' attitudes towards these patients (11).

The patients' attitudes can also be affected by the number of hours of clinical practice by the dentist. In a study conducted in the Massachusetts General Hospital (Boston, MA), patients treated by dentistry residents with 3–4 months of clinical training more frequently canceled appointments, attended fewer follow-up consultations and demanded less emergency care than the patients treated by residents with 11 months of clinical training. The study author concluded that “short block rotations have an adverse effect on resident experience and outcomes of patient care” (12).

These results assume special relevance in the current situation caused by the COVID-19 pandemic and its possible impact on dental education. A recent survey conducted in the European dental schools showed that most universities rapidly adapted their curriculums to provide theoretical training through various electronic tools, but the options available for clinical training are scarce (13).

## Conclusions

While keeping the study's limitations in mind, limited practical training increases students' reserves for treating certain patients with special needs, especially those with mental and/or behavioral disorders. By increasing the duration of practical clinical training, the students' self-sufficiency is increased in all of the planned scenarios.

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### Ethics

Ethical approval not required

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## IADH 2020 - CASE REPORT AWARD

### Special-Needs Patients: Contribution of Digital Dentistry

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#### Abstract

Patients with special care are individuals with a medical, physical, psychological and/or social condition that can limit access to care. They should be treated with the same standards than the general population, using facilitatory measures (individualized behavior management techniques, oral premedications, hypnosis, nitrous oxide sedation, conscious sedation under IV midazolam, general anaesthesia) if necessary. Digital dentistry (oral scan, computer aided design and computer aided manufacture CAD/CAM) and adhesive restorative materials revolutionized dentistry. This case report describes how using optical impression and CAD/CAM technology during general anaesthesia permitted a full oral rehabilitation for a 39-year woman with autism and severe bruxism. It also describes the acceptance for optical impression on the dental chair than would not have been possible for conventional impression. Sedation using equimolar mixture of oxygen and nitrous oxide or general anaesthesia do not stop from setting digital dentistry up.

#### Introduction

Patients with special care are individuals with a medical, physical, psychological and/or social condition that can limit access to care. The main challenge in Special Care is providing access to the same, equitable, efficient, and effective services for patients with special needs than for the general population (1). Practitioner should adapt their behavioural approach while maintaining academic standards of treatment (2). Facilitatory measures (indi-

vidualized behaviour management techniques, oral premedications, hypnosis, nitrous oxide sedation, conscious sedation under IV midazolam, general anaesthesia) can be used if necessary.

Digital dentistry (oral scan, computer aided design and computer aided manufacture CAD/CAM) and adhesive restorative materials revolutionized dentistry (3,4). New restorations are made possible, the tooth tissue preservation increases, the chairside time is reduced. These tools facilitate care and are compatible with varying degrees of patient cooperation.

This case aims to show advantages, limits and practicability of digital dentistry for patients with special needs. It describes how using optical impression and CAD/CAM technology permitted a full oral rehabilitation for a 39-year woman with autism and severe bruxism.

#### Case Report

A 39-year-old woman with autism consulted the Special Care Unit of Clermont-Ferrand University Hospital with severe tooth wear due to bruxism (Figure 1). At the request of the parents, a treatment was set up with functional and aesthetic objectives. The vertical dimension should be increased, that inducing occlusal restorations on all teeth. The decision was made to bond no-prep overlays on the mandibular molar and premolar teeth. Then, to correct the consecutive anterior gap, crowns should be bonded on the maxillary anterior teeth. The patient was uncooperative to be treated on the dental chair, and all the previous treatments were performed under general anaesthesia. Sedation using equimolar mixture of oxygen and nitrous oxide nor midazolam were efficient to improve cooperation.

Two general anaesthesias with naso-tracheal intubation were realized with an interval of two months. Dental preparations of maxillary anterior teeth were realized during the first general anaesthesia: peripheral preparations for endodontically treated tooth upper right and left central incisors and for vital tooth upper right and left lateral incisors were performed for mechanical reasons. Dental tissues were preserved for lower right 1<sup>st</sup> and 2<sup>nd</sup> bicuspid, lower right and left 1<sup>st</sup> and 2<sup>nd</sup> molars. Optical impression of molar and premolar of mandibular teeth and optical impression of anterior teeth were realized during the same general anaesthesia.

The overlays and crowns were designed in the dental unit of Clermont-Ferrand University Hospital (Figure 2). Vita Enamic blocks were machined: Vita Enamic is a durable hybrid ceramic, wear-resistant and does not cause accelerated wear of the antagonist.

During the second general anaesthesia, all overlays and anterior restorations were bonded under rubber dam with the Variolink® resin system. The manufacturer's bonding instructions were strictly followed. The static occlusion was tested. The dynamic occlusion was difficult to check.

It was observed during the check-up appointment, that the anterior maxillary sector was debonded, probably due to an excessive overbite and overjet. The anterior crowns had to be redone. We tried during this same appointment a new digital impression of the anterior teeth. The impression was unexpectedly succeeded. The optical impression of the preparations and of the antagonist was scanned in several times, taking regular breaks: the intra-oral scanner compounds the different recordings into one file. It took just a few seconds for the intra-oral scanner to acquire the bite registration. Because the impression went well, the bonding of the new crowns was tried without sedation in a second appointment one week later. The preparations had a mechanical retention. The cooperation was insufficient to bond under rubber dam. These two elements led to the choice of the RelyX Unicem 2 Self-Adhesive Resin Cement system to bond the crowns: it allows adequate working time, an easy removal of excess and is moisture-tolerant. The bonding went well (Figure 3).

### Discussion

In this case, optical impression worked well, both under general anaesthesia and on the dental chair without sedation. It has enabled the achievement of the treatment objectives.

The optical impression is particularly well suited for general anaesthesia, contrary to the conventional impression technique. It is more hygienic and the organization is easier. There is no need for impression paste, nor trays. There is no risk of inhaling impression paste. Also, the practitioner can immediately validate the impression and the occlusion. Partial corrections of the impression can be made without starting over.

Moreover, this case reports the unexpected acceptance of the optical impression by the patient, and that without any sedation. That would not have been possible with the conventional impression technique. Indeed, the conventional impression is one of the most anxiety-provoking procedures in dentistry (5). It can also generate a nausea reflex. On the contrary, optical impression is easier. It allows timeliness and precision in the same time. It allows breaks without losing any information. In this case, working on the maxillary



Fig. 1. Initial situation : front view and occlusal view of right lower jaw.

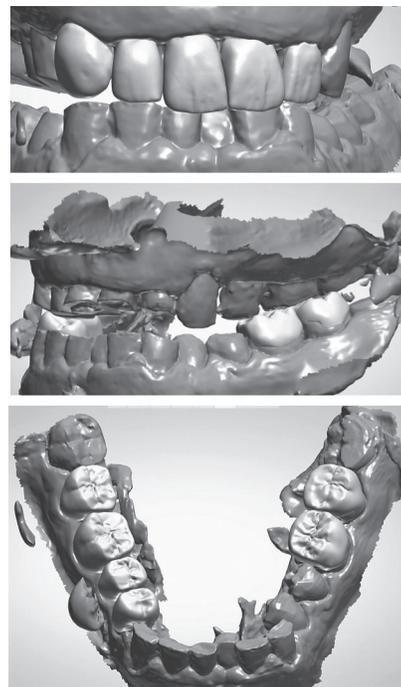


Fig. 2. Conception and manufacturing of the crowns and overlays, using the 3Shape Trios Design Studio Software



Fig. 3. Post-treatment intraoral photo

anterior sector facilitated the optical impression and the bonding.

Digital dentistry is not a widespread routine yet, even less in the field of special care dentistry. However, along with adhesive restorative materials, it gives new opportunities of care. Sedation using equimolar mixture of oxygen and nitrous oxide or general anaesthesia do not stop from setting it up. The limits of digital dentistry depend on the ability to have an efficient bonding and not on the CAD/CAM technology itself. New technologies facilitate equitable oral health outcomes for patients with special care.

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### Conflicts of interest

All authors disclose any financial and personal relationships with other people or organizations that could inappropriately influence their work.



## IADH 2020 - CASE REPORT AWARD

### Newer therapies in management of haemophilia opens up prosthodontic opportunities: A Case Report

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#### Abstract

The development of new haemophilia therapies has opened up opportunities for multi-stage procedures in dentistry for people with haemophilia (PWH). PWH have experienced extensive tooth loss in the past but now have the possibility of comprehensive prosthodontic care. This case report detailed the personalised multi-disciplinary haemostatic management protocol for a patient with haemophilia whose oral rehabilitation involved implant-supported prosthesis and comprehensive multi-stage prosthodontic treatment. A personalised haemostatic plan assessed the bleeding risk of each stage and utilised a combination of local measures and oral antifibrinolytic therapy for low and medium risk procedures, reserving the use of long acting factor replacement therapy for the highest risk procedures. PWH have been denied advanced prosthodontic treatment due to cost and lack of clinical guidance to inform their teams. With careful planning and judicious management of haemostatic treatments, this case demonstrates that implant-retained dental prostheses offer viable, safe and cost-effective alternatives to removable prostheses.

#### Introduction

People with haemophilia (PWH) have faced a historic lack of access to dental care (1). This has resulted in extensive tooth loss (1) and suboptimal oral health outcomes (1,2), especially evident in the first generation of

older PWH who now enjoy normal life expectancy (3). New haemophilia therapies have opened up opportunities for a wider portfolio of multi-stage procedures in dentistry (4). Well established dental treatment protocols involve combinations of oral antifibrinolytic agents, systemic hemostatic replacement therapy, and local hemostatic agents (5,6). The placement of dental implants has only been recently included in the list of surgical procedures for PWH, with a recommendation to consult a haematologist for a personalized management plan (6). In Ireland some PWH have recently been switched to a novel recombinant human FVIII (rFVIII) or Efmoroctocog alfa (Elocta) which is licensed to manage Haemophilia A (7). This recombinant fusion protein is composed of a single molecule of FVIII covalently linked to the Fc domain of human IgG1 and it extends circulating rFVIII t1/2 whilst also eliminating the risk of blood-borne pathogen transmission. The 1.6-fold half-life of Elocta compared to traditional recombinant FVIII means PWH now live with far higher daily protective peak and trough factor levels compared to previous regimes and achieve better joint and physical activity outcomes (4). This also means that PWH can confidently receive complex surgical care with a single dose of factor pre-operatively, retaining its benefit for far longer post-operatively (4,6,7). Additionally in procedures which carry low or moderate bleeding risks such as subgingival margin preparations, second stage (implant exposure) procedures or placement of healing abutments, the use of readily available, low cost oral antifibrinolytic therapies has also decreased the risk of post-operative bleeding thereby removing the previous reliance on factor replacement therapy (5,8). We present a case report which follows an individualised and personalised haemostatic protocol for a patient with haemophilia A undergoing full mouth rehabilitation to address his concerns regarding the cumulative effects of tooth loss.

#### Case Report

Patient A was a 65-year-old man living with mild haemophilia A but with a significant bleeding phenotype; which he managed with Elocta on demand for episodic bleeding or prior to planned surgery. He presented with aesthetic and functional concerns related to tooth wear and repeated failure of extensive restorations in his anterior

teeth (Fig. 1). He had not tolerated a series of removable devices and a lack of posterior support had resulted in tooth wear, loss of occlusal vertical dimension and limited food choices.

While implant-retained prostheses have rapidly evolved to become the standard of care to replace missing teeth in typical patients (9), there has been a scarcity of evidence to inform guidance for implant placement for PWH. Patient A had not been aware that implants were a viable choice but collaboration with National Coagulation Centre (NCC) and assurance around modifications of surgical procedures during implant therapy encouraged him to opt for prosthodontic rehabilitation more confidently.

His full mouth rehabilitation treatment plan involved the placement of a screw retained implant supported 3-unit bridge on 45 and 47, crown placements on 7 anterior teeth, and a resin bonded bridge replacing missing 15 (Fig.2). The sequence of procedures completed are outlined in Table 1, including the bleeding risk assessment for each procedure, the haemostatic management plan and the outcome detailing any reported or observed bleeding requiring further professional intervention (10).

Procedures defined as no or low bleeding risk required no special haemostatic measures. Local measures and careful manipulation of soft tissues along with oral anti-fibrinolytic therapy were added for procedures of moderate bleeding risk (5). The administration of Elocta raised factor levels appropriately in accordance with the bleeding risk and was calculated to 0.50 IU/ml or 1.0 IU/ml based on the empirical finding that 1 IU factor VIII per

kg body weight raises the plasma factor VIII activity by 2 IU/dL (7). The post-operative outcome of these procedures were all deemed successful with mild bleeding post-implant reported at 5 days by the patient and managed with self-infusion of Elocta, routinely available at his home and monitored using a track and trace app.

### Discussion and Clinical Relevance

Dental procedures carry a variable risk for post-operative or peri-operative bleeding that requires a proportionate response and patient partnership (6). Guidelines typically recommend a necessary consultation with a hematologist prior to any invasive or high-risk dental procedures (5,6). Additionally they recommend the routine use of systemic and/or topical tranexamic acid or epsilon aminocaproic acid (EACA) as an adjunct treatment to inhibit the fibrinolysis of unstable clots (8). This significantly reduces the amount of factor replacement therapy required whilst also improving the outcome (5,6,8,10). This case report demonstrates this approach by optimising the use of Elocta for gingival recontouring and first stage implant placement, but using a combination of local measures and oral antifibrinolytics alone for the prosthodontic rehabilitation that followed. The sequence of the multi-step procedures was planned and carried out systematically to maximise the use of factor when it was administered. The protocol used here involved a single infusion of Elocta 6000 IU one hour before procedure, careful local measures, and peri- and post-operative Cyclokapron tablets 1g three times a day for 5 days for the highest risk procedures (5,6,8,10). This concurs with a recent systematic review which found that there was no significant differ-



Fig. 1. Pre-operative photographs.



Fig. 2. Post-operative photographs.

Table 1. The Irish NCC Dental Treatment Protocol.

Procedure	Bleeding risk	Haemostatic Cover	Post-operative Outcome
Implant placement on 44 and 46 with local anaesthesia (LA) inferior dental block (IDB)	High	• Treatment with Elocta one hour prior to surgery and factor levels raised to 100% Post-op Cyclokapron 1g TDS 5/7	Self-Infusion prophylactic dose of Elocta 5 days post-op to manage oozing from site
Implant exposure and placement of healing abutments with IDB	Moderate	• Treatment with Elocta one hour prior to surgery and factor levels raised to 50% Post-op Cyclokapron 1g TDS 5/7	No bleeding
Impression taking	No	• No intervention	No bleeding
Implant restoration	No	• No intervention	No bleeding
Crown preparations and gingival manipulation for impression taking under LA buccal infiltration (BI)	Low	• Pre- and Post-op Cyclokapron 1g TDS 5/7	No bleeding
Gingivectomy using electrosurgery under LA (BI)	Moderate	• Treatment with Elocta one hour prior to surgery and factor levels raised to 50% Post-op Cyclokapron 1g TDS 5/7	No bleeding
Crown fitting under LA (BI)	No	• No intervention	No bleeding

ence in bleeding rates between protocols that used single dose before surgery as compared to those that routinely used factor both before and after surgery (10). Elocta was routinely available at home due to this patient's significant bleeding phenotype and he elected to self-administer 1000 units on day 5 post-implant placement when the start of a potential delayed bleed was observed. This is typical on demand self-management behaviour for someone living with a bleeding disorder.

## Conclusion

PWH have been denied dental implants due to cost and lack of clinical guidance to inform their teams. With careful planning and judicious management of haemostatic treatments, this case demonstrates that implant-retained dental prostheses offer a viable, safe alternative to removable prostheses thus increasing opportunities for cost-effective prosthodontic treatment in PWH.

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## Conflicts of interest

The authors declare no conflicts of interest in preparing this case report.

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## IADH 2020 - EARLY CAREER AWARD

### **Is there bacterial infection in intact coronal teeth and pulp necrosis of sickle-cell anaemia subjects? A case series study nested in a cohort**

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Sickle-cell anemia, the most prevalent genetic hemoglobinopathy in the world not associated with gender, is caused by a point mutation in the  $\beta$ -globin gene that leads to the formation of modified hemoglobin (HbS). In situations of persistent low oxygen tension, HbS molecules undergo polymerization, causing the sickling of red blood cells. The clinical manifestations of sickle-cell anemia result from the increased adhesion of sickle cells to the vascular endothelium, leading to local vasoconstriction, episodes of pain, and damage to vital organ. In the oral cavity, possible complications of sickle-cell anemia include pulp necrosis in intact crown teeth (without caries, periodontal disease or dental trauma), mental nerve neuropathy, and mandibular osteomyelitis. Pulp necrosis in intact crown teeth is considered the primary oral manifestation of sickle-cell anemia. It is estimated that the relative risk of occurrence of this complication is 8.33 times higher in sickle-cell anemia subjects (HbSS genotype) than in those without this disease. However, little is known about the need to treat these teeth with pulp necrosis. Aim: The aim of this study was to evaluate if there is a bacterial infection in intact teeth with necrotic pulp of patients with sickle-cell anemia by analyzing clinical, imaging, and microbiological parameters. Methods: This is a case series nested in a cohort study. In the first follow-up of this cohort study (2015-2016), ten subjects HbSS with at least one tooth with an intact crown and pulp necrosis clinically diagnosed by pulse oximetry adapted to dentistry and a cold sensitivity test (n= 27 teeth) were selected. Changes in the pulp chamber, root, and periodontal ligament were identified in tomographic analysis. Bacterial culture, staining for live and dead bacteria, and real-time polymerase chain reaction with 16S rRNA primers were used to identify the presence of bacteria. Microbiological collection was performed im-

mediately after access to the pulp chamber. The microbiome was analyzed with a MiSeq sequencer (Illumina, San Diego, CA). Results: The diagnosis of pulp necrosis was clinically confirmed in 81.5% (22/27) of the teeth, and the prevalence was higher in the upper jaw (59%). Pulp stones, hypercementosis, and periodontal ligament thickening were observed in 14% (3/22) of the evaluated teeth. Bacterial DNA was less than 100 copies/ $\mu$ L in 23% (5/22) of the teeth with pulp necrosis. Thirteen bacterial species were identified in intact crown teeth and pulp necrosis, *Acinetobacter calcoaceticus*, *Acinetobacter nosocomialis*, *Agrobacterium tumefaciens*, *Bifidobacterium breve*, *Brevundimonas vesicularis*, *Streptococcus parasanguinis*, *Escherichia coli*, *Granulicatella adiacens*, *Lactobacillus ssp.*, *Macrococcus caseolyticus*, *Moraxella osloensis*, *Proteus mirabilis*, and *Pseudomonas putida*. Conclusion: Clinical, imaging, and microbiological analyses indicate that there is not bacterial infection in intact crown teeth and pulp necrosis of HbSS subjects.



**BASIC, TRASLATIONAL, CLINICAL AND EDUCATION  
RESEARCH ABSTRACTS**

## 1. COVID-19: Making reasonable adjustments for the provision of urgent dental care for patients with additional needs during the pandemic

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**Aim:** To discuss how urgent dental care pathways were established, making reasonable adjustments for patients with additional needs during the COVID-19 pandemic.

**Method:** A collaborative approach co-ordinated by NHS England led to 27 Urgent Dental Care (UDC) hubs being set up in general dental practices and community dental services across the region of Kent, Surrey & Sussex, UK. One of these hubs was based at East Surrey Hospital, using salaried community dentists as well as the hospital dental team as a workforce. Reasonable adjustments were needed for patients who were shielding (those who are at a high risk of serious illness, should they catch COVID) or had additional needs, such as patients living in care homes. This included maintaining close contact with the local care homes and providing domiciliary care where appropriate. The hub had access to sedation throughout the pandemic for patients unable to tolerate treatment under local anaesthesia; during the recovery period, we also had limited access to general anaesthesia (GA). Patients were referred into the hub via a central electronic referral system, existing patients of the service were also able to access care and patients were also referred from other medical specialities within the hospital itself e.g. oncology, A&E. Over the 19 week period where the UDC was operating, 248 patients were seen; 98 of these were adults who have additional needs.

**Results:** During the operating period of the UDC, 10 domiciliary visits were performed for patients who were shielding, 14 patients were treated under sedation and 2 patients were seen under GA; 67 extractions, 9 extirpations and 38 other treatments such as dressings, smoothing teeth, prescriptions were carried out for adults with additional needs. Reasonable adjustments for these patients included offering sedation assessments virtually (via telephone or video), providing domiciliary visits on appropriate risk assessment, sending photographs of staff in Level 3 PPE to construct social stories for those with learning disabilities and virtual best interests meetings for patients who lacked capacity. As we moved into the recovery period, adjustments to patient flow, patient prioritisation and protocols around the provision of GA were implemented, including arrangements for pre-operative COVID swabbing and isolation.

**Conclusions:** During the pandemic, adults with additional needs required some adjustments to allow safe

and timely access to urgent dental care. It is important to continue with these adjustments as the COVID risk continues to affect the way we deliver dentistry in the UK, especially as we are working at a reduced capacity, so that the needs of these vulnerable groups are not forgotten.

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## 2. Structured relationships and networks between specialists and general dentists improve the willingness of clinicians to treat individuals with special needs

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Patients with special needs continue to experience poorer oral health due to problems with finding dentists with the required knowledge and skills to manage their treatment needs. In South Australia, specialists from the Special Needs Unit at the Adelaide Dental Hospital established a Special Needs Network to provide support to clinicians working through South Australian Dental Service, a government-funded statewide dental service, and thus to improve their willingness to treat these individuals.

**Aim:** To evaluate whether support provided through the Special Needs Network improved the willingness of dentists to provide oral health care for patients with special needs.

**Methods:** Clinicians involved in the Special Needs Network were invited to participate in online focus groups about their experiences of managing individuals with special needs. In particular, questions asked about their perspectives towards treating individuals with special needs, how the support provided through the Special Needs Network influenced their ability or willingness to manage these patients, and barriers and opportunities related to provision of care for individuals with special needs. Interviews were recorded, transcribed, and checked for accuracy prior to qualitative analysis. NVivo (QSR International) was used to analyse responses thematically and code for positive and negative sentiments in responses. Ethics approval was granted by the Melbourne Dental School Human Ethics Advisory Group (ID 1544156.2) and Central Adelaide Local Health Network Human Research Ethics Committee (ID 11629).

**Results:** 8 general dentists participated in this study. All were senior dentists involved in the Special Needs Network with the majority (n=6) working in regional and remote areas of South Australia. Challenges faced by general dentists in managing patients with special needs differed by patient group. Obtaining informed consent and providing treatment were the most significant challenges reported for those with intellectual disabilities and behavioural issues. For those with complex medical issues, challenges related to treatment planning and determining how treatment would best be provided safely. Responses relating to the Special Needs Network were presented as a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis. Strengths identified by dentists were that working as part of a wider network gave them a sense of collegiality and support in managing more complex patients as well as a pathway to keep abreast with current knowledge. Weaknesses related to difficulties with obtaining acute advice for complex cases due to the small number of specialists in special needs dentistry in the state. Perceived threats within the network were primarily related to workforce issues and systemic barriers within the wider dental service and their local clinics. However, clinicians felt opportunities lay in the use of new technologies, such as telehealth, and other initiatives to improve interactions with specialists and the skills of their workforce.

**Conclusions:** Dentists responded positively to support with managing patients with special needs through a formal network arrangement. Overall, clinicians felt it improved their willingness to provide treatment for patients with special needs resulting in more timely access to care for individuals with special needs.

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### **3. Oral health survey of caregivers of people with Alzheimer's disease**

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Alzheimer's disease is the most common cause of dementia, a condition which causes continuous decline in cognition and physical skills and that disrupts independent living. Thus, caregivers play a significant role in assisting this population of persons in completing their activities of daily living, which include their bathing and personal

hygiene. More than 15 million Americans provide this informal and usually unpaid care for people with Alzheimer's disease. Numerous previous studies have reported significant adverse general health effects among Alzheimer's caregivers but none could be identified which focused specifically on oral health.

**Aim:** The primary goal of this pilot study was to assess and analyze the extent to which a caregiver's own oral health practices and conditions were adversely affected by their caregiving responsibilities. The pilot survey also aims to gather initial information regarding effects of their caregiving for an Alzheimer's patient on that of any others for whom they may have caregiving responsibilities; for example, children, grandchildren, or other dependent adults.

**Methods:** This was a cross sectional pilot survey which was conducted at the Alzheimer's Association, Rochester & Finger Lakes Region (AARFL), New York. For the purpose of gathering the information a survey composed of 10 items with content about oral health practices and conditions was developed. The survey was designed by a dental geriatrician and leaders of the AARFL, who work closely and routinely with caregivers. The survey elicited subjects' level of agreement with each of the 10 statements along a 5-point Likert-type scale. Face validity for the items in this new pilot survey form was confirmed by other local experts in geriatrics and oral health. A single open-ended question at the end requested brief narrative responses if subjects wished to add comments about issues that were not addressed with the questions. A convenience sample of 126 informal caregiver subjects was recruited from among those who attended support groups and conferences in the Finger Lakes Region between November, 2018 and April, 2019. Early data analysis has consisted of reporting percentage of the population which reported scores of at least 1 (Some effect on oral health) on the survey scales.

**Results:** The results revealed that 44.2% felt that the quality of their own health has decreased due to their caregiving responsibilities for someone with Alzheimer's disease. Additionally, the study also found that 41.5% of the caregivers felt that they were not able to complete brushing their own teeth as carefully or as often as before due to their responsibilities while 48 % of the caregivers reported that they were not able to complete cleaning between the teeth (e.g. floss, Stim-U-Dents). Also, 39.8% of the caregivers felt that they had delayed or not scheduled one or more appointments for themselves with their dentist or hygienist due to lack of time because of caregiving.

**Conclusions:** This pilot study provides initial insight into the potential negative effect on oral health behaviors of a population of informal caregivers of patients with Alzheimer's Disease.

#### *Acknowledgements*

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#### **4. Fabrication and evaluation of toothbrush-mounted robotic arm for wheelchair-bound patient**

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**Aim:** To fabricate a toothbrush-mounted robotic arm that is attached to a wheelchair, and to evaluate its effectiveness in removing dental biofilm.

**Methods:** The toothbrush-mounted robotic arm was designed. Two hydraulic motors (DC motor), timer and an electronic toothbrush were purchased. They were assembled and attached to the lateral side of the wheelchair. A complete set of extracted teeth were mounted to the phantom head, smeared with a thin layer of saliva on the labial surfaces and stained with disclosing solution. The duration of tooth brushing was set for 2 minutes. The effectiveness of biofilm removal was evaluated based on the differences in percentage of disclosing solution staining before and after using the electronic toothbrush, using image software analyser. Quantitative data analysis was done using SPSS (paired T-test;  $p < 0.01$ ).

**Results:** Image software analyser showed the percentages of disclosing solution staining as 59.35% ( $\pm 15.13$ ) at pre-test, and 38.48% ( $\pm 20.08$ ) at post-test. Statistical analyses revealed a significant difference in removal of disclosing solution staining on the teeth using the device.

**Conclusions:** The toothbrush-mounted robotic arm is an effective innovative instrument that is effective in removing dental biofilm on tooth surfaces of wheelchair-bound patient.

#### **5. Impact of sign language communication training on dental students' empathy, learning experiences and attitudes towards people with disabilities**

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**Aim:** This study investigated the impact of the Sign Language Communication (SLC) training program on dental

students' empathy and attitudes towards people with disability, as well as participants' perceptions of their learning experiences.

**Methods:** 28 first year dental students undertook a 14-hour SLC module consisting of hands-on workshops, lectures and community engagement program, developed by a specialist in Special Care Dentistry and Deaf trainers. Participants answered the validated Toronto Empathy Questionnaire (TEQ) and the Attitude Towards Disabled People (ATDP) survey, pre- and post-test. Post-test results were compared with that conducted on a control group, consisting of 28 first year dental students who did not participate in the SLC training program. Participants also wrote a reflective journal to note their learning experiences during the program. Quantitative data were analysed via T-test (significance level  $p < 0.05$ ). Qualitative data were analysed via thematic analysis. Ethical approval was granted by the Research Ethics Committee at the UniversitiTeknologi MARA, Malaysia.

**Results:** Following the program, participants demonstrated a significant increase in total mean empathy score, the individual mean scores for 9 (out of 16) items of the TEQ, and mean ATDP score. In comparison with the control group, participants demonstrated significantly higher total mean empathy score, the individual mean scores for 4 (out of 16) items of the TEQ, and mean ATDP score. Students opined that the educational program enhanced disability awareness (e.g. understanding of Deaf culture, empowering disability advocacy, creating a caring society), encouraged acquisition of skills essential for professional development (e.g. communication skills, critical thinking ability, comfort in managing patients with disabilities, teamwork) and improved one's personal values or beliefs (e.g. self-gratitude, empathy, responsibility).

**Conclusions:** The SLC training program is effective in improving dental students' empathy and attitude towards people with disability, while providing learning experiences that are beneficial in improving patient care and personal development.

#### **6. The use of tele-dentistry for patients with inherited bleeding disorders during lockdown in the Covid-19 era in Ireland**

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Access to dental care was severely impacted during the COVID-19 pandemic in the Republic of Ireland. During lockdown, most dental practices closed voluntarily with dental care mostly limited to extractions in facilities equipped with required levels of PPE. In the absence of an individualised risk assessment and haemostatic management plan, dental extractions carry both higher morbidity and mortality in people with inherited bleeding disorders (PBD). There is a body of evidence to suggest that PBD may refrain from disclosing their condition in order to access urgent dental care in a timely fashion.

**Aim:** This aim of this study was to evaluate the use of tele-dentistry in to support PBD experiencing dental problems during the lockdown period.

**Methods:** A set of online resources to educate PBD about self-management of dental emergencies during the pandemic was developed. These included a video on how to take intra oral ‘selfies’ and an algorithm to aid patients and their dentists risk assess dental problems and navigate the inter-disciplinary care pathway. The Irish Haemophilia Society organised regular webinars for their members whereby PBD were instructed how to access a telephone or video consultation with a specialist dentist if required. PBD accessing this dental helpline were triaged by a trained dental nurse: asked to photograph their dental problem and completed a pain scale and oral health related quality of life questionnaire. Specialist tele-dentistry consults were booked and conducted off-site via a telemedicine programme, electronic patient portal with prescribing facility.

**Results:** 89 telephone/video dental consultations were conducted during 8 weeks of data collection; advice was provided to all callers; 28 patients recorded pain scores of 7 or above with half of those reporting maximum scores; 26 people indicated their dental problems were impacting significantly on their relationships, sleep, nutrition or mood; 29 scripts were issued remotely for patients who were not managing their dental pain adequately; 8 patients were tutored in the self-placement of temporary fillings using kits from local pharmacies; dental extractions were arranged for 22 patients of which 15 were carried out locally by general dentists via tele-mentoring. There was no incidence of post-operative bleeding from the mouth requiring hospital admission or additional systemic post-operative haemostatic measures.

**Conclusions:** During the pandemic dental problems impacted significantly on QoL exacerbated by sub-optimal pain regimes and difficulty accessing care locally. Tele-dentistry enabled urgent dental problems to be identified and addressed efficiently, effectively and safely using an interdisciplinary algorithm. Patients expressed shame in not coping with severe dental pain and guilt that dental neglect had put their families at risk by needing to break lockdown. Patients were especially worried

that spreading dental infection would trigger spontaneous bleeding and that broken teeth would lacerate their mucosa. Tele-mentoring of anxious dentists and online meetings with haemophilia treaters enabled timely safe local care to be provided using optimal factor regimes. Now well-established, the use of tele-dentistry offers the possibility to reduce many barriers to care for PBD and the teams that treat them long after the pandemic has ceased.

*Acknowledgements*

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## **7. Development of a mathematical model for predicting the behavior of individuals with mental disability in the dental office**

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**Aim:** Dental treatment for individuals with mental disability in the outpatient setting can be particularly complex due to the presence of behavioral disorders and the limited level of cooperation. The aim of this study was to identify variables related to behavior during certain daily life activities and when implementing additional tests for medical diagnosis, which could help develop a predictive model for the behavior of these patients in the dental office. **Methodology:** The study included 250 patients with mental disability who visited the dentist’s office in the Special Patients Unit of the Faculty of Medicine and Dentistry of the University of Santiago de Compostela (Spain) between 2017 and 2019. The study group’s mean age was  $23.0 \pm 12.6$  years, 105 (42%) of the participants were women, and 145 (58%) were men. The systemic diagnoses by order of prevalence were as follows: intellectual disability of unknown etiology (n=115), autism spectrum disorders (ASDs; n=39), Down syndrome (DS; n=36), cerebral palsy with cognitive impairment (CP; n=25) and a heterogeneous set of rare diseases (n=35). The patients’ companions were given a standardized questionnaire with 6 sections that collected information on demographic data, medical history, patient behavior in daily situations, presence of harmful routines/habits, data on socialization/participation in activities and behavior in other previous medical/dental consultations. With the data obtained with this questionnaire, we developed mathematical models to predict the patient’s level of

cooperation for 2 scenarios: an intraoral examination and an invasive dental procedure. The outcome variables for these scenarios were the need for protective stabilization (yes/no) and the need to resort to general anesthesia (yes/no), respectively. The results were analyzed in terms of sensitivity, specificity and Akaike's information criterion. The study was approved by the Ethics Committee of the University of Santiago de Compostela, Spain (Ref. 123-17).

**Results:** The predictive models that showed the best results were those that only included individuals with the same systemic diagnosis. In terms of the need for protective stabilization during the intraoral examination, the DS model achieved a sensitivity of 93.1% and a specificity of 57.1%. The ASD model achieved a sensitivity of 66.6% and a specificity of 90.4%. The CP model achieved a sensitivity of 100% and a specificity of 100%. In terms of the need for general anesthesia to perform an invasive dental procedure, the DS model achieved a sensitivity of 100% and a specificity of 80.9%. The ASD model achieved a sensitivity of 100% and a specificity of 100%. The CP model achieved a sensitivity of 100% and a specificity of 50.0%.

**Conclusions:** The predictive models developed in this study can be useful for introducing a selection filter before indiscriminately referring these patients to specialist centers or hospital departments.

## 8. Clinical Service Evaluation of a Dental Nurse-led Cognitive Behavioural Therapy Service based in the UK

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Dental anxiety is an impediment to accessing dental care across all demographics. Cognitive behavioural therapy (CBT) has been shown to have effective outcomes in reducing anxiety across a wide spectrum, and allows many patients to access care more easily or with less reliance on sedation.

**Aim:** To evaluate the effectiveness of a Dental nurse-led Cognitive Behavioural Therapy Service, and identify trends that may improve successful patient selection.

**Methods:** A retrospective sample of all CBT patients seen within the service between 2015-2017, to allow treatment to be completed. Data collection was carried out including Pre- and post CBT Modified Dental Anxiety Scores (MDAS), success in treatment modality de-escalation, patient demographics and reason for referral.

**Results:** A statistically significant reduction in MDAS is seen for dental nurse delivered CBT. There also appears

to be greater success rates for more specific phobias, younger patients prior to or during early adolescence and a dip in success rates in CBT in midlife.

**Conclusions:** A large reduction in MDAS can be seen, comparable to other therapist led models. This model shows that dental CBT can be delivered by dental nurses, in a cost effective manner, integrated with a dental service.

### *Acknowledgements*

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## 9. Clinical considerations in providing intravenous sedation with midazolam for obese patients in Dentistry

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**Aim:** The widespread prevalence of obesity continues to rise. Obesity and dental disease share common risk factors and so the demand for dental care for obese patients is escalating. The impact of obesity on general and oral health, as well as the challenges in delivering dental care for this cohort has been previously explored; however this project will outline the increased risk that this cohort experience during intravenous sedation (IVS) specifically and propose considerations which will reduce these risks. Current national guidelines in the United Kingdom provide little detail about managing obese patients using benzodiazepine sedation, despite the increased risk they likely experience. Obesity is a risk factor for adverse cardiovascular events such as myocardial infarction and stroke and so IVS is an essential tool in managing obese patients because the judicious use of carefully controlled sedation will lower the sympathetically induced stress response and associated oxygen demand, thereby managing this risk. Literature from dentistry and other medical specialties is reviewed to propose suggestions such as the benefits in administering supplemental oxygen and the use of capnography as a monitoring tool.

**Methods:** By reviewing the literature from dentistry and other medical specialties we will address the risks associated and then outline the most important aspects of pre-operative risk assessment as well as management considerations. In particular the benefit in administering supplemental oxygen and the use of capnography in monitoring this cohort of patients during sedation with midazolam will be discussed.

**Results:** The increased risks, pre-operative assessment and management considerations will form the content of this study. This will be a practical tool which practitioners could use to guide their practice, ensuring the provision of safe care for this ever increasing group of patients.

**Conclusions:** The key considerations for assessment and management outlined in this study will help to ensure safe management of obese patients and prevent adverse events. Obesity is not a contra-indication to sedation but individuals with moderate to severe Obstructive Sleep Apnoea, Obesity Hypoventilation Syndrome or associated co-morbidities should be identified and referred to specialist colleagues and may be more safely managed by an anaesthetist in an acute hospital setting. Further high quality research is needed to conclusively demonstrate the benefits of supplemental oxygen and use of capnography.

## 10. A three year service evaluation of dental treatment for higher risk patients delivered in a medically supported setting

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**Aim:** To evaluate a service provided to a cohort of patients who may require immediate access to medical assistance or who require sedation by an anaesthetist or using propofol. Service evaluation will prompt review of adverse events and provide better understanding of patient's needs to improve service planning as well as safeguarding future funding.

**Methods:** Retrospective analysis of clinical notes was completed for patients receiving dental treatment from the Special Care Dental (SCD) service covered by an emergency care (2222) team within the Queen Elizabeth Hospital, Birmingham (QEHB), United Kingdom. After obtaining local approval, data including the patient's baseline measurements/vital signs, medical conditions, dental treatment performed, additional adjuncts to facilitate care, and occurrence of adverse events was recorded and analysed. All patients treated under SCD in QEHB were included regardless of the utilisation of sedation. Exclusion criteria included patients listed for expedition of treatment, or pre-cardiac surgery habilitation.

**Results:** 110 episodes of care were analysed over 3 years. The most common reason for treatment being required in a medically supported setting was the presence of a cardiac condition (48%, n= 53); 41 patients (37%, n=41) required sedation to be provided by an anaesthetist and in 44% of these cases this was necessary because of the

presence of an unstable cardiac condition; 17% (n=19) of patients had an ASA grade of IV and the majority (68%, n=66) were ASA III. Body mass index (BMI) and total body weight (TBW) were under-recorded however the average BMI was 38.4 which is classified as obese. Combined restorative and surgical treatment plans and multiple extractions were most often carried out (n= 40, 32% and n=44, 35%, respectively,) with very few fixed prosthodontics plans (1%, n= 1); 27% (n=30) of patients required adjuncts to facilitate their care, including specialist transport arrangements (60%, n=66), positioning cushions (17%, n=19), hoist transfers into the dental chair (13%, n= 14) and vein finder technology (10%, n=11). Only one adverse event occurred during this period; 75 appointments were missed or cancelled at short notice.

**Conclusions:** This service evaluation highlights that the patients receiving treatment in this setting are complex in their medical, dental and logistical management. The evaluation also indicates a safe and effective service. Obese patients have an increased risk of co-morbidities, administering sedation and managing airways, therefore unsurprisingly the average BMI and TBW of patients treated were high. For patients who are treated within this service, simple and definitive treatment plans must be considered to avoid repeated visits resulting in further exposure to medical risk. Risk assessment and organising specialist transport demands adequate staff preparation time. Reassuringly the single adverse event was managed and reflected upon well with no lasting harm to the patient. Patients with complex or chronic medical conditions frequently experience illness, which results in high cancellation rates. Expansion of this service to localities across the West Midlands would improve access to safe care for this cohort where a local service in unavailable.

### *Acknowledgements*

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## 11. Influence of regular appointments in the improvement of oral hygiene in patients with cerebral palsy

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**Aim:** Analyze the influence of frequent appointments in the improvement of oral hygiene in individuals with Cerebral Palsy.

**Methods:** An analytic, observational study was developed. A convenience sample was used, consisting of 18 patients whose main disability was cerebral palsy. These patients regularly attended oral hygiene appointments, for a period of 10 years minimum. This research was accepted by the Ethical Committee of the University of Lisbon's Faculty of Dental Medicine, in Portugal, following the rules of the declaration of Helsinki. The individuals who agreed to participate read and signed the informed consent, or if the patient could not provide consent, the parents or caregivers would give it. Patients who were absent in oral hygiene appointments for more than a year were excluded. The data was collected from October through December 2019. Essential information was gathered from each participant's file, including Gingival index (GI) and Simplified Debris index (DI-S), and the findings were compared between the first and the most recent visit. The Shapiro-Wilk test was used to evaluate the data distribution. The Wilcoxon test was used to assess the progression of the oral status, showing the difference between the mean values of the different indexes overtime. The Mann-Whitney U test was applied to determine the variations of the indexes related to the frequency of appointments, and the Spearman correlation was used to analyse the bivariate relationship between the mean number of appointments per year with the progression of each oral health index.

**Results:** This sample attended oral hygiene appointments for at least ten years up to thirty, with an average number of appointments 2,16 ( $\pm 0,37$ ) per year. The majority of our sample (72.2%) received help or were totally dependent on others to carry out daily hygiene habits. Most of them (61%) brushed their teeth twice a day or more. Between the first and last appointments, both the indexes decreased. The GI had a mean decrease of 0.63 ( $\pm 1.05$ ) ( $p=0.09$ ) and the DI-S index decreased 0.86 ( $\pm .57$ ) ( $p=0.01$ ). When using the Spearman's test, it was determined that there was no statistically significant correlation between the mean number of appointments per year and the GI ( $p=0.346$ ) and the DI-S ( $p=0.229$ ).

**Conclusions:** Thanks to the regular oral hygiene appointments, CP patients were able to improve their oral hygiene and gingival status overtime, although these changes were not related to the mean number of appointments per year. This progress could be higher, however with the aging of patients and their caregivers, the degree of dependence tends to increase. Considering the challenges in daily oral hygiene in CP patients, these findings seem to reinforce the importance of frequent oral health care intervention in regard to promote oral hygiene practices for patients and caregivers, as well as the implementation of preventive strategies.

## 12. Influence of the brushing autonomy and frequency in the oral hygiene of institutionalized cerebral palsy individuals

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**Aim:** To evaluate the influence of institutionalization type and number of years, brushing dependency and frequency, on cerebral palsy individual's dental hygiene.

**Methods:** An observational study was developed after approval by the Ethics Committee of the Faculty of Dental Medicine at the University Lisbon, institutional and parents/tutors authorization. Data collection was made by analysis of clinical records, regarding the type of the cerebral palsy (CP), brushing dependency and frequency, institutionalization years and type (daily regime and/or homecare). To evaluate the efficacy of tooth brushing the Simplified Oral Hygiene Index (OHI-S) was used. Inclusion criteria were to be teenagers or adults that attend or live in institutions with more than 3 individuals with CP. The data was analysed using IBM SPSS Statistics 25 (Statistical Package for the Social Sciences) applying the Kruskal Wallis and the method Forward Stepwise for linear regression tests.

**Results:** From the 30 institutions evaluated, 10 implemented the daily tooth brushing program, 14 had the program implemented but didn't perform it regularly and 6 didn't do the tooth brushing at all. In these institutions, a total of 415 individuals with CP were enrolled in the study. Of these, 47 (34.2%) perform the tooth brushing in the institution twice or more a day, 120 (27.9%), once a day and 148 (34.4%) never brush their teeth in the institution. The most dependent individuals, regarding tooth brushing are the ones with spastic palsy (163; 67.6%) ( $p<0.001$ ) and the ones living in the institution (120; 49.8%) ( $p=0.002$ ). Analysing the OHI-S, shows that dependent individuals have higher values ( $p=0.236$ ) and people that brush their teeth twice or more a day have an OHI-S of (2.48,  $\pm 1.24$ ) ( $p=0.001$ ), an Simplified Debris Index (DI-S) (1.67 $\pm 0.59$ ) ( $p=0.006$ ) and a Simplified Calculus Index (CI-S) (0.81 $\pm 0.78$ ) ( $p<0.001$ ) all values lower than the ones who do not brush their teeth twice a day. The probability of brushing at least once a day was lower in the non-dependent (OR=0.474;  $p=0.001$ ) and that the probability of performing the brushing in the institution at least once a day was about twice as high in the type of mixed paralysis (OR=2.361;  $p=0.043$ ). People who lived in the institution have a lower debris index (DI-S)=1.78 $\pm 0.66$ , without significant difference ( $p=0.210$ ) when compared with the ones that have homecare. The DI-S mean value for people that attend do not live in the

institutions is 0.21 times higher than the ones that live.

**Conclusions:** The type of CP, brushing dependency and frequency as well as the number of years in institutionalization can weight on the oral hygiene and therefore the overall oral health of this population.

### 13. Self-reported oral lesions and complaints by diabetic members of diabetes mellitus related social media groups in Portugal

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**Aim:** The study aimed to identify and collect self-reported information about the presence of oral lesions and other major oral complaints, from diabetic members of Diabetes Mellitus related social media groups in Portugal.

**Methods:** An online survey, developed by the authors, with 8 questions was used, published on social media, available for 8 weeks, in which 2 reminders were made. The data was gathered in a sample of Portuguese people diagnosed with Diabetes mellitus, contacted during January-March 2020. The samples were collected among diabetic people members of social media groups specific for this type of population. The sample can be classified as a convenience sample since there was no selection or randomization process, besides been members of the social media groups, for this fact it is not representative of the Portuguese diabetic population. Consent was obtained by the voluntary completion of the questionnaire. Ethical approval was obtained from the Ethics Commission at the Lisbon Dental School. For data analysis statistical tests were performed, such as Chi-square and Cramer's tests. Given the methodology selected for the study it was not possible to define a group size and establish a response rate. Two of the respondents did not fulfil the inclusion criteria (underaged) and were removed from the database.

**Results:** A sample of 126 people was obtained, with an average age of 42.2 years ( $\pm 14.45$ ), mostly female 91 (72.2%). The majority 91 (72.2%) reported a lower last blood glucose value than normal. Concerning oral manifestation reported by the participants, 45 (35.7%) mentioned dry mouth syndrome (DMS), 23 (18.3%) oral pain and 43 (34.1%) halitosis. It was also possible to see that there is a statistically significant relation among above normal glycemic values and DMS ( $p=0.02$ ), oral pain ( $p=0.01$ ) and halitosis ( $p=0.01$ ). For the presence of oral lesions, 17 participants (13.5%) reported angular cheilitis,

14 participants (11.1%) tongue lesions, 19 (15.1%) lip lesions and 21 (16.7%) vestibular mucosae lesion. Vestibular mucosae lesion presented a statistically significant relation with the above normal glycemic value ( $p=0.02$ ), as well as the presence of angular cheilitis ( $p<0.01$ ).

**Conclusions:** The study confirmed the increased prevalence of oral lesions and major oral complaints in individuals with uncontrolled diabetes, demonstrating the importance of a healthy oral cavity in controlling diabetes, as well as the importance of controlling diabetes in preventing oral diseases.

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### 14. Influence of oral hygiene appointments in the gingival status and biofilm accumulation in patients with intellectual disability

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**Aim:** To assess longitudinally the oral status in individuals with Intellectual Disability (ID), regarding frequency of oral hygiene appointments and its influence on gingival health and biofilm accumulation.

**Methods:** The sample was gathered between October and December of 2019, from all of the patients with special needs, who attended, for a minimum of 10 years, the oral hygiene appointments at the Faculty of Dental Medicine of the University of Lisbon (FDMUL). The individuals who agreed to participate read and signed the Informed Consent, or if the patient could not provide consent, the parents or caregivers would give it. A convenience sample with a total of 32 patients with Intellectual Disability (ID) was selected. This study was approved by the Ethical Committee of FDMUL, in Portugal, following the rules of the declaration of Helsinki. Essential information (date of birth, gender, frequency of appointments, and level of support required), oral hygiene habits (brushing frequency and daily oral hygiene devices), and oral health indexes were collected from each participant's file. The indexes collected were specific for evaluation of the gingival status (Gingival index (GI)) and biofilm accumulation in the teeth surfaces (Simplified Debris index (DI-S)). The Shapiro-Wilk test was used to investigate the normality of the sample. To assess the progression of the oral status, the Wilcoxon test calculated the differ-

ence between the first and last appointments' mean values of the indexes. The Spearman correlation was used in order to investigate the relationship between the mean number of appointments per year with the progression of the GI and the DI-S. The Mann-Whitney U test was applied to evaluate the variations in the indexes related to the frequency of appointments, the sample was divided into two groups – those who visited less than 2 times per year, and those who visited 2 or more times per year.

**Results:** The distribution of the sample was not normal. The mean age of the participants was 37.78 ( $\pm 10.74$ ). The mean number of appointments, in the last 10 years, was 2.19 ( $\pm 1.14$ ) appointments per year. Between the first and last evaluations, we observed a significant decrease in the DI-S ( $p = 0.03$ ). The GI also decreased, although not significantly. Despite there being a decrease in the GI in both groups, only the patients who visited 2 or more times had a significant GI decrease ( $p = 0.046$ ). The frequency of attendance showed a general decrease in the GI and a positive influence in the progression of this index ( $r_s = -.483$ ;  $n = 18$ ;  $p = 0.042$ ).

**Conclusions:** The attendance to the oral hygiene appointments promoted a decrease in biofilm accumulation. The frequency of appointments had a positive impact on the gingival status, which is confirmed when the patients visit 2 or more times per year. Considering the difficulty in daily oral hygiene care in ID patients and its influence on the gingival status, these results seem to reinforce the importance of the regular intervention of oral health professionals in regard to oral hygiene promoting activities to both patients and caregivers.

## 15. Influence of oral hygiene appointments in the gingival status and biofilm accumulation in patients with Intellectual Disability

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**Aim:** To characterize and compare oral hygiene and gingival status between trisomy 21, cerebral palsy and intellectual disability. To study the influence of individuals' dependence on the same oral aspects.

**Methods:** This was a cross-sectional study, approved by the Ethics Committee of the Faculty of Dental Medicine, University of Lisbon. The sample was obtained by convenience, consisting of 58 patients with trisomy 21, cerebral palsy and intellectual disability who had been attending the oral hygiene appointment for people with special needs, for at least 10 years, at the FDMUL. Data col-

lection was carried out between October and December 2019. The data were grouped into the following groups: demographic, dependency, oral hygiene habits and oral assessment, which consisted of collecting the Simplified Debris Index (DI-S) and Gingival Index (GI). For the statistical analysis of the collected data, the Kruskal-Wallis test, the Pearson Chi-Square test, Comparison of Proportions test and the Pearson Correlation were performed.

**Results:** The sample consisted of 8 individuals with trisomy 21 (T21), 18 with cerebral palsy (CP) and 32 with intellectual disability (ID). The mean age was similar for all groups, in T21 was 39.75 ( $\pm 11.49$ ), in CP 40.39 ( $\pm 12.08$ ) and in ID 37.78 ( $\pm 10.74$ ). The gender distribution in the three groups was equally distributed. Considering the different levels of dependency, the ID group presented the highest level of dependency in carrying out daily activities (90,7%), and in contrast, the majority of independents (50.0%) had T21. Among the three pathologies, significant differences were found in the degree of dependence of individuals ( $p = 0.021$ ). The post-hoc Bonferroni's correction, revealed difference in dependence between T21 and ID. Regarding tooth brushing frequency, the majority of individuals brush 2 or more times a day regardless the pathology and none used interproximal cleaning devices. In the assessment of oral hygiene and gingival status, it was noted that ID had the highest mean of DI-S (1.72;  $\pm 0.65$ ) and GI (1.02;  $\pm 0.58$ ), in contrast to CP which showed the lowest DI-S (1.10;  $\pm 0.60$ ) and GI (0.59;  $\pm 0.60$ ). Only DI-S revealed a significant difference between all pathologies ( $p = 0.048$ ), in particular, it was significantly different between CP and ID ( $p = 0.028$ ). An inverse relationship was found between the DI-S and the brushing frequency ( $\rho = -0,351$ ;  $p = 0.026$ ). As for dependence, a direct relationship was found, meaning that DI-S and GI increase with an increase of individual's dependence, but without statistical significance.

**Conclusions:** ID presented the worst oral hygiene and gingival status, possibly justified by the fact that greater dependence was detected among these patients. Oral health professionals should bear in mind this differences so that they can adapt preventive strategies to specific needs of different systemic disorders.

## 16. An audit of the compliance with legislation for adults with incapacity certificates used in a public dental service setting

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**Aim:** This audit assessed the compliance with legislation surrounding incapacity certificates for adults with inca-

capacity (AWI) who received dental treatment at St John's Hospital, Livingston, and Howden Dental Centre. It also aimed to ensure justified use of the AWI certificates and to encourage residual capacity.

**Methods:** The audit investigated if there is documented evidence that the five principles of the Adults with Incapacity Act (Scotland) 2000 are being followed, and if written justification was present for implementing AWI. It also identified whether certificates were issued more frequently by general medical practitioners (GMPs) or general dental practitioners (GDPs). There are five principles of the AWI Act. They state that the decision must benefit the person, it must be the least restrictive option to the person's freedom, the wishes of the person must be taken into consideration, relevant others should be consulted, and the person should be encouraged and allowed to make their own decision using existing skills. Guidance used for this audit was primarily based on the AWI Act 2000, supported by the Faculty of General Dental Practice's "Dementia-Friendly Dentistry: Good Practice Guidelines", and National Education Scotland's documentation intended for acute general hospitals entitled "Think Capacity. Think Consent." Three months of data was collected retrospectively for the first round, which totalled to 48 patients. Once the data was collected, analysed and appropriate corrective information on AWI principles relayed to the team, the same collection tool was used to collect a further three months of data prospectively for the second round, totalling 17 patients.

**Results:** In the first round, 40% of records did not include written justification for implementing AWI certificates, and 65% did not document evidence that principles of the AWI act were being applied; 94% of AWI certificates were issued by GMPs. In the second round, 94% of records had written justification for the AWI certificate, and 88% showed evidence that the AWI principles were being followed; 76% of certificates were issued by GMPs.

**Conclusions:** This audit showed that, before intervention, there was often suboptimal dental record keeping for patients who have AWI certificates, frequently showing no written justification for implementation of the AWI act. While the absence of a written justification for using an AWI certificate does not mean that the use was unjustified, it is best practice to keep such written records. In both rounds of the audit, the majority of the AWI certificates were completed by GMPs rather than GDPs. This can be an issue when dental care is required, because GMPs do not always specify that dental treatment is included in the AWI certificate. This suggests that more training should be given to GDPs to allow them to complete AWI certificates.

## **17. Assessment of tooth retention and denture wear at a residential centre for adults with intellectual disabilities (ID) by comparison to similarly-aged community-dwelling adults without ID**

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**Aim:** To compare dentate status, edentulousness and denture wear of residents of a centre for adults with intellectual disabilities (ID) to similarly-aged community-dwelling adults without ID. Comparison by residential status: a) all residents i.e. campus-based and community/group home dwelling and b) community/group home dwelling residents only.

**Methods:** Dental records of 55 residents aged 50 years and over (96.5% of all residents aged 50+ yrs, 24 campus-based, 31 community/group home dwelling) were audited in March 2020. Data was compared to a cross-sectional analysis of oral health data for subjects aged 50 years and over from Wave 3 cohort of the Irish Longitudinal Study on Ageing (TILDA). Average age of all residents was 64.4 yrs. Campus-based residents were older with average age of 66.5 yrs compared to 62.7 yrs for community/group home dwelling residents.

**Results:** Mean number of teeth present was 12.6 for all residents and 15.6 for community/group home dwellers compared to 17.9 for TILDA participants while the proportion of subjects with 20+ teeth was 29.1% (n=16), 38.7% (n=12) and 54.3% respectively (base edentate/dentate). Prevalence of edentulousness was 23.6% (n=13) for all residents and 12.9% (n=4) for community/group home dwellers compared to 9.9% for TILDA participants. The average age of edentulous residents was 68.3 yrs. Only 5.3% of edentulous TILDA participants had no denture, compared to 1 of the 4 edentulous community/group home dwellers and 46.1% (n=5) of all edentulous residents. Half of all residents with a normative prosthetic need wore full or partial dentures, 35.3% were deemed unsuitable, primarily due to severity of ID or anticipated inability to adapt to denture wear and the remaining 14.7% either declined or could not tolerate dentures.

**Conclusions:** Six of the 13 edentulous residents were already edentulous prior to the commencement of a routine dental service for this centre in 1998. Therefore, 12.7% (n=7) of residents have been rendered edentulous over the past 22 years. Despite a high prevalence of edentulousness, almost 30% of all residents and almost 40% of community/group home dwellers have retained 20+ teeth over 22 years.

## 18. Improving dental screenings for medically compromised patients referred from University Hospital Wales

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**Aim:** To improve the quality of dental screenings so to maximise patients' dental episode as an opportunity to provide a good quality history, examination, and treatment plan, including preventative care. Medical specialties at University Hospital Wales refer inpatients to the Dental Hospital for dental screening prior to medical intervention e.g. pre bone marrow transplant or cardiac valve replacement surgery. A robust screening process, preventive advice and subsequent dental treatment should help work towards minimising complications to medical treatment due to pre-existing dental pathology. Preventative dental advice is crucial for these medically compromised patients due to their increased risk of complications from dental pathology i.e. infective endocarditis, sepsis, osteonecrosis. Currently challenges in providing high quality screening include a lack of consensus on appropriate treatment, high junior staff turnover and limited time between referral and the planned medical intervention.

**Methods:** Through retrospective assessment of patient records, we investigated the quality of pre-operative dental screenings at our Exam & Emergency Dental Department using 14 assessment domains. Feedback about the referral pathway and confidence in managing these medically complex patients was obtained from current departmental staff. Changes were made to the triage referral form for greater formality of the current pathway. A new record keeping tool and an aide-memoire was implemented for clinicians to use during screenings. Improvements were planned by using the quality improvement 'Model of Improvement' methodology. Other QI tools used included process mapping, driver diagrams and model of sustainability.

**Results:** In the first cycle, over a three-month period, 21 patients were referred by medical specialities for dental screening. Of these 10 were reactive referrals and 11 prophylactic referrals. Further data was obtained for prophylactic patients and prevention advice was the main domain of focus. This showed that only 9% received prevention advice and 54% received a basic periodontal examination. In the second cycle, over a two-month period, 12 patients were referred by medical specialities. Of these, 3 were 'reactive' and 9 were 'prophylactic'. Following implementation of the change, a prevention proforma, prevention advice improved significantly from 9% to 77%. Basic periodontal examination showed some improvement, following formal reminder, from 54% to

77%. This was not reciprocated with another domain, dental charting, which reduced from 45% to 44%.

**Conclusions:** Improved resources and support for staff has enabled more comprehensive dental screening and better ensured prevention is being delivered to high-risk patients. Long term to improve sustainability of record keeping, against all 14 domains, a proforma including all elements of record keeping is being designed.

## 19. Palliative Care Dentistry: to treat or not to treat. A shared approach

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**Aim:** The Palliative Dentistry Project comes as a result of multiple conversations and concerns-shared between Special Care Dentistry (SCD) providers and General Dental Practitioners (GDPs) in the Midlands (United Kingdom) joining at the Management Clinical Network for SCD. Promoting patients' quality of life and empowering patients and families through effective communication are at the heart of this document.

**Methods:** This document aims to inform and support colleagues to deliver care collaboratively between GDPs, doctors and SCD professionals in the best interest of patients. Patients with life-limiting conditions are often supported by a multidisciplinary team that rarely includes dental care professionals and their input might not be sought until the patient complains of discomfort. This document reflects the authors experience based on their close collaboration over the years with regional Palliative Care professionals. Due to the latest medical advances patients, who before would have not survived, are living with complex medical co-morbidities and other disabilities. Similarly, as reported by the latest surveys, older people are now more likely to retain their natural teeth. As great as all of this is, our patients are more likely to require dental treatment at a moment in their lives when they may no longer cope with dental treatment due to frailty. Early access within the diagnosis gives patients and clinicians the opportunity to treat and plan for the future; however, the dilemma remains for those referred at a late stage when severe frailty or cognitive impairment limits their capacity to manage dental treatment. Most articles in Palliative Care Dentistry focus on the importance of the provision of oral hygiene and common oral symptoms. While prevention is a key element to avoid disease and improve quality of life, the greatest difficulty appears when deciding whether to treat or not to treat dental disease in the terminally ill patient.

**Results:** To support clinicians to make this decision, the document outlines the differences between palliative, end-of-life and terminal care and highlights some of the indicators present in patients who are deteriorating adapted from the Supportive and Palliative Care Indicators Tool. Recognition of these red flags supports us to plan dental care including provision of invasive dental treatment and referral to specialist services. This document offers a multidimensional approach to patient care and consequently, the psychological impact of a life-threatening illness should not be underestimated. This will directly impact on how patients and families will interact with dental professionals but also on their ability to engage and cope with dental treatment. Communication, empathy and active listening are qualities that members of the dental team should have when addressing patients and families experiencing distress and uncertainty; accepting that at times, conversations might become difficult and emotionally challenging.

**Conclusions:** As we aim for a holistic approach to patient's care, this project has been widely reviewed by dental care professionals and Health Education England and Palliative Care specialists. Everyone agreed that this document will aid clinicians to support their patients on decision making and promotes a share-care approach between SCD and GDPs.

#### *Acknowledgements*

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## **20. Oral health related quality of life in children with acute lymphoblastic leukemia undergoing chemotherapy according to their caregiver's perceptions: a cross sectional study**

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Chemotherapy in children with acute lymphoblastic leukaemia (ALL) can lead to many oral manifestations such as oral mucositis and periodontal inflammation, which may affect negatively their quality of life.

**Aim:** The aim of this study was to assess the impact of the parental perception oral health related quality of life (OHRQoL) in children with ALL undergoing chemotherapy.

**Methods:** Parents/caregivers of 43 children aged 6-14 years old attending the Instituto Nacional de Neoplasias, Lima-Perú were invited to participate in the present study. A calibrated examiner conducted the clinical assessment for dental caries (dmft/DMFT), dental plaque (Silness&Løe Index), mucositis (WHO Grading Scales) and candidiasis in children undergoing chemotherapy. Parent-Caregivers Perception Questionnaire (P-CPQ) was applied using face-to-face interview. Poisson regression analysis was conducted to evaluate the association between independent variables and total scores ( $\alpha=5\%$ ).

**Results:** Mucositis classified as grade 1 and 2 was associated with a negative impact on P-CPQ total scores (RR=1.34;  $p=0.001$  and RR=1.99;  $p<0.0001$ ; respectively). Moreover, a higher fathers' level education and family income demonstrated a worst impact on total PCP-Q scores (RR=1.46;  $p<0.0001$  and RR=1.55;  $p<0.0001$ , respectively). There was no association between caries experience (dmft/DMFT) and P-CPQ total scores ( $p=0.73$ ).

**Conclusions:** According to parents/caregivers' perceptions, mucositis impact negatively on the OHRQoL of children with ALL undergoing chemotherapy, but dental caries did not impact the OHRQoL in this population.

## **21. Dental students' perception of care of geriatric patients – a comparative study involving eight nations**

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**Aim:** To analyze the perceptions of dental students about geriatric care environment by comparing their knowledge and attitude, according to year of study from 8 countries in the Asia-Oceania region.

**Methods:** A qualitative, exploratory-descriptive, cross-sectional and correlational study approach was developed. The study was conducted in dental schools located in India (13), Malaysia (4), New Zealand (1), Taiwan (1), Cambodia (1), the Philippines (1), and Nepal (1). The instrument for assessing knowledge was taken from the 2015 revised Breytspraak' Facts on Aging Quiz – based on Palmore (1977) instrument. A nonprobability convenience sampling method was used and included all dental students from these 22 dental schools. It was hypothesized that at least 80% of the subjects surveyed had adequate knowledge on aging and a positive attitude towards geriatric dental care. Frequency analysis, mean and standard de-

viation and non-parametric test including Kruskal Wallis, one sample rank test and Wilcoxon test were applied.

**Results:** There were a total of 100 respondents from Cambodia, 1365 from India, 378 from Malaysia, 52 from Nepal, 93 from New Zealand, 61 from the Philippines and 92 from Taiwan. The sample (n=2141) was mostly comprised of female students (73.8 %) and in the 4th year (33.1 %) of dental study. As all the students from the respective dental schools were involved in the study, 28 % of the respondents had not treated a geriatric patient yet. There was significant difference among countries on knowledge score. The highest level belonged to New Zealand, which was significantly higher compared to Cambodia, India and the Philippine with the lowest level of knowledge. All students, irrespective of the year of study, demonstrated adequate knowledge. However, when comparing to the cut off 80 % achievement, except for New Zealand, all other countries had a lower difference ( $p < 0.05$ ). Results showed that the level of attitude towards geriatric dental care among the respondents was well below the cut off value (8 %). Comparing between the level of attitude and the cutoff point (80 %), respondents from all participating countries demonstrated a significantly low level of attitude and the lowest belonged to Malaysia. Comparison between standardized scores of knowledge and attitude showed that there was a significant gap between attitude and knowledge among students for all countries except Cambodia. The highest gap was observed among the Malaysian students followed by New Zealand.

**Conclusions:** The findings suggest the need for increased investment by the healthcare administrators in collaboration with dental school top management to promote a comprehensive, holistic and integrated geriatric dentistry teaching-learning environment that supports the specialized needs of older adults, especially those who are frail and dependent. Empathy and awareness of the need to provide care for the disabled has to be emphasized in the curriculum as we enter the aging population era. Knowledge and skills can be developed over time but the right attitude is essential in life to achieve success.

#### *Acknowledgements*

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## **22. A disability-based exploration of psychosocial barriers and enablers to accessing dental services for people with clinically severe obesity: a qualitative study**

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**Aims:** This qualitative study aimed to explore the psychosocial barriers and enablers to accessing dental services for people with clinically severe obesity (PwCSO) and to assess their acceptance of tailored dental care, which begins with discussion around their weight.

**Methods:** Ethical approval was granted for this study (project number: 2018/ETH00353). Eight focus groups were conducted by one researcher with forty adult participants at the Adult Healthy Weight Clinic (AHWC) within a hospital-based lifespan obesity service in Greater Western Sydney, New South Wales, Australia. Focus groups were predominantly carried out during multidisciplinary health and wellbeing group sessions. A semi-structured script for each focus group was used to guide discussions. All focus groups were audio recorded and subsequently transcribed verbatim. Focus group transcripts were analysed thematically using an inductive grounded theory qualitative approach.

**Results:** Eleven (27.5%) participants were male, twenty-nine (72.5%) female, all between the ages of 23-74 (mean age of 50). The body mass index (BMI) of participants ranged from 31.6-84.6kg/m<sup>2</sup>. The results highlighted four key themes including ‘disempowerment to act to improve oral health’, ‘weight-related stigma and discrimination’, ‘unpredictability of the dental environment’ and a ‘lack of tailored services for PwCSO. A number of subthemes, which reflect the six categories of barriers to access from the disability literature: Availability, Affordability, Acceptability, Accommodation, Accessibility and Appropriateness were identified and explored to further appreciate the unique psychosocial considerations for this group. The participants reported enablers to dental access for PwCSO including increased numbers of bariatric dental chairs, possibly within the hospital-based obesity service itself, with privacy as a main feature to these facilities, increased awareness and knowledge of obesity, kinder treatment by dental professionals and measures by to reduce weight stigma. Environmental factors to alleviate anxiety and reduced cost or support with government subsidised schemes were also mentioned. Some participants suggested the role of advanced technology and home visits to aid access. The participants in this study showed an overall reluctance of PwCSO to discuss their weight with the dental team and displayed a lack of awareness of bariatric dental facilities or of the safe working limits of dental chairs.

**Conclusions:** PwCSO face significant psychosocial barriers to accessing dental services, complicating the physical aspect of their disability. Of significance, the findings provide valuable patient-based information to guide the approach of dentists attending to this high-risk group and could be used to inform the design of Specialised Bariatric Dental Services in the future, with a focus on enablers to access.

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### **23. Dental utilisation, body mass index and oral and general health variables in those with clinically severe obesity: a survey-based cohort study**

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**Aim:** Data linking body mass index (BMI) and dental utilisation with oral and general health variables including dental anxiety, oral health related quality of life (OHRQoL), wellbeing and mental health are lacking. This study aimed to explore the relationship between BMI and these parameters in individuals attending a hospital-based obesity service.

**Methods:** This study was a single-site project. Ethics approval was granted (project number: 2018/ETH00353). All adult patients of the Nepean Family Metabolic Health Service (NFMHS), a hospital-based multidisciplinary obesity service, were invited to participate in the study at time of consultation. Data on oral and general health were obtained through surveys and the participants' medical records. Age, gender, BMI and medical complications of interest were recorded from the medical record. The study survey was designed by the research team and contained questions on dental utilisation, oral health variables including dental anxiety and oral health related quality of life. Study surveys were distributed in person, by electronic link or by mail for completion, depending on participant preference. Participants were asked screening questions for general health variables in-

cluding indicators of wellbeing and mental health. After performing graphical inspection of BMI data in relation to the primary outcome of last dental visit more than one year ago, the cohort was divided into BMI tertiles and all variables described for the whole cohort and by BMI tertiles. Univariate associations between BMI tertiles and other study measures were determined using chi squared for categorical variables and Kruskal Wallis test for continuous variables.

**Results:** Of the 82 individuals who consented to participate, 81 (98.8%) completed the study questionnaire and 74 (91.3%) answered additional screening questions relating to their general wellbeing and mental health. The median BMI of the cohort was 49.1kg/m<sup>2</sup> (IQR 43.2-57.3kg/m<sup>2</sup>) and median age 51 (IQR 39-63) years. Of participants, 50 (61.7%) reported that their last dental visit was more than one year ago and 24 (29.6%) of participants reported high levels of dental anxiety. Across the cohort, there were fair to high levels of OHRQoL. Screening questions suggested low general wellbeing and poor mental health in this patient cohort. BMI was not significantly correlated with any of the variables of dental utilisation, dental anxiety or OHRQoL.

**Conclusions:** Patients with clinically severe obesity reported poor dental utilisation, high levels of dental anxiety and fair to high levels of OHRQoL which had no significant association with BMI. Medical complications, lack of wellbeing and poor mental health may complicate dental management. These factors, and the limitations of conventional dental chairs for a majority of these patients, support an increased number and promotion of bariatric dental facilities, including Special Needs Dental Units, in addition to education of dental practitioners in obesity management.

*Acknowledgements*

*The authors would like to acknowledge the help of dietitians Sally Badorrek and Gillian Rosic, physiotherapist Gavin Cho and clinical psychologist Sophia Kwan; and additionally Dr Avanti Karve and Dr Babak Sarrafpour in the university oversight and academic support for this project, and the participants of this study. is not possible.*

### **24. Special Needs Dentistry and allied dental professionals in Australia**

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In Australia, Dental Therapists (DTs), Dental Hygienists (DHs) and Oral Health Therapists (OHTs) encounter Special Needs Patients (SNP) in their clinical practice.

**Aim:** This cross-sectional study investigated their perception, training and working experience, as well as referral patterns within Special Needs Dentistry (SND). Our hypothesis was that they have a positive perception of SND.

**Methods:** A paper-based questionnaire was distributed to a systematic sample of 1000 registered DHs, DTs and OHTs who were members of the respective professional bodies at the time of the survey. Participants were included irrespective of age, gender, length of working experience and country of graduation. If they were still studying or not practicing in Australia, they were excluded from the study. Data analysis consisted of Chi-squared regression analysis using IBM SPSS for Windows Version 22.0 (Melbourne, Victoria, Australia).

**Results:** A response rate of 49.8% (215 DTs, 107 DHs and 163 OHTs) was obtained. A significantly larger proportion of OHTs (59.5%) were aware of SND as specialty compared to DHs (45%) and DTs (41.9%) ( $p=0.003$ ) and hence OHTs referred to SND specialists more often than other groups. In addition, 73.6% of OHTs, 63.6% of DHs and 40% of DTs had both didactic and clinical training in SND ( $p<0.001$ ). All the categories stated lack of training and continuing professional development (CPD) in SND as the main reasons for not treating SN patients. They therefore expressed interest in attending SND related CPD training (OHTs: 90.2%, DHs: 88.8% and DTs: 88.3%). In general, allied dental professionals remained neutral regarding their perception of working primarily with SN patients in the future with 45% of OHTs responded positively to the calling ( $p=0.005$ ).

**Conclusions:** This study has clearly demonstrated the differences that exists in the perception and attitudes of allied dental professionals towards SND and SN patients in Australia. The lack of training and CPD courses appears to play a pivotal role in differences among the allied dental professionals studied. Hence, future directions should focus on education and training for this group of allied dental professionals who are able to improve the oral health and well-being of SN population.

## 25. Concepts of disability, facilitators and barriers to implementation of Special Care Dentistry in Brunei Darussalam: a qualitative study

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The introduction of Special Care Dentistry (SCD) specialty in Brunei Darussalam provides the opportunity to develop a care pathway for people with disability. How-

ever, little is known about how dental services for these group are organised presently and what barriers and enablers the providers faced in providing dental care services for people with special health care needs. **Aims:** To explore and understand the concepts of disability, the current provision of dentistry for people with special care needs (PSCN), and the facilitators and barriers encountered through the experiences of service providers in Brunei Darussalam.

**Methods:** A descriptive qualitative research method was used, and data were collected using semi-structured interviews. A diverse sample of clinicians, clinical managers and the wider dental team were approached using purposive and snowball sampling. Participants were drawn from primary and secondary care settings. Interviews were conducted in two phases: from December 2018 to January 2019 and in August 2019. Interviews were conducted in English and Malay and transcribed, with back translation where appropriate. Data were analysed using thematic analysis. Two independent researchers coded the interviews and agreed the final thematic framework.

**Results:** Of 46 invitees, 22 agreed to be interviewed. Of the 22 participants, 16 (73%) were women; 17 dentists of whom  $n=6$  had specialist qualifications and  $n=4$  had a managerial role,  $n=3$  dental nurses,  $n=2$  were from the wider dental team. Four main themes relating to SCD were identified: 'Concepts of disability', 'The workforce in SCD', 'The current provisions of SCD' and 'Facilitators and Barriers of SCD'. A broad range of people with disability were acknowledged, however the complexities of the disabilities in terms of impact on function was poorly understood, and there were obvious gaps in knowledge, for example, equating mental health problems with intellectual disability. There seemed to be an attributed hierarchy to disability, where older people were revered. In contrast, some groups appeared to hidden/unseen, such as people with intellectual disability, with few clinicians reporting engagement with these groups. Facilitators identified were the primary care focus, structure and organisation in Brunei, their cultural context particularly the role of Islam in cultivating the duty of care to those whom are disadvantaged, the introduction of medical departments such as the neuro-rehabilitative and geriatric medicine identifying PSCN and individual clinicians who 'made things work' – the problem solvers. Barriers identified were the lack of any formal care pathways, lack of reasonable adjustment to PSCN, and participant's attitudes and training needs which compounded their discomfort and fear lead avoidance in providing care for these group.

**Conclusions:** The current structure and organisational focus on primary care has the potential for optimal configuration of the provision of service for people with disabilities. However structured training in disabil-

ity awareness alongside training in optimal provision of dental care to people with special care needs is required to support the development of a care pathway in Brunei. Furthermore, there is a need to empower the problem solvers, and to engage and support the ‘avoiders’ to ensure its success.

#### *Acknowledgements*

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## **26. Content validation and response process validation of questionnaire on accessibility of children with cerebral palsy to oral health care services**

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In development of new questionnaire about accessibility of children with cerebral palsy to oral health care services, a systematic production as well as objective evaluation of the developed contents is required through expert review and response process validation.

**Aim:** To determine the content validity and response process validation of a new questionnaire on accessibility of children with cerebral palsy to oral health care service.

**Methods:** A form for content validation was disseminated via email to seven expert panels of different dental specialties. They critically reviewed the relevance of each item to the underlying construct. Then, the individual items were rated using a rating scale of four points. They were also encouraged to give written feedback. The calculation of content validity index was then performed and items reaching the satisfactory level were included in the form for response process validation. Thirty caregivers of children with cerebral palsy in Kelantan engaged by telephone survey in response process validation phase. They assessed the clarity and comprehensibility of the items and gave a score using a four points scale. Comments which emerge from the survey will be documented. Then, the face validity index was performed and should be used to improve the items and the questionnaire overall. Result: Of the initial 42 items, 36 items have reached the satisfactory level content validation index of at least 0.83. More refinement following response process validation and resulting to 33 items matched the satisfactory level of the face validity index of at least 0.80.

**Conclusions:** In order to support the validity of the newly develop questionnaires it is important to determine content validity and response process validity.

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## **27. Dental assessments for patients undergoing cardiac valve surgery**

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**Aim:** This service evaluation aimed to review the referral pathway for patients requiring dental assessment prior to proposed cardiac valve surgery at King's College Hospital. **Methods:** Prospective data was collected for all patients who were referred to the Special Care Dentistry department for pre-cardiac surgery dental assessment from May 2019 to March 2020. A data collection tool was used to collect the required information during the dental assessment appointment. Any missing or additional data required was obtained, where possible, from the electronic patient record which the medical team use to record clinical notes.

**Results:** 40 patients were referred for dental assessment prior to cardiac surgery over a period of 10 months. The age range was 28-84 years and the average age was 61.2; 80% (n=32) of participants were male and 20% (n=8) female; 60% of referrals were made within 5 days of hospital admission; 79% (n=31) of patients were assessed either on the day of referral or the day after referral. The majority of patients who were referred had provisional dates for surgery within 5 days of the referral date (67%, n=26), with 23% (n=9) planned for urgent surgery (on the day of referral, the day after surgery, or as soon as possible). Most patients (n=29; 74%) had dental treatment carried out on the day of assessment. Only 26% (n=10) of patients reported to visit a dentist regularly, 51% (n=20) did not, and the remaining 23% (n=9) of patients were not asked if they attended a dentist routinely; 82% (n=32) of patients who were assessed required dental treatment prior to surgery. The most common treatment required was dental extractions (72%; n=28). Following dental assessment/treatment, 85% (n=33) of patients went on to have cardiac surgery. The surgery carried out included a range of procedures, 88% (n=29) underwent cardiac valve surgery as planned, with the most common procedure being an aortic valve replacement (36%; n=12). Of the patients who proceeded to have cardiac surgery, 43% (n=14) underwent surgery without delay. For those who did have a delay with surgery, 32% (n=6) were dental related; 83% (n=5) of these were due to a late referral and the remaining 17% (n=1) was due to the patient initially declining dental treatment.

**Conclusions:** This study has highlighted the need for timely, succinct communication and a review to improve the referral pathway between the Cardiothoracic and Spe-

cial Care Dentistry teams to ensure positive patient outcomes. This cohort were found to have higher levels of poor oral health in comparison to the general population and had a high treatment need. The current inclusion criteria and timing of referrals does need to be considered to allow sufficient healing time following dental treatment, reduce risk of infective endocarditis and to avoid delay in provision of cardiac surgery.

## 28. Dental care and oral hygiene in adults with intellectual disability working in sheltered workshops in Germany

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**Aim:** In Germany, the majority of adult persons with intellectual disability (PWID) is working in sheltered workshops. This setting offers many advantages for epidemiological studies. The aim of this study was to receive information about provision of dental care and oral hygiene in PWID.

**Methods:** The legal guardians of PWID working in sheltered workshop in the German administration district Unna (Nordrhein-Westfalen) were asked to complete a questionnaire. The University's ethical committee had given consent to this study.

**Results:** Out of the 850 legal guardians who had been contacted 161 completed the questionnaire. The mean age of the 161 PIWD was 34.6 years (SD= 10.5) and the majority was living with their parents (n=90; 55.9%). Nearly all PIWD had a family dentist (n=137; 85.1%) and had consulted him in the precedent year (n=130; 80.7%). Nearly half of the PWID (n=72; 44.7%) receives a professional toothcleaning at least once a year. Nearly all PWID brush their teeth at least once a day (n=144; 89.5%) and the majority does this without any support (n=97; 60.2%).

**Conclusions:** It is very positive that so many persons with intellectual disability have a family dentist. Nevertheless, preventive care for these persons has to be intensified.

## 29. Is there bacterial infection in intact coronal teeth and pulp necrosis of sickle-cell anaemia subjects? A case series study nested in a cohort

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Sickle-cell anemia, the most prevalent genetic hemoglobinopathy in the world not associated with gender, is caused by a point mutation in the  $\beta$ -globin gene that leads to the formation of modified hemoglobin (HbS). In situations of persistent low oxygen tension, HbS molecules undergo polymerization, causing the sickling of red blood cells. The clinical manifestations of sickle-cell anemia result from the increased adhesion of sickle cells to the vascular endothelium, leading to local vasoconstriction, episodes of pain, and damage to vital organ. In the oral cavity, possible complications of sickle-cell anemia include pulp necrosis in intact crown teeth (without caries, periodontal disease or dental trauma), mental nerve neuropathy, and mandibular osteomyelitis. Pulp necrosis in intact crown teeth is considered the primary oral manifestation of sickle-cell anemia. It is estimated that the relative risk of occurrence of this complication is 8.33 times higher in sickle-cell anemia subjects (HbSS genotype) than in those without this disease. However, little is known about the need to treat these teeth with pulp necrosis.

**Aim:** The aim of this study was to evaluate if there is a bacterial infection in intact teeth with necrotic pulp of patients with sickle-cell anemia by analyzing clinical, imaging, and microbiological parameters.

**Methods:** This is a case series nested in a cohort study. In the first follow-up of this cohort study (2015-2016), ten subjects HbSS with at least one tooth with an intact crown and pulp necrosis clinically diagnosed by pulse oximetry adapted to dentistry and a cold sensitivity test (n= 27 teeth) were selected. Changes in the pulp chamber, root, and periodontal ligament were identified in tomographic analysis. Bacterial culture, staining for live and dead bacteria, and real-time polymerase chain reaction with 16S rRNA primers were used to identify the presence of bacteria. Microbiological collection was performed immediately after access to the pulp chamber. The microbiome was analyzed with a MiSeq sequencer (Illumina, San Diego, CA).

**Results:** The diagnosis of pulp necrosis was clinically confirmed in 81.5% (22/27) of the teeth, and the prevalence was higher in the upper jaw (59%). Pulp stones, hypercementosis, and periodontal ligament thickening were observed in 14% (3/22) of the evaluated teeth. Bacterial DNA was less than 100 copies/ $\mu$ L in 23% (5/22) of the teeth with pulp necrosis. Thirteen bacterial species were identified in intact crown teeth and pulp necrosis, *Acinetobacter calcoaceticus*, *Acinetobacter nosocomialis*, *Agrobacterium tumefaciens*, *Bifidobacterium breve*, *Brevundimonas vesicularis*, *Streptococcus parasanguinis*, *Escherichia coli*, *Granulicatella adiacens*, *Lactoba-*

*cillus ssp.*, *Macrococccuscaseolyticus*, *Moraxella osloensis*, *Proteus mirabilis*, and *Pseudomonas putida*.

**Conclusions:** Clinical, imaging, and microbiological analyses indicate that there is not bacterial infection in intact crown teeth and pulp necrosis of HbSS subjects.

#### *Acknowledgements*

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### **30. Periodontal disease and Alzheimer's disease share a background of genetic susceptibility?**

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**Aim:** Alzheimer's disease (AD) is the most common neurodegenerative disease which courses with cognitive and functional decline associated with age. Whereas, periodontitis is a chronic multifactorial inflammatory disease associated with dysbiotic plaque biofilms and characterized by progressive destruction of the supporting tissues of the tooth that eventually may result in tooth loss. Inflammation is known to play an important role in both diseases, so there is growing evidence of an association between periodontitis and AD. The aim of this study is to investigate the shared genetic background between AD and the severe form of periodontitis, aggressive periodontitis (AgP).

**Methods:** Our target sample includes  $N = 10,708$  participants (5,971 AD cases and 4,737 controls) from the Genome Research at Fundación ACE (GR@ACE). We develop a genome-wide polygenic risk score (PRS) for our target sample using the top 8 single nucleotide polymorphisms (SNPs) ( $p < 10^{-6}$ ) of PerioGEN study, the first AgP genome-wide association study (GWAS) in Spanish population.

**Results:** We found no significant difference in AgP risk between AD cases and controls. The  $R^2$  change for the inclusion of PRS was 0.004.

**Conclusions:** Despite previous reports of association, we did not find any evidence of association between AD and AgP.

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### **31. Morphological integration of cranial-cervical-facial structures in Down syndrome**

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**Aim:** Morphological integration refers to the tendency for structures to show correlated variation because they develop in response to shared developmental processes or function in concert with other structures. The aim of this study was to determine the relationships between the measures of various cranial-cervical-facial structures in patients with Down syndrome (DS).

**Methods:** The study group consisted of 41 individuals with DS who underwent cone beam computed tomography (CBCT), within the framework of a previous study, in the Dental Radiology Unit of the University of Santiago de Compostela (Spain). From the same Unit's historical file, we selected 41 CBCTs belonging to individuals with no known systemic disease or severe malformations of the maxillofacial bones, which comprised the control group (CG) paired by age and sex with the study group. In each CBCT, we performed 29 measurements that were grouped into 3 blocks: atlantoaxial, craniocervical and cephalometric. To determine whether there were significant differences between the measures obtained from the DS group and CG, we applied the multiple analysis of variance and linear discriminant analysis tests. The analysis of the association between blocks (by pairs) was performed with the canonical correlation analysis test.

**Results:** The measures evaluated in the 3 blocks of variables were statistically significant when comparing the DS group and CG ( $p < 0.001$ ). The greater discriminatory capacity for identifying patients with DS and the CG was achieved with the cephalometric measures (87.5%), followed by the craniocervical measures (83.3%). With regard to the 2-to-2 association between the blocks of measurements, we found no significant relationship in the DS group. In the GC, however, we confirmed a statistically significant correlation between all pairs of variable

blocks, especially between the atlantoaxial and cephalometric measurements ( $p < 0.001$ ) and between the cranio-cervical and cephalometric measurements ( $p < 0.001$ ).

**Conclusions:** The morphological integration of cranial-cervical-facial structures is poorer in DS than in the non-syndromic population. This finding probably indicates that the growth pattern for DS is more heterogeneous and less predictable, and this could potentially affect the results of certain interventions of orthopedic or surgical nature.

### 32. Can teaching in Special Care Dentistry be improved? The impact of role play on attitudes of undergraduates towards persons with disabilities

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**Background:** Comprehensive and multidisciplinary undergraduate training in special care dentistry (SCD) influences young graduates' willingness and competence in treating patients with special health care needs. The aim of present study was to analyze how psychological training of dental students affects barriers that undergraduates might perceive about dental treatment of persons with special health care needs.

**Methods:** Non-equivalent control group quasi-experimental design of the study was used. Sampling was based on the module undergraduates have chosen. Group 1 ( $n=92$ ) received didactical package involving 15 ninety minutes lectures and one seminar during 10th semester in SCD and 30 forty-five-minutes-lectures in Removable Prosthodontics (RP) in elderly. Group 2 ( $n=142$ ) participated in lectures and clinical training in SCD (guided chairside teaching at the School of Dental Medicine, and in dental office at Institution for children and youth with intellectual disabilities; visiting Center for dental treatment of patients with disabilities under general anesthesia and attending pre-surgical anesthesia assessment at School of Dental Medicine) and Removable Prosthodontics (180 hours of guided chairside teaching which include indication, production, and complications of removable partial dentures). Group 3 ( $n=20$ ) received didactic and clinical training and additionally participated in specially designed role play sessions designed through collaboration between dentists and psychologists, three times during semester. A structured approach to role-

play was used. The barriers scale was administered during the last teaching session to students who agreed to participate in the study. Present survey involved only items targeted at treating patients with disabilities. Total score per participant was reached by summing scores for seven items: maximum score presenting the most positive attitude was 28, while minimum score presenting the least favorable attitude was 7.

**Results:** Total mean attitudes score for all students was  $18.2 \pm 3.1$ . Highly statistically significant different mean students' scores were observed between all groups regarding attitudes towards barriers in treating patients with disabilities ( $p > 0.05$ ) (Group 1= $19 \pm 2$ , Group 2= $17 \pm 2$ , and Group 3= $25 \pm 2$ ). Statistically significant differences regarding barriers in time ( $p < 0.05$ ), recourses ( $p < 0.05$ ), and professional communication ( $p < 0.05$ ) were observed between three groups of participants having more positive attitudes in groups with more training. Students training aimed in bettering communication and empathy influenced undergraduates' attitude regarding non-specialist dental treatment – 9.8% ( $n=9$ ) in Group 1, 15.5% ( $n=22$ ) in Group 2 and 70.0% ( $n=14$ ) in group 3 strongly disagreed that people with disabilities always need a specialist.

**Conclusions:** Role play is a powerful tool in fostering positive attitudes towards persons from marginalized groups in education of dental students and highlighted the importance of multidisciplinary training.

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### 33. Oral Health health beliefs in people living with low Von Willebrand Factor in Ireland

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**Aims:** Bleeding from the gums is an often cited symptom of Von Willebrand's disease (vWD) in medical and dental texts. Previous research suggests that people with vWD may avoid thorough toothbrushing for fear of making their gums bleed, attributing post-brush bleeding to their vWD rather than an underlying gingivitis. Little is known about oral health beliefs of people with low vWF and how this impacts their behaviours around daily, ef-

fective oral hygiene practices. The aim of this study was to investigate the oral health beliefs of people living with low vWFactor (wWF) in Ireland.

**Methods:** Cross-sectional study; approved by Tallaght Hospital Research Ethics Committee. 30 patients (mean age 42, SD 16) recruited from the low vWF in Ireland cohort (LOVIC). Outcomes: Self rating of general and oral health status (White et al., 2009). Experience and beliefs regarding bleeding gums adapted from Wienman & Petrie (1996).

**Results:** Participants rated their general health as “very good” and “good” (83%, n=25) but were less positive about their dental health with 40% (n=12) rating it as either “fair” or “bad”. Most participants (70%, n=21) frequently experienced bleeding gums after brushing and flossing [1= never and 10= very often; mean 5.9 SD 2.7]. Many participants (70%, n=21) reported they had little understanding of bleeding gums (mean 3.3, SD 1.9) and believed they had little/ no control over bleeding from their gums (mean 4.2, S.D 2.8) . Overall, there were mixed responses as to whether dental treatment might help. Length of time for bleeding to stop after toothbrushing or flossing was reported by 73% (n=22) of participants to occur at < 5 minutes and 17% (n=5) between 5 - 10 minutes. Few expressed concerns about length of time for bleeding to stop. When asked about causes of bleeding gums 80% (n=24) of participants attributed the cause to personal oral hygiene; 37% (n=11) specifying they were using ‘too hard a brush’, in addition to provision of interdental cleaning with floss or interdental brushes (53%, n=15). Only 6% (n=2) identified the accumulation of plaque as a cause of their gums bleeding. 6% (n=2) attributed bleeding to low vWF status.

**Conclusions:** This study is the first to explore the oral health beliefs of people with low vWF. Participants self-rated their oral health poorer than their general health, but most were resigned to living with bleeding gums and accepted it as ‘normal’. In contrast to the literature, this sample did not attribute gum bleeding to their bleeding disorder but to their oral hygiene provision. Few believed that they could change the tendency of gums to bleed or that dental treatment could ameliorate the condition. This research is important for people with low vWD as it helps inform interventions to guide this population to control gingival inflammation and reduce risk of progression to periodontal disease. Interventions should include professional support providing tailored oral health education to mitigate risks coupled with education of dental and medical teams to ensure consistent messages are conveyed.

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## **34. Development of Preventive Oral Care Program for Special Needs Patients**

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**Aims:** To promote oral health for special needs patients, health care providers at Purme dental clinic has developed a program which consists of proper oral hygiene practice, preventive oral care and dietary counseling. Our goal is focused on change of behavior, which leads to dental caries and gingivitis.

**Methods:** 10 individuals were selected for intervention. A survey about participants’ past dental experiences and current oral health needs was applied to all caregivers at the baseline. For first session, researcher conducted toothbrushing on model. Participant practiced how to do tooth brushing on model. For the second session (a week apart from 1st session), researcher measured participant’s O’Leary index, and photos were taken. Participant demonstrated their toothbrushing on their teeth. Researcher helped their toothbrushing and demonstrated the toothbrushing method on their teeth. Researcher applied fluoride varnish on participant’s dentition. Dietary counseling logbook was given, and participant was told to record what they have eaten during seven days. For the third session (a week apart from 2nd session), participant’s O’Leary index is measured. Participant demonstrated their tooth brushing on their teeth. Researcher helped their toothbrushing and demonstrated method on their dentition. Researcher has reviewed the dietary logbook. For the fourth session (one month apart from 2nd session), participant’s O’Leary index was measured, and photos of dentition are taken. Participant demonstrated their tooth brushing on their teeth. Researcher helped their toothbrushing and demonstrated method on their dentition. Fluoride treatment was done. Researcher checked the dietary logbook. For the fifth session (three month apart from 2nd session), participant’s O’Leary index was measured, and photos of dentition were taken. Participant demonstrated their tooth brushing on their teeth. Researcher helped their tooth brushing and demonstrated method on their dentition. Fluoride treatment was provided. Researcher reviewed the dietary logbook, gave advice regarding caries prone habit and told him/her what can be changed. Exit interview was given. IRB: S-D20190022 Seoul National University Graduate School of Dentistry, Medical Search Ethics Committee.

**Results:** 10 individuals were selected with various disabilities. Participant 1 is 26-year-old male with developmental delay. Participant 2 is 26-year-old female with autism. Participant 3 is 18-year-old male with visual impairment. Participant 4 is 20-year-old female with visual

impairment. Participant 5 is 22-year-old male with hearing impairment and developmental delay. Participant 6 is 28-year-old male with Down syndrome. Participant 7 is 17-year-old male with Klinefelter syndrome with maxillofacial malformation. Participant 8 is 42-year-old male with cerebral palsy. Participant 9 is 20-year-old female with brain injury. Participant 10 is 22-year-old female with intellectual disability. There was a significant reduction of O'Leary index at 4th and 5th session with the most significant reduction at 5th session. Caregivers reported repetitive tooth brushing instruction motivated participants investing more time and effort in toothbrushing.

**Conclusions:** Repeated tooth brushing education and dietary counseling can reduce plaque level for special needs patients.

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### **35. Dental-skeletal disorders in individuals with rare diseases**

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**Aim:** Rare diseases are a heterogeneous collection of disorders with very low prevalence (in Europe, 1 case per 2000 inhabitants), which are generally of a chronic and progressive nature and whose prognosis is usually poor. A considerable number of these diseases presents orofacial manifestations, which require dentists to assume a special responsibility in the diagnostic phase and in these patients' clinical approach. The aim of this study was to report the most prevalent dental-skeletal disorders in patients with rare diseases.

**Methods:** We retrospectively analyzed the medical records of patients with rare diseases who underwent orthopedic/orthodontic diagnosis/treatment in the Dental Unit for Patients with Special Needs of the University of Santiago de Compostela (Spain), between 2002 and 2020. The following dental variables were recorded: dental eruption abnormalities (chronology and ectopia); abnormal numbers (agenesis and supernumerary teeth); and disorders in tooth morphology, size and structure. The following skeletal variable types were analyzed: posterior-anterior plane (Angle classes and affected bone base); vertical plane (facial biotype, presence of anterior open bite and overbite); and transverse plane (presence

of crossbite, scissor bite and maxillary compression). We also recorded the presence of cleft lip and/or palate.

**Results:** The study group consisted of 93 patients, in whom 66 different entities considered rare diseases were diagnosed. Depending on the primary target system, the patients were distributed into 8 categories: neurological disorders (n=25), global developmental disorders (n=12), skeletal dysplasia (n=9), head and neck syndromes (n=10), genodermatosis (n=9), sensory disorders (n=4), intellectual/cognitive disorders (n=11) and others (n=13). The most prevalent conditions were ectodermal dysplasia (n=7), fragile X syndrome (n=4), periventricular leukomalacia (n=3), microcephaly (n= 3), Williams syndrome (n= 3), Rett syndrome (n= 3) and Pierre Robin syndrome (n= 3). We detected dental abnormalities in 52 patients (55.9%); agenesis (23.6%) and ectopic eruptions (18.2%) were particularly prevalent. When analyzing these findings by disease category, we found that all patients with genodermatosis had agenesis, 60% of the patients with head and neck syndromes had ectopic eruptions, and 50% of the patients with sensory disorders had dental morphology abnormalities. We observed skeletal abnormalities in 75 patients (80.6%). The most prevalent biotype was mesofacial (59.1%), while 43% had maxillary compression. In the vertical plane, open bite was the most prevalent disorder (27.9%), followed by bilateral crossbite (20.4%). Only 7 patients (7.5%) had a confirmed cleft lip and/or palate. After analyzing these findings by disease category, we found that class II was the predominant in the group with neurological disorders (60%) and among the patients with intellectual/cognitive impairment (54.5%). Some 55.5% of the patients with skeletal dysplasia had class III, and 33.3% had an open bite. Three of the 4 patients (75%) with sensory disorders were diagnosed with class III, openbite and maxillary compression.

**Conclusions:** Dental-skeletal abnormalities are common in patients with rare diseases, and their clinical patterns are related to the type of disease categorized based on the primary target system.

### **36. *Streptococcus downii*, a new bacterial species that could contribute to preserving the eubiosis of oral microbiota**

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**Aims:** A new strain of alpha-hemolytic *Streptococcus* was isolated in the dental plaque of an adolescent with Down syndrome. Based on its biochemical, genetic and taxonomic characteristics, we considered that this was a new bacterial species belonging to the *Streptococcus* genus (oralis group), the Streptococcaceae family and the Lactobacillales order, which has been identified with the name *Streptococcus downii* sp. nov. (*S. downii*). Phylogenetically, *S. downii* is next to *Streptococcus dentisani*, a bacterium with antistreptococcal activity. The aim of this study was to analyze the antibacterial activity of *S. downii*.

**Methods:** An inhibition assay was performed by the spot-on-the-lawn method. Reference strains of *Streptococcus mutans*, *Veillonella parvula*, *Actinomyces naeslundii* and *Aggregatibacter actinomycetemcomitans* were inoculated on blood agar plates and brain heart infusion agar plates. *S. downii* was then placed onto the inoculated surfaces of the agar as a button, and the plates were incubated in anaerobic conditions and at 5% CO<sub>2</sub> atmosphere. After incubation, the presence of a growth inhibition halo zone was considered a positive result. To test the potential antibiofilm properties of *S. downii*, the bacterial strains *S. mutans*, *A. naeslundii*, *V. parvula*, *F. nucleatum*, *P. gingivalis* and *A. actinomycetemcomitans* were grown in a static in vitro biofilm model in the presence or not (control biofilm) of *S. downii* for up to 120 h. Biofilms structures were studied by confocal laser scanning microscopy and scanning electron microscopy. For potential antibacterial activity, biofilms were exposed to *S. downii* for 24 and 48 h. We employed quantitative polymerase chain reaction to assess the effect of *S. downii* on bacterial load.

**Results:** In the inhibition assay, *S. downii* showed an antimicrobial effect against the cariogenic bacteria *S. mutans* and against periodontopathogens such as *V. parvula*, *A. naeslundii* and *A. actinomycetemcomitans*. For antibiofilm activity, the presence of *S. downii* during biofilm development did not affect the structure of the community, but an antibiofilm effect against *S. mutans* was observed and became statistically significant when biofilms reached the stationary phase ( $p < 0.001$  after 96 and 120 h of incubation). For antibacterial activity, counts of *S. mutans* ( $p = 0.019$ ) and *A. actinomycetemcomitans* ( $p = 0.020$ ) were significantly reduced in well-structured biofilms after 24 h of exposure to *S. downii*, when compared with control biofilms not exposed to *S. downii*.

**Conclusions:** The antibacterial and antibiofilm activities of *S. downii* against oral bacteria (including *S. mutans* and some periodontal pathogens) has been demonstrated in inhibition assays and in a static in vitro biofilm model. This finding allows for speculation as to whether *S. downii* could contribute to preserving eubiosis or for combating dysbiosis of the oral microbiota.

### 37. Determining expectations among family members of eating disorder (ED) sufferers regarding the role of dental professionals

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**Aim:** In Ireland, Eating Disorders (ED) affect up to 200,000 people, with an estimated 400 new cases emerging each year, representing 80 deaths annually. Our aim is to identify the expectations among family members of ED sufferers regarding the role of dental healthcare professionals including their exposure to the dentist, expectations of the participant when visiting the dentist, and their awareness on the impact a dentist can play diagnosing and potentially managing their family member's eating disorder.

**Methods:** Five 60-minute semi structured interviews were conducted on a one to one basis. Written informed consent was obtained from the family member of the ED patient prior to beginning each interview. Interviews were audio recorded and transcribed. A number of open ended and scenario-based questions were used in order to gather information. Family members were selected by the Eating Disorder Centre Cork manager to ensure their loved ones ED was at a 'stable stage' of the rehabilitation process.

**Results:** All family members agreed that if a dentist suspected an eating disorder it should be acknowledged. However, there was a difference in opinion in the role of a dentist regarding the eating disorder itself – some family members felt that they should only discuss the potential dental impacts an eating disorder may have, while others felt the dentist should offer advice, support and a referral to an appropriate medical practitioner.

**Conclusions:** There is need for further research in this area, with a bigger sample size and ideally interviewing eating disorder patients rather than a family member. This would ensure that opinions are of those directly affected by the disorder are sought. Family members are not fully aware of the specific oral manifestations of eating disorders. Dental professionals may benefit from further education and training in the ED recognition and management during their undergraduate training.

### 38. Assessment of a case mix tool to assist stratification of public dental patients with disability in South Australia

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**Aims:** Investigate the use of a case mix tool to assist stratification of public dental patients with disability in South Australia, to support its implementation in the South Australian Dental Service for increasing access to oral healthcare for individuals with disability. Identify factors increasing likelihood of patients requiring specialist level of care and adjunct measures for dental care, including general anaesthesia, to assist in informing work practices after the tool's implementation.

**Methods:** Ethics approval was obtained from the Human Research Ethics Committee of the Central Adelaide Local Health Network and the University of Adelaide to undertake a retrospective analysis of 131 patient dental records on the disability recall list at the Adelaide Dental Hospital using the British Dental Association full and simplified case mix tool; 44 patients were complex patients under the care of a Special needs dentistry consultant; 45 patients were moderately complex patients under the care of dentists and postgraduates working in the Special needs unit; 42 patients were patients referred to public dentists in the community who had been upskilled in caring for disability patients to allow assessment of the tools across a range of differing complexities.

**Results:** The previous stratification of patients with disability in 2016 into the three complexity groups of Special Needs Dentistry consultant, Special Needs Unit dentist and community dentist, demonstrated a low rate of re-referral and transferring of care at 2% (3 of 131 records analysed). Fleiss' kappa was used to calculate the reliability of the complexity scores of the full case mix tool versus the simplified case mix tool in allocating the patients to same complexity level as the previous 2016 stratification. The simplified case mix tool demonstrated moderate agreement and the full case mix tool demonstrated substantial agreement with the previous stratification. Patients with high overall complexity scores and high complexity for the communication category of the case mix tool, had a statistically significant association with requiring use of general anaesthesia. Patients with high complexity scores for the communication, legal and ethical issues and cooperation categories of the case mix tool, had a statistically significant association with requiring the care of a Special Needs Dentistry consultant versus a Special Needs Unit Dentist.

**Conclusions:** The British Dental Association case mix tool can be used to stratify complexity of patients with disability to assist in referral to an appropriate clinician which suits their individual needs. The case mix tool can also be used to identify characteristics of patients more

likely require referral to a Special Needs Unit Consultant or who require adjunct measures for oral healthcare, including general anaesthesia.

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### **39. Oral health status of adults with disabilities in Singapore - Preliminary results of CASA-MODAL**

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**Aims:** In 2017, 25 out of all 77 nursing homes in Singapore did not have access to any forms of dental services. All 11 adult disability facilities (activity centres and residences) did not have any dental services either. In 2018, the Casa-Modal initiative started, seeking to "Clean And Screen All Mouths Of Disability facilities and Long-term care facilities" and driving oral health promotion. This study aims to report on the oral health status of adults screened in the disability facilities within Casa-Modal's initial 16 month. There were no known prior studies which measured both the oral health status and disability parameters of these facilities. Results from nursing homes were excluded.

**Methods:** Various disability facilities were contacted via email for their interest in the free service. The core team consisted of a dentist and an assistant, who provided the mobile set-up at each screening event. They provided dental screening, toothbrushing, fluoride application, oral hygiene education, and referral for dental services. The core team is occasionally supported by a volunteer, who may be a registered dentist or oral health therapist. Informed consent for participation was sought from the patients' parents, legal guardians, or legal representatives. After the screening at each facility, screening forms and consent forms are collated and the results tallied. This initiative was licensed by the Ministry of Health as an offsite healthcare service offered by the Tzu Chi Free Clinic (MH 50:10/20-482).

**Results:** Between November 2018 and February 2020, 5 disability day centres and 2 disability homes were completed. 339 adults participated fully. Their average age was 41.7 years old. The average teeth retained per person was 17.0. 11.4% were fully edentulous. Among those dentate, the prevalence of visualised periodontal disease was 36.4%. For these 339 adults, a total of 776 absolute extrac-

tions and 343 restorations were required. 67% required periodontal therapy of varying levels of complexity. The average BDA case mix score was 26.6. Behavioural categorisation considers the level of behavioural intervention to complete dental treatment. 46.0% would accept dental treatment with additional chairside behavioural management. 18.0% required significant behavioural management and possibly sedation. 18.9% definitely required at least conscious sedation, and 6.78% definitely general anaesthesia. Accessibility categorisation considers physical mobility. 67.6% were fully ambulant. 14.5% required support and presented with fall risks. 2.06% were wheelchair users who could transfer independently. 16.2% were wheelchair users who required assisted transfers. There were no bedridden adults. The limitations faced included difficulties with periodontal diagnosis as portable x-ray equipment was not permitted. 6 adults were unable to accept full screening, and therefore excluded in the results. **Conclusions:** The oral health status of adults in Singaporean disability facilities is commiserable, with extremely high unmet needs. Other than medical complexities, accessibility and cooperation could present barriers in seeking dental treatment. Whilst further investigative research is constantly required, it is imperative to start initiating and innovating with different care models to tackle the visible and unique needs.

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#### **40. Test-retest validation of the new French Case Mix Tool**

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**Introduction:** The French government has recently introduced a new Case Mix Tool that is used to justify an additional fee paid to dentists for the management of patients with disability. The tool is questionnaire based. Despite entering legislation, the Case Mix Tool has not been scientifically validated. This study aimed to evaluate the intra- and interdentist stability, the reliability, the interpretability and the internal consistency of the Case Mix Tool, using test-retest methodology.

**Methods:** The Case Mix Tool consists of 7 domains, which are scored from 0 (no adaptation) to 3 (major adaptation). The domains include Communication, Use of facilitatory procedures (sedation etc), Co-operation, Medical health, Dental risk, Autonomy and Coordination. The tool is designed to be completed retrospectively, at the end of a dental appointment. A group of three experts devised, piloted and revised a set of 12 virtual case studies, each describing a patient-dentist encounter of differing complexity. An independent group of experts established a consensus on the 'ideal' answers to the Case Mix Tool for each case study. Fifty-one dentists were recruited via the French Association for Disability and Oral Health (SOSS – SantéOrale et SoinsSpécifiques) to complete the Case Mix Tool for each of the 12 case studies online, and to repeat the exercise 14 days later. Intra-dentist stability and reliability were tested using % concordance and kappa coefficient. Inter-dentist stability was tested using an intra-class correlation coefficient (ICC), and internal consistency using Cronbach's alpha.

**Results:** For all the cases and domains combined, the intra-dentist stability was good with a concordance rate of 80% and a kappa statistic of 0.77. Stability varied however between the domains and the different case studies. The inter-dentist stability was also good, with an ICC between 0.7 CI [0.51 - 0.84] and 0.9 CI [0.82 - 0.96] depending on the domain. The concordance rates for reliability compared to the set of 'ideal' answers for each domain were good with concordance rates between 77% and 91% and kappa statistics of 0.67 to 0.83. In terms of interpretability, problems were found with one of the domains in particular, relating to the degree of medical complexity, and with two of the case studies. The values of Cronbach alpha were low for each case study (between 0.48 and 0.09), suggesting that the different domains of the Case Mix Tool measure different things, as would be expected. **Conclusions:** The result of the test-retest evaluation of the Case Mix Tool were positive overall, although the detailed analysis identified potential problems with the concept or wording of one of the domains.

#### **41. Taking special care to manage our waste sustainably- An audit of the waste management practices in Ireland's National Coagulation Centre**

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Climate change remains one of the biggest health threats of the 21st Century. Its global burden of disease is perhaps one of the most inequitable health risks of our time

as it disproportionately affects our more vulnerable population groups. The healthcare sector, established to protect these vulnerable and sick population groups, is responsible for between 4.6%-10% of global CO<sub>2</sub> emissions. Environmentally sustainable practices help to ensure that basic needs like clean air, healthy food and a safe environment are met now and for our future generation of potentially vulnerable intellectually and medically compromised population groups. A significant pillar within sustainable dentistry is the ecologically sound management of healthcare waste.

**Aims:** The aim of this study is to demonstrate the efficacy of evidence-based waste management strategies at minimising the reduction, safe recycling and environmental impact of waste. By conducting the study within a rigorous cross-infection controlled environment, it is hoped that this should exemplify the transferability of the audit's design to our dental community and encourage others explore their waste management strategies with sustainability in mind.

**Methods:** The study design was a prospective audit carried out in 2019 to measure the nature and quantity of healthcare risk waste and healthcare non-risk waste generated over three days in the dental unit of The National Coagulation Centre of Ireland (NCC). This facility manages the dental needs of patients with bleeding disorders and those with haematological or oncological conditions, a site where a high proportion of patients are medically compromised, have communicable diseases or are immunocompromised. Four practical and evidence-based waste management strategies were then implemented and a re-audit was performed over a similar three day period to measure the effects of these strategies on ecological waste management practices. The audit was approved by the audit committee, the NCC's consultant in Special Care Dentistry, the clinic nurse manager and head of department.

**Results:** The most frequently disposed of item was sterile packaging. After the implementation of the key strategies, the dental unit's total waste production per patient reduced by 190g (35%). The introduction of recycle bins within the dental units resulted in 87g (26%) of waste that was recycled per patient. The quantity of inappropriately segregated waste reduced by 84% to 22g per patient.

**Conclusions:** The carbon cost of healthcare waste in the dental setting is significant and contributes towards climate change. This audit demonstrated how to perform a waste audit within the dental care setting. It has also proven the effect that the aforementioned evidence-based implementation strategies can have on reducing waste, improving segregation and recycling within a dental setting where excellent infection prevention and control is of paramount importance given the medically compromised patient base. No better community exists to

champion sustainability within dentistry than the special care team, given the inequity that climate change carries against vulnerable population groups, and our community's powerful roles in advocacy, leadership and safeguarding the health of our most at-risk patient groups.

#### *Acknowledgements*

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## **42. Oral Special Care Academic Resources (OSCAR) Project - a step towards better oral care for children with special treatment needs**

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In many healthcare systems, children with Special Health Care Needs (SHCN) have less access to dental treatment and poorer oral health status than the general population. Practitioner's reluctance in dealing with SHCN patients, differences in under and postgraduate curricula on Special Oral Care (SOC) and parents' level of information regarding the importance of oral health may count as reasons for such discrepancies.

**Aims:** To raise awareness among young dentists, including Paediatric Dentistry (PD) residents, and improve their knowledge and skills in SOC; to improve access of children with SHCN to quality oral care services; to enhance parents' awareness on the importance of prevention and regular dental check-ups; to encourage exchange of good practice between National Societies of PD; to propose an SOC postgraduate curriculum.

**Methods:** Need for such a project was identified by: assessing dentists' level of confidence in providing treatment to children with SHCN and their felt need for more information on SOC (97.6% of the 167 respondents); assessing families' and caregivers' perception regarding their children's need for professional oral care. OSCAR reunites partners from France (HopitauxUniversitaires de Strasbourg), Italy (OspedalePediatico Bambino Gesù), Turkey (Marmara University) and Romania (Romanian National Association of Paediatric Dentistry, Carol Davila University, Special Olympics Romania) who, based upon clinical experience, research and literature data, are currently constructing a digital platform (oscarpd.eu) containing structured, easily accessible

practical information on providing SOC to children with SHCN.

**Results:** The platform also contains a Parents' section, with useful advice on efficient home oral care routine as well as on efficient digital interaction with oral health professionals. Direct contact and interaction between dental professionals and children with SHCN are provided and encouraged during OSCAR events. Hands-on experience is important, as feedback from families of children with SHCN as well as from dentists taking part in the project's surveys show that there is still a lot of reluctance among practitioners in dealing with this category of patients, mostly due to lack of experience. Differences were found between practitioners in participating countries, Romanian dentists being less likely to have treated patients with SOCN than colleagues from the other countries ( $p=0.007$ ), while Turkish dentists feel less confident than the others in treating children with SOCN without the help of pharmacologic means ( $p=0.001$ ).

**Conclusions:** Addressing both dental professionals and parents by providing useful and easily accessible information, OSCAR can help improve dental addressability of children with SOCN and contribute to the improvement of their oral health status.

#### Acknowledgements

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### 43. Genetic susceptibility to periodontal disease in Down syndrome

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Periodontal disease is one of the most prevalent oral manifestations in Down syndrome (DS). It has been suggested that its multifactorial etiology includes the participation of bacterial flora, the host's response and certain genetic factors.

**Aim:** The aim of this study was to detect the genetic variations associated with the presence of periodontal disease in individuals with DS and to identify susceptibility genes and biomarkers that can help predict its risk of onset and severity.

**Methods:** We collected saliva samples from 86 White patients with DS from the attendees of educational and occupational therapy centers in the Galician region (Spain) from 2017 to 2018. The participant selection process was performed by applying the criteria of the "2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions". The study group was distributed into patients with periodontal disease ( $n=50$ ) and patients with a healthy periodontium ( $N=36$ ). To perform a genome-wide association study (GWAS), all samples were genotyped with the "Axiom Spanish Biobank" array, which contains 757,836 markers. The genetic data were subjected to quality control. Subsequently, we performed an association analysis at the individual marker level using logistic regression, as well as an analysis at the gene level applying the sequence kernel association test (SKAT). Lastly, the genes that showed the best results ( $p < 1.55 \times 10^{-04}$ ) were included in a pathway analysis using the free DAVID software. The study was approved by the Research Ethics Committee of Santiago-Lugo, Spain (Registration code: 2018/510).

**Results:** In the individual analysis, the following 5 markers showed a higher probability: C12orf74 (rs4315121,  $p=9.85 \times 10^{-05}$ ; OR, 8.84), LOC101930064 (rs4814890,  $p=9.61 \times 10^{-05}$ ; OR, 0.13), KBTBD12 (rs1549874,  $p=8.27 \times 10^{-05}$ ; OR, 0.08), PIWIL1 (rs11060842,  $p=7.82 \times 10^{-05}$ ; OR, 9.05) and C16orf82 (rs62030877,  $p=8.92 \times 10^{-05}$ ; OR, 0.14). The analysis at the gene level once again highlighted PIWIL1 along with MIR9-2, LHCGR, TPR and BCR. At the signaling pathway level, there were 3 metabolic pathways of interest: PI3K-Akt, long-term depression and FoxO, all of which had nominal significance ( $p=1.3 \times 10^{-02}$ ,  $p=5.1 \times 10^{-03}$ ,  $p=1.2 \times 10^{-02}$ , respectively).

**Conclusions:** The results of this study suggest that the pathogenesis of periodontitis in DS and in the general population share metabolic pathways, such as PI3K-Akt, which regulates cell proliferation and plays an essential role in the host's inflammatory response.

### 44. Oral manifestations of Wolf-Hirschhorn syndrome: A case series

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Wolf-Hirschhorn syndrome (WHS) is a rare disease (1/50,000 births) caused by a deletion in the distal moiety

of the short arm of chromosome 4, whose diagnosis is mainly genetic. The classic presentation of this polymalformative syndrome includes a unique facial phenotype, developmental delay, intellectual disability and epilepsy.

**Aim:** The objectives of this study were to report the most representative oral findings of WHS, to relate them with other systemic manifestations of the disease and to establish a phenotype-genotype correlation.

**Methods:** This study was conducted in collaboration with the Spanish Wolf-Hirschhorn Syndrome Association, in which 47 patients are registered, 31 of whom voluntarily participated in this study. The patients' mean age was 9.5 years (range 2.2–20.7 years), 21 (67.7%) were girls, and 10 (32.2%) were boys. During 2018–2019, a standardized dental examination of the study participants was conducted at 6 reference centers distributed throughout Spain. All participants had previously undergone a specific and regulated medical examination for WHS, during which anatomical, functional and epilepsy-related data were recorded. The participants also underwent a genetic study that applied microarray and multiplex ligation-dependent probe amplification techniques.

**Results:** The descriptive analysis of the most prevalent oral findings in the study group was performed by distributing the study variables into soft tissue abnormalities, dental abnormalities, skeletal characteristics and harmful habits. Ten (32.3%) patients had inverted labial commissures, and 4 (12.9%) had frenulum abnormalities. With regard to the dental abnormalities, 23 (74.2%) patients had delayed tooth eruption, 8 (25.8%) had microdontia, and 8 (25.8%) had at least 1 conoid tooth. Of the 11 patients whose age and level of cooperation allowed for radiological tests, 7 (63.6%) showed agenesis and 5 (45.5%) showed oligodontia. The noteworthy skeletal characteristics included a high and narrow palate in 5 (16.7%) patients, a cleft palate in 5 (16.7%) cases, micrognathia/Angle's class II in 8 (61.3%) and crossbite in 5 (38.5%). Twenty (64.5%) patients had bruxism. We detected a strong correlation between oligodontia and psychomotor retardation ( $p=0.008$ ) and between oligodontia and cardiac defects ( $p=0.060$ ). Micrognathia/Angle's class II was related to low weight ( $p=0.04$ ), short stature ( $p=0.036$ ) and cardiac defects ( $p=0.035$ ). Crossbite was related to the onset of febrile seizures ( $p=0.035$ ). The presence of oligodontia and crossbite was correlated in a statistically significant manner with the size of the deletion of the short arm of chromosome 4 ( $p=0.009$  and  $p=0.047$ , respectively).

**Conclusions:** The oral findings of WHS are related to certain systemic manifestations of the syndrome and with its genetic bases and could therefore contribute to establishing phenotypic variants with differing severity and prognosis.

#### 45. Patient specific tele-dentistry educational program for people with epidermolysis bullosa – patient perception

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**Aim:** Patients with rare diseases such as Epidermolysis Bullosa have been particularly concerned during the COVID-19 pandemic. In addition to each countries lockdown policy, several patients have chosen to stay at home to reduce the risk of infection. Dental care has been largely reduced to emergency services and non-aerosol generating procedures, To aim of this study was to evaluate the perception of patients and caregivers about the effectiveness, advantages, and disadvantages of an individualized tele-dentistry program for patients with Epidermolysis Bullosa (EB).

**Methods:** An evidence based educational tele-dentistry program for patients with Epidermolysis Bullosa was designed. Twenty-five online educational sessions for patients and their caregivers from four Latin American countries [Chile (15), Colombia (5), Mexico (4), and Venezuela (1)] were completed. The sessions were recorded for audit purposes. At the end of each session the patients were invited to complete an online questionnaire to evaluate the program.

**Results:** 25 educational sessions were conducted during July and August 2020. Each session included a questionnaire on patients' oral hygiene habits, oral disease concerns and main areas on interest for the educational session. A second stage of the session included a powerpoint presentation individualized on the patients age and type of EB. The sessions lasted on average one hour and were conducted by three dentists using the online platform Zoom. Twenty-two patients answered the questionnaire. All patients reported that: (1) this was their first tele-medicine experience, (2) they felt the information obtained was useful, (3) the session helped them clarify questions, and (4) they would like to continue having online educational sessions even after the quarantine. On an numerical scale from 1 (strongly disagree) to 7 (strongly agree) the patients reported: (1) I could see, understand and speak to the clinician easily: 6.8, (2) the session was well individualized according to my needs: 6.9, (3) I felt comfortable talking to the dentist: 7.0, (4) through tele-dentistry I felt supported by the dental team during lock-down: 6.8, (5) I am satisfied with the overall tele-dentistry educational session: 6.9, (6) I would like to have more tele-dentistry sessions: 6.9 and (7) this session has accomplished my expectations (7.0).

**Conclusions:** Tele-dentistry educational sessions for patients with rare diseases such as Epidermolysis Bullosa are an effective tool to support patients during lockdown. Tele-dentistry can help reducing geographical barriers to specialized care. In this educational program 25 patients from 4 different countries in Latin America received individualized educational support. All 22 patients that completed the follow up questionnaire found the information useful and would like to continue having online session, even after lockdown.

#### 46. One year survival rate of high viscosity glass ionomer restorations compared to amalgam restorations in patients with disabilities and challenging behaviour: randomized controlled trial

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**Aim:** To assess the clinical performance of high-density glass ionomer compared to amalgam restorations on occlusal lesions in patients with disabilities and challenging behaviour at 12 months.

**Methods:** Two-arm split mouth randomized controlled clinical trial design. Treatment centre: Special Care Clinic, University of Chile. Inclusion criteria: patients with occlusal caries lesions on two molars of opposite arches were randomly assigned to (group A) amalgam or (group B) Equia FIL GC high-density glass ionomer. A total of 77 patients were included, completing a total of 154 restorations. After 12 months the restorations were evaluated on: marginal adaptation, anatomy, surface roughness, brightness, marginal staining, and secondary caries. Ethic approval was obtained from Human research ethics committee and the analysis was performed using Chi-square test.

**Results:** 58 patients with 98 restorations (49 amalgam, 49 Equia FIL glass ionomer) were evaluated. Drop out: 3 patients left the school and 1 patient died. 15 patients have not been able to review due to COVID 19 pandemic. In group A, 6 restorations presented one or more parameters rated Charlie. In group B, 3 restorations had one or more Charlie parameters. Two restorations in each group developed caries lesions adjacent to the restoration (Charlie) in the evaluated period. Only the “Brightness” parameter showed a difference between the groups ( $p = 0.001$ ), with group A showing a significantly higher number of restorations evaluated Bravo, while group B showed a high number of Alpha restorations. There were no differences in any of the other parameters evaluated ( $p > 0.05$ ).

**Conclusions:** After 12 months, amalgam restorations show a similar behaviour to high-density glass ionomer

restorations, with a better performance in the “Brightness” parameter of the latter.

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#### 47. Patient specific tele-dentistry educational for people with Epidermolysis Bullosa – clinician perceptions

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**Aim:** To explore the perceptions of dental professionals about the effectiveness, advantages and disadvantages of a personalized tele-dentistry program for patients with Epidermolysis Bullosa (EB).

**Methods:** An evidence based educational tele-dentistry program for patients with Epidermolysis Bullosa was designed. Five professionals carried out 25 online educational sessions to patients with Epidermolysis Bullosa (EB) from four Latin American countries (Chile, Colombia, Mexico and Venezuela). On average, three professionals participated on each clinical session. The sessions were recorded for audit purposes. At the end of each session every clinician completed an evaluation sheet as part of the audit process. After completing the 25 educational sessions, each clinician was invited to complete a second evaluation form, to assess the overall program. The quantitative data was analyzed using descriptive statistics and the qualitative information was analyzed using Atlas.Ti 7.5.7.

**Results:** Single session evaluation: a total of 65 single session evaluation sheets were completed. On the quantitative analysis, (87.6% of the clinicians were able to speak and see the patient easily. While in 40% of the sessions some technical problems arose, these only affected severely 12.3% of the sessions. The professionals reported feeling comfortable with the activity in 84.6% of the sessions, were happy about the degree the session was personalized for each patient in 87.6% of the cases and reported to be satisfied with the overall experience of the tele-dentistry education session in 90.7% of the cases. Qualitative analysis identified 39 codes grouped into 5 families. The main aspect highlighted by the clinicians was the positive attitude and participation of the patients and family members during the activity, followed by the possibility of discussing questions, the individualized adaptation of the activity to the patient’s needs, the reduction of access barriers, follow-up patients unable to attend due to coronavirus lockdown and the intercultural

experience with foreign patients. Some of the negative aspects reported were low participation or distraction of young patients, internet connection problems, variability of dental products available in different countries and disadvantage of the use of mobile phones in comparison of computers. In the final evaluation, all professionals agree that tele-dentistry is a good tool for educating and monitoring patients, as well as reducing barriers for patients with disabilities. They acknowledged that tele-dentistry should be incorporated in both undergraduate training and professional practice, replicating this activity with a focus on other groups as well.

**Conclusions:** Dental professionals positively perceive the use of tele-dentistry to carry out oral health educational programs and follow-up screenings in patients with Epidermolysis Bullosa. These sessions allow personalized oral care education, reinforce the therapeutic alliance, reduce the anxiety of traditional dental care as well as reducing access barriers in patients who cannot attend face-to-face sessions. Although there may be technical problems during the activity, positive attitudes of the patient and their caregivers can help overcoming them.

#### **48. Knowledge and attitudes on oral health of people with Epidermolysis Bullosa and their caregivers: a qualitative analysis**

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**Aim:** To analyze the knowledge and attitudes on aspects related to oral health in people with Epidermolysis Bullosa (EB).

**Methods:** A qualitative clinical audit was carried out, considering a theoretical sampling. A semi-structured interview based on a script was conducted using an online platform (ZOOM). to explore the patient's knowledge and attitudes towards oral health. Verbal and non-verbal expressions were coded for both for the patients and their caregivers. Each participant consented recording the session. Data analysis was done using Atlas.ti program, 7th version.

**Results:** Patients with Epidermolysis Bullosa age 1 to 29 years old were interviewed. Their diagnostic types corresponded to Simplex EB, Junction EB, Dystrophic dominant EB and Dystrophic recessive EB. Fourteen participants were Chilean and 5 were Colombians. The research was grounded theory based and, since it is a rare disease, the number of people to interview was not previously defined, since theoretical saturation was sought.

Some preliminary criteria for theoretical saturation considered were: Oral hygiene elements use, frequency of toothbrushing, difficulties associated with the condition, topics that people with EB or their relatives wanted to learn. The sample was homogeneous, since the selected people had the same profile or characteristics. A total of 129 codes were categorized and 14 code families were identified, including: knowledge on oral health, city of residence, caregiver factors, age range, hygiene elements, environmental factors, dentist factors, personal factors, remineralizing elements, hygiene habits, type of Epidermolysis Bullosa, treatments carried out and ulcers. It was detected that the participants did not consider tooth decay as an oral infection. Likewise, they did not consider it necessary to seek dental treatment for dental mobility, bleeding gums, facial inflammation and bruxism. It was observed that those with better access to oral health centers specialized in EB had more knowledge about the use of oral care elements and management of the oral condition. Caregiver or patient fear was often related with lack of use of hygiene items due to the frequent formation of oral ulcers in previous experiences. Patients who reported regular visits to dental specialist showed higher expectations of treatment and asked questions related to more complex procedures. The presence of microstomia and ankyloglossia was perceived as a difficulty in oral hygiene, but pseudosyndactyly was not. The only patient who had access to an orthosis reported that they did not use it for toothbrushing, because it was uncomfortable. Among the main topics of interest reported by people with EB and their caregivers were concerns about progression of disease manifestations, such as pseudosyndactyly, microstomia, ankyloglossia and associated functional and oral hygiene consequences.

**Conclusions:** Qualitative analysis, based on symbolic interactionism, allowed to determine common practices associated with the condition and each subtype of EB. Likewise, this approach allowed understanding how oral hygiene habits are modified and adapted to each case.

#### **49. Intrahospital educational intervention in oral health to patients under childhood cancer's treatment**

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**Aim:** During cancer treatment, patients may have oral complications such as xerostomy, mucositis and opportunistic infections, being more prevalent in children than in adults because of the stage of growth in which they are found. It is described that the risk of developing them

and the severity increase in the presence of gingivitis, tooth decay and/or poor oral hygiene. The presence of these complications can disrupt cancer treatment, increase hospitalization days, and severely alter quality of life. The objective of this work is to present an experience of education and prevention in oral health in a Pediatric Oncology Unit.

**Methods:** For 3 months, an oral health prevention and educational intervention was performed on patients in hospitalized or outpatient treatment of childhood cancer, their parents and/or caregivers and the health team of the cancer unit of the clinic “Redsalud Santiago”, Santiago, Chile. It was performed in 4 stages, starting with individual diagnosis, through medical history and clinical examination. The second stage consisted of carrying out personalized educational actions aimed at the maintenance of oral health during cancer treatment and the prevention and/or early management of the most common oral complications, such as xerostomy and mucositis, through oral hygiene instruction and the application of different natural mouthwashes or rinses. Depending on the clinical diagnosis of each patient, the third stage was performed, which consisted of the arresting active carious lesions applying silver diamine fluoride (SDF) and preventing future cavities, through the application of topical fluoride varnish. Finally, it was given to parents and/or caregivers and health equipment, a triptych with the same information previously given from their concerns.

**Results:** 21 patients were treated from 11 months to 17 years old, with an average of 5 years old. The main diagnosis was acute lymphoblastic leukemia, followed by rhabdomyosarcoma, condrosarcoma, medulloblastoma and one case of hepatosarcoma, one of atipicrabbinoid teratoma of the central nervous system and one of choroid plexus carcinoma. The main oral complications were xerostomy, lower lip ulcers, mucositis and dysgeusia. Education and hygiene instruction were performed on all of them, application of SDF in one patient and varnish fluoride in 5 of them.

**Conclusions:** While oral complications arising from cancer treatment have been widely described, there is little information about in-hospital oral health education and prevention programs. The presence of oral complications and infections can interfere with cancer treatment, increasing hospitalization days or causing the treatment to be postponed until resolution. For this reason, it is important to participate the dentist in health teams, leading intrahospital programs of education and prevention in oral health; as well as early management of risk factors, preventing future complications and their severity. We should include education on long-term oral complications, to anticipate parents and/or caregivers in the next stages and provide tools to the health team to identify them and perform an early referral.

## 50. X-fragile Syndrome: gene expression of virulence factors of *Streptococcus mutans* correlated with dental caries experience

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**Aim:** Fragile X syndrome (FXS) is the most prevalent hereditary syndrome characterized by intellectual deficit and alterations of some behavioral characteristics such as autism, hyperactivity and anxiety. Additionally, difficult oral hygiene may occur in these patients, compromising biofilm virulence. This study aimed to evaluate the prevalence of carious lesion and the expression of virulence factors related to biofilm formation of *Streptococcus mutans* isolated from patients with FXS.

**Methods:** The study was approved by the Ethics and Research Committee (protocol n. 643,617) under informed consent of the the parents or guardians of the patients. A non-random (convenience) sample was used, comprising patients with FXS from a regional center for dental care for patients with special needs at Presidente Prudente (São Paulo, Brazil). The inclusion criteria for the study was additionally to the confirmation of FXS with molecular tests, no other syndromes associated could be present. Twenty-three patients were evaluated, including 5 females and 18 males, with a range age from 15 to 30 years old. The clinical parameters of dental carie experience were evaluated on FXS patients were performed using the International Caries Detection and Assessment System (ICDAS), periodontal condition (PCI) and invasive dental treatment need indexes. *S. mutans* strains were collected from saliva of FXS patients after culture at Mitis Salivarius Bacitracin (MSB) medium containing bacitracin (Sigma) (0.2 IU/mL MSB). RNA total purification was performed using RNeasy Mini Kit and then, converted to cDNA. The analysis of vicR and covR gene expression were performed by qPCR and the analyzes were normalized by expression of 16S reference gene. As comparison, an inoculum of *S. mutans* UA159 strain was used. A Student T test was applied for comparison between groups, adopting a significant level of 5%.

**Results:** High levels of caries (87%) in FXS patients were observed. Periodontal clinical parameters demonstrated a large prevalence of localized gingival bleeding and absence of a bag depth. The levels of vicR and covR transcripts from *S. mutans* of FXS patients were higher when compared to the standard strain ( $p < 0.05$ ).

**Conclusions:** The patients with FXS have more unfavor-

able clinical conditions, greatest biofilm accumulation and *S. mutans* virulence, which, combined with behavioral characteristics, increasing the susceptible to dental caries disease.

## 51. Association between postoperative pneumonia and oral function management in patients with esophageal cancer

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**Aim:** Surgery for esophageal cancer often induces postoperative pneumonia due to its high invasiveness and the postoperative decrease in swallowing function. Therefore, we surveyed the present status of perioperative oral function management for patients with esophageal cancer.

**Methods:** The subjects consisted of 92 patients who were diagnosed with thoracic esophageal cancer and underwent thoracoscopy-assisted esophagectomy. The investigation items were patient factors, clinical examination results, treatment factors, the presence of postoperative pneumonia, hospitalization period, and outcome. This study was performed after approval by the ethics committee of our university (ERB-C-1079-1).

**Results:** Postoperative pneumonia developed in 22% of the 92 patients, whereas postoperative dysphasia was observed in 13%, of whom more than 50% developed pneumonia. The incidence of postoperative pneumonia was 14.6% among patients without a smoking history and 27.5% among those with a smoking history, but 35% among patients with decreased respiratory function on preoperative lung function tests.

**Conclusions:** Pneumonia frequently develops after surgery for esophageal cancer. Smoking and decreased respiratory function are considered to be risk factors in pneumonia. Patients who developed postoperative dysphagia frequently developed postoperative pneumonia. Therefore, more thorough oral function management may be necessary.

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## 52. Oral health perception of a homeless group from Lisbon

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A homeless person is a person who lives without a home or a ceiling, regardless of their nationality, age, sex, socioeconomic status and physical and mental health status. They are characterized by being uncooperative in some approaches and with a tendency to lie or omit information. In this group, dental problems are greater than in people with a stable house.

**Aim:** Evaluate the perception of the oral health status of a group of homeless people in Lisbon.

**Methods:** Observational and cross-sectional study, approved by the Ethics Committee of the Faculty of Dental Medicine, University of Lisbon whose non-random convenience sample consisted of 44 homeless individuals in Lisbon district. Subjects attending institutions that provide social support were invited to participate in the study. Participants signed an informed consent, which excluded minors, under the influence of alcohol or illegal substances or with violent behavior. A questionnaire was applied with questions of the perception of oral health status and an oral cavity observation was made. It was used the index of decayed, missing and filled teeth (DMFT), the register of presence of gingival inflammation (through the observation of gingival characteristics) and the presence of supragingival tartarus. The collected data were analyzed statistically by using the “Statistical Package for the Social Sciences” program (IBM SPSS version 25.0).

**Results:** The mean age was 49,27 ( $\pm$  13,87) [20; 82] years old, the majority (37; 84,1%) was male. More than half (25; 56,8%) had lived as homeless for less than five years, inclusive, while the rest had lived for more than five years. The sample had an average of 17,32 present teeth ( $\pm$ 11,19) which seven were edentulous. The DMFT was 19,70 ( $\pm$  10,62) and the mean of decayed teeth was 5,59 ( $\pm$ 5,78), lost teeth 14,68 ( $\pm$ 11,19) and filled teeth 0,43 ( $\pm$ 0,93). The presence of gingival inflammation was 81% and supragingival calculus 92%. Individuals who didn't have toothache had more missing teeth ( $p=0,040$ ), fewer decayed teeth ( $p=0,033$ ) and higher DMFT ( $p=0,045$ ) compared to those who had toothache. Those without toothache had greater gingival inflammation ( $p=0,206$ ) and presence of calculus ( $p=0,190$ ). Individuals who considered had a good oral health had a higher DMFT ( $p=0,631$ ), fewer decayed teeth ( $p=0,008$ ) and higher missing teeth ( $p=0,318$ ) compared to those who considered had a poor oral health. The presence of gingival inflammation ( $p=0,159$ ) and calculus ( $p=0,164$ ) were similar. Homeless for more than five years consider had better oral health ( $p=0,009$ ) and less toothache ( $p=0,044$ ) compared to homeless people for less than five years, inclusive.

**Conclusions:** The perception of good oral health and not having toothache is due to the fact that they have a high number of missing teeth which gives them a lack of perception of good oral health. The lack of treatment in this

sample is notorious, where the average number of filled teeth was low. This study can help local authorities to create conditions to improve the oral health of this disadvantaged group.

### 53. Effectiveness of plaque removal using a manual brush with and without an adapter: a crossover study

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The toothbrush is a simple and effective tool for removing plaque and preventing tooth decay and periodontal diseases. However, it brings difficulty of use in some populations, namely in cerebral palsy individuals. In many cases, the difficulty of grasping the brush, will prevent correct access to all dental surfaces and thus increase the presence of plaque in the oral cavity, leading to a decline in oral health. Many devices have been designed to help these patients to preserve their ability to perform daily tasks, modifying commonly used items and making use of stronger or unaffected muscles. By improving the ergonomic properties of these items, the efficiency and performance of daily tasks will also improve with positive impacts on users' health and satisfaction.

**Aim:** This study aims to assess the effectiveness of the Inava 20/100 brush with an adapter (InavaSystem®) in removing plaque.

**Methods:** A cross-over study was conducted in 2 phases of 4 weeks each. Sixteen participants with cerebral palsy that gave informed consent and met the inclusion criteria were randomly allocated into groups A (n=8) and B (n=8). In phase 1: group A was assigned with Inava toothbrush 20/100 without the adapter (T1) and group B was assigned with the same toothbrush with the adapter Inava System®(T2). Tooth brushing was advised twice daily for 2 minutes using the same dentifrice in both groups. At baseline, 4 weeks and 8 weeks the Turesky plaque index modified by Quigley Hein(QH) was recorded. In phase 2 group A was assigned T2 and group B was assigned T1 following the same study protocol. Intergroup changes were assessed by Friedman test and intragroup changes by Kruskal Wallis test.

**Results:** Plaque scores were reduced significantly at phase 1 as compared to baseline in both groups ( $p = 0.017$ ) but not in phase 2 ( $p=0.426$ ) regardless the order of use of the INAVA System® and no group reach the baseline scores after 2 months. Inter-group comparisons revealed that QH mean differences were not statistically

significant ( $p=0.368$ ) in Group A (baseline =  $1.94 \pm 0.88$ ; T1= $1.59 \pm 0.65$ ; T2= $1.74 \pm 0.62$ ) but statistically significant ( $p=0.036$ ) in Group B (baseline =  $2.55 \pm 0.77$ ; T1= $1.47 \pm 0.58$ ; T2=  $2.22 \pm 0.66$ ). QH mean score using the adapter was lower than without it ( $1.65 \pm 0.59$  vs  $1.92 \pm 0.72$ ) ( $p=0,215$ ) suggesting a better performance in plaque control with the use of the adapter.

**Conclusions:** The results of this study suggest a slightly better performance in plaque control with the use of the adapter. Given the difficulties that the study sample find in such procedure, improving the ergonomic properties of the toothbrush can also increase the efficiency and performance of toothbrushing.

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### 54. Evaluation of the factors that influence the oral hygiene status in individuals with Asperger's syndrome

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Asperger Syndrome (AS) is a mild neurodevelopmental disorder that is integrated into Autism Spectrum Disorders (ASD). Individuals with AS have common characteristics that are identified according to three specific functional domains, known as the Wing Triad: social relationships capacity, communication skills, and mental and behavioral flexibility. These characteristics can affect negatively the individual oral daily care, which will favour the appearance of oral diseases, such as dental caries and/or periodontitis.

**Aim:** This study aims to evaluate the factors that may influence the oral hygiene status of a group with AS.

**Methods:** A convenience sample of 23 individuals with AS, members of the Portuguese Association of Asperger's Syndrome (APSA) gave their informed consent to participate in the study. The participants had to answer an interview questionnaire followed by an oral examination to evaluate the oral hygiene index (OHIS) and its components: deposits index (DI) and calculus index (CI). This study was conducted during the months of December 2019 and January 2020, at APSA, Lisbon, Portugal. Ethical approval for was requested from the Ethical Committee of the School of Dental Medicine at the University of Lisbon (FMDUL). Data was analyzed using the SPSS® software version 25, considering the level of significance of 5%. After investigate the sample normality, using the Kolmogorov-Smirnov test, the nonparametric

tests Mann-Whitney and Kruskal-Wallis were applied.

**Results:** The average age of the participants was 26.7 ( $\pm 5.18$ ) years, being mostly of them male gender (18;78,3%). The mean OHIS was 2,08 ( $\pm 0,73$ ), corresponding to a fair oral hygiene status, the DI was 0,99 ( $\pm 0,46$ ) and CI was 1,09 ( $\pm 0,42$ ). Women had better oral hygiene results (OHIS=1,47  $\pm 0,29$ ,  $p=0,067$ ). The majority (14; 60.8%) brushed their teeth two or more times a day, with six (26.1%) needing to be remembered to perform it. All the individuals used toothpaste, four (17.2%) used dental floss and three (12.9%) used an electric toothbrush. Although there is no statistical significance, it was found that the participants who brushed their teeth more often ( $p=0.127$ ), flossed daily ( $p=0.350$ ), had an electric toothbrush ( $p=0.583$ ) and those who are reminded to brush their teeth ( $p=0,440$ ) had lower OHIS values. It was also observed that individuals with a higher brushing frequency and those who recently had been to an oral health appointment had significantly lower calculus deposits ( $p=0,038$  and  $p=0,021$ , respectively).

**Conclusions:** This group of individuals with AS had a fair oral hygiene status. Those who had better oral hygiene are the ones who brush their teeth more often, use dental floss and an electric toothbrush. It is suggested to carry out further investigations with larger samples that prove the results of this study.

#### *Acknowledgements*

*Portuguese Association of Asperger's Syndrome (APSA)*

## **55. Oral hygiene of sighted and visually impaired children: a comparative study**

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**Aim:** To compare visually impaired children oral hygiene habits and their effectiveness with those of sighted children.

**Methods:** This observational and transversal study covered 68 participants which belonged to seven schools from Lisbon, where 9 of them were totally blind, 25 had mild to severe vision impairment (partially blind) and 34 were sighted people. The sighted participants were matched accordingly with visually impaired participants, to avoid significant statistical differences of gender and age between the two groups. All the children were submitted to an oral observation (one examiner) using the Simplified Oral Hygiene Index (OHI-S) followed by a questionnaire, with the purpose of finding the participants oral hygiene habits. The oral observations were done in the participant's schools during the months of January and

February of 2020. This study was approved by the Ethics Commission of the Faculty of Dental Medicine of the University of Lisbon and was authorized by the directive councils of the participants' schools, furthermore, the informed consent of the participant's parents. The collected data was analysed using the "Statistical Package for the Social Sciences" (IBM SPSS 26.0), where the Mann-Whitney and Pearson's Chi-Square statistical tests were applied.

**Results:** The study participants included 36 male individuals (52.9%) and the average age was 11.15 ( $\pm 3.413$ ) years. The results showed there were no differences in the frequency of brushing between the two groups, given that most of the samples said they brush two or more times per day. However, more visually impaired children need help with brushing ( $p=0,046$ ). Moreover, it was noted that less parents of sighted children (5; 31.3%) check their brushing regularly. Most of the children use complementary oral hygiene products, where it was found that there was a preference for dental floss by sighted children (11; 68.8%) fluoride mouthwash by visually impaired children (18; 54.5%) ( $p=0,316$ ). It was verified that visually impaired children showed higher average values in debris (DI=0,56 $\pm$ 0,38;  $p=0,166$ ) and calculus (CI=0,05 $\pm$ 0,13;  $p=0,951$ ) indexes, and consequently in the simplified oral hygiene index (OHI-S=0,61 $\pm$ 0,40;  $p=0,199$ ). Within them, partially blind children had higher average values in debris ( $p=0,396$ ) and OHI-S ( $p=0,418$ ) indexes, while the calculus index ( $p=0,318$ ) was higher in totally blind children. The OHI-S showed that most have an excellent/good oral hygiene (95.6%), though a slightly larger percentage of sighted children (33; 50.8%) are in this condition than visually impaired children (32; 49.2%).

**Conclusions:** The results of this study suggest that the visually impaired children showed a higher need of help with brushing and their oral hygiene habits showed an inferior efficiency when comparing with their sighted counterparts. This compares with medical literature, that references blind people generally display a higher difficulty with brushing.

## **56. Impact of clinical training on the attitudes of undergraduate dental students towards persons with special needs**

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**Aims:** The aim of this study was to determine how access to clinical practices in real scenarios affects the attitudes and behaviors of undergraduate students with respect to the dental care of individuals with special needs.

**Methods:** The study group consisted of fifth-year undergraduate dental students at the University of Santiago de Compostela (Spain). All participants were administered the iADH Toolbox for measuring attitudes and intended behaviors (iADH 2015), after translation and cultural adaptation to Spanish. This survey consists of 5 clearly differentiated parts with a total of 222 questions. In the present study, we only analyzed the blocks for Section 3, which evaluated “Attitudes regarding oral health” (13 questions), and Section 4, which evaluated “Expected behavior”. In Section 4, four differentiated scenarios were chosen: 1. a patient with physical disability; 2. a patient with schizophrenia; 3. an elderly patient with Alzheimer’s disease who cannot leave their home; and 4. an individual who did not speak the native language of the survey and who was of a different ethnicity than the student’s. The survey was applied at 3 separate times: (T0) At the start the academic year; (T1) Upon completion of the theoretical training + 60 hours of practical training; (T2) Upon completion of 120 hours of practical training. The results were analyzed with the SPSS program, applying the Wilcoxon test and Student’s t-test.

**Results:** The participants included a total of 40 students, 22–23 years of age; 13 were men (32.5%), and 27 were women (67.5%). When evaluating the results of the measurement (T1) with respect to baseline (T0), the respondents considered that patients with special needs “should be treated by specialists” ( $p=0.000$ ). There was also a clearer need to perform a “rapid, effective treatment, preventing anxiety” in the patient with schizophrenia ( $p=0.019$ ). The predisposition to treat patients with Alzheimer’s disease decreased ( $p=0.001$ ), and there was an increase in the number of students who thought that “the treatment is extended” with foreign patients ( $p=0.039$ ). Upon completing the practical training (T2), the students considered that they were “more qualified” to treat patients with special needs ( $p=0.002$ ) and that they “had sufficient training” to do so without having to refer to specialists ( $p=0.003$ ). The students also considered it important to perform and successfully complete the treatment, detracting importance from other objectives of the dental practice, especially in the case of patients with schizophrenia ( $p=0.040$ ) and patients with Alzheimer’s disease ( $p=0.004$ ).

**Conclusions:** Limited practical training increases the students’ reserves for treating certain patients with special needs, especially those with mental and/or behavioral disorders. By increasing the duration of practical clinical training, the students’ self-sufficiency is increased in all of the planned scenarios.

## 57. Psoriatic arthritis associated proteins were identified by proteomic techniques on the patients’ saliva samples

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Saliva is a complex body fluid and functions as a rich reservoir of proteins and peptides from the salivary glands and blood. Proteomic analysis of the content of total saliva samples could provide a basis for the recognition of potential biomarkers of human diseases. This information could be useful for the diagnosis, prognosis and monitoring of the treatment of patients with oral and systemic diseases. Psoriatic arthritis (PsA) is a chronic rheumatological disease characterized by inflammation of the peripheral and axial joints, entheses and the skin and is associated with increased mortality from cardiovascular disease.

**Aim:** To identify proteins in saliva samples from patients with psoriatic arthritis that can serve as clinical biomarkers.

**Methods:** Saliva samples were collected from 55 patients diagnosed with PsA (40 (72%) were women) and a control group of 55 healthy subjects of the same age and sex. The study was evaluated and approved by the Ethics Committee of the Institute of Psychophysical Rehabilitation of Buenos Aires and the Ethics Committee of the School of Dentistry of the University of Buenos Aires, and written consent was obtained from all persons. The samples were analyzed using nanoHPLC coupled to a mass spectrometer with Orbitrap technology and analyzed with the Proteome Discoverer program. The data obtained were analyzed using the uniprot database to identify the proteins and the string program (Search Tool for the Retrieval of Interacting Genes / Proteins) to study the relationships that exist between them.

**Results:** A total of 265 proteins were identified and 61.3% are shared constituents of the human salivary proteome from control and pathological samples. Primary analysis of the data allowed the detection of unique proteins in PsA samples such as K17, Pycard and EEF2. During skin lesion psoriasis, K17 may induce hyperproliferation of suprabasal keratinocytes and may also serve as an autoantigen leading to the pathogenesis of psoriasis by autoimmune amplification. degeneration.

**Conclusions:** We present 3 unique proteins in this preliminary study of the salivary proteome of patients with

PsA. These identified proteins are related to the pathology of PsA and could be used in the future as biomarkers. Understanding the human salivary proteome is a prerequisite for understanding the physiological and pathological processes relevant to oral and systemic health and is crucial for the identification of significant biomarkers for oral and systemic diseases. To our knowledge, this is the first study to investigate the salivary proteomics of psoriatic arthritis.

### 58. Raman spectroscopy enabled non-invasive visualization of molecules forming neurites in neural cells

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**Aim:** Recent advances in tissue engineering are expected to produce regenerative medicines in which iPS cells and mesenchymal stem cells are differentiated into nerve cells, which can be transplanted into areas where nerve degeneration by caused amyotrophic lateral sclerosis and dementia have taken place. However, to conduct safe and high-quality regenerative medical procedures, it is essential to remove undifferentiated cells, and select only good quality nerve cells. We focused on Raman spectroscopy, which allows non-invasive molecular analyses.

**Methods:** PC12 cells were cultured in neuronal differentiation induction media, and neurite extensions were measured using time-lapse imaging. Immunostaining was performed using antibodies against  $\beta$ -tubulin and 1-Oleoyl-Palmitoyl-Phosphatidylcholine (OPPC). Raman spectroscopy was conducted with a laser Raman microscope.

**Results:** Neurite extension was observed with time lapse imaging after inducing differentiation of PC12 cells using neuronal differentiation induction media. Expression of the neuronal differentiation markers  $\beta$ -tubulin and OPPC was observed by immunostaining after inducing neuronal differentiation. Raman measurement of induction of neuronal differentiation confirmed the presence of strong Raman signals of lipid-derived molecules and nucleic acid-derived molecules in the neurites.

**Conclusions:** Raman spectroscopy enabled non-invasive visualization of dynamic changes in lipids and nucleic acids associated with neurogenesis at a molecular level without staining.

### 59. Oral findings in individuals with rare diseases

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People with rare diseases have a predisposition to aggravated oral health and their oral characteristics are still largely unknown due to reduced access to dental diagnosis and treatment.

**Aim:** To describe the oral characteristics and malocclusion of individuals with rare diseases.

**Methods:** 19 people with 13 rare diseases who attended oral health consultations from the Clinic for people with special needs from the Faculty of Dental Medicine of the University of Lisbon were selected. This was a descriptive study, approved by the Ethics Committee of the Faculty of Dental Medicine, University of Lisbon (FM-DUL). The convenience sample included patients with Rett syndrome (3), Myotonic Dystrophy (3), Fragile X (2), Lissencephaly Type I (2), Lennox-Gastaut (1), West (1), Prader-Willi (1), Wolf-Hirschhorn (1), Chromosome 1 (1), Microcephaly (1), Cri Du Chat (1), Pontocerebellar Hypoplasia Type II (1) and Klinefelter (1), who had been attending the oral hygiene appointment for people with special needs, at the FDMUL. Data collection was carried out between October and December 2019. An oral examination was performed, recording the presence of dental anomalies, evaluation of malocclusion with Angle's class, and Dental Aesthetic Index (DAI).

**Results:** The mean age was 31.47 ( $\pm$  9.198) years [18-50], and the majority of them (n=11; 57.9%) being female. Gingival hyperplasia (n=9; 47.4%) was identified in Lennox Gastaut syndrome, West, Rett, Fragile X, Wolf Hirschhorn, Lissencephaly Type I, and Microcephaly; Gingival recessions (n=7; 36.8%) in Lennox Gastaut syndrome, West, Fragile X, Klinefelter, Cri Du Chat, and Myotonic Dystrophy; and Bruxism (n=6; 31.6%) in West syndrome, Rett, Wolf-Hirschhorn, and Cri Du Chat. 84.2% (n=16) presented intraoral alterations, such as Macroglossia (n=3; 15.8%) in Lennox-Gastaut syndrome, and Fragile X; Tooth Wear (n=7; 36.8%) in Prader-Willi syndrome, West, Rett, Fragile X and Cri Du Chat; Hypodontia (n=2; 10.5%) in Wolf-Hirschhorn syndrome and Klinefelter; Enamel Hypoplasia (n=3; 15.8%) in Prader-Willi syndrome, Fragile X and Cri Du Chat; Mouth Breathing (n=9; 47.4%) in Prader-Willi syndrome, West, Microcephaly, Rett and Myotonic Dystrophy; High and Narrow Palate (n=12; 63.2%) in Chromosome 1 syndrome, Wolf-Hirschhorn, West, Fragile X, Myotonic Dystrophy and Cri Du Chat; Open Bite (n=11; 57.9%) in Lennox-Gastaut syndrome, West, Rett, Fragile

X, Myotonic Dystrophy, Cri Du Chat and Pontocerebellar Hypoplasia Type II; and Crossbite (n=4; 21.1%) in Fragile X syndrome, Myotonic Dystrophy and Pontocerebellar Hypoplasia Type II. In assessing malocclusion, eight (42.1%) individuals presented Class III of Angle in Lennox Gastaut syndrome, West, Rett, Fragile X, Microcephaly, and Klinefelter; and seven (36.8%) have presented Class II of Angle in Prader-Willi syndrome, Wolf-Hirschhorn, Lissencephaly Type I, Myotonic Dystrophy, Cri Du Chat and Pontocerebellar Hypoplasia Type II. The average value of the DAI was 53.16 ( $\pm 26.06$ ) [15; 107], where 14 (73.7%) needed mandatory treatment. The Rett syndrome and Cri Du Chat had the highest values.

**Conclusions:** Clinical findings in rare diseases have included a diverse range of oral alterations that are very characteristic in each syndrome. The identification of these characteristics allows the creation of strategies to improve oral hygiene.

## 60. Qualification of patients with disability for dental treatment – Proposal of introductory visit to the Dental Surgery

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In numerous cases, patients with intellectual disabilities need special visits to help them get accustomed to a dental surgery, including equipment, personnel and procedures. Such introductory visits should be carried out in a friendly environment to decrease their anxiety and reduce the need for general anesthesia or deep sedation.

**Aim:** The aim of the study is to present the concept of an introductory visit to the dental surgery for children and adolescents with intellectual disabilities.

**Methods:** A draft project was developed in cooperation with the Foundation at one of a special-care school located in the city of Poznan (Poland) by dentists that are specialists in pediatric dentistry, a psychologist and special educational needs (SEN) teacher. The project is devoted to help students with intellectual disabilities to get accustomed to a dental surgery in a known environment of a special-care school.

**Results:** A makeshift dental office, with mobile dental chair and operating lamp, was installed at the special-care school. The authors of the project developed a special check list where successive steps of a dental visit are checked while the individual is cooperative. It may take

more than one visit for a student to become accustomed to the procedure and the procedures are carried out by a dentist. Initially, the proceeding was tested at one school in the city of Poznan. Subsequently, the material together with instructions will be posted on the website to allow easy access for other educational establishments.

**Conclusions:** It is assumed that introductory visits to the dental surgery for children and adolescents with disabilities will allow them to increase their access to dental care.

## 61. Salivary gland function and protein glycooxidation in stroke patients – a preliminary study

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At present, stroke is a serious worldwide health problem since a global epidemic of this disease is observed. Therefore, it is an urgent need to develop new therapeutic and diagnostic methods. As it was presented previously, in the saliva of patients in the subacute phase of stroke, the enzymatic and non-enzymatic systems are disturbed and oxidative damage to proteins and lipids is increased.

**Aim:** The aim of the present study was to assess salivary gland function and protein glycooxidation products in patients after cerebral stroke with normal and decreased saliva secretion. Additionally, salivary flow rate, amylase activity and total protein content were evaluated.

**Methods:** The research was carried out in 20 stroke patients, between June and September 2019, in Bonifraterskie Centrum Zdrowia (health center) in Piaski–Marysin (Piaski, Poland). The study group was emerged out of 385 individuals that were subjects in the neurorehabilitation ward following different incidents. The control group consisted of 20 healthy individuals. The participation of each individual in the study was voluntary, and full written consent was obtained from all participants in accordance with the Declaration of Helsinki. The study was approved by the Ethics Committee of the Poznan University of Medical Sciences. The research material was mixed non-stimulated (NWS) and stimulated saliva (SWS) collected via spitting method. The total protein content and amylase activity were determined colorimetrically. The content of dityrosine, kynurenine, N-formylkynurenine and tryptophan were assessed fluorimetrically. Statistical

analysis was performed by ANOVA analysis of variance with an appropriate post-hoc test. Statistical significance was assumed to be  $p < 0.05$ .

**Results:** Salivary flow rate, total protein content and salivary amylase activity were significantly lower in NWS of stroke patients compared to controls as well as in the group of stroke patients with hyposalivation compared to patients with normal salivary secretion. The content of glycooxidation products was significantly higher in non-stimulated saliva of stroke patients compared to controls. Dityrosine content was also significantly higher in NWS of stroke patients with hyposalivation compared to those with normal salivary secretion. The content of glycooxidation products did not differ significantly in stimulated saliva of stroke and control patients.

**Conclusions:** In stroke patients, the function of salivary glands (mainly submandibular salivary glands) is disturbed and salivary protein glycooxidation is increased. Oxidative stress may be one of the mechanisms responsible for the impairment of saliva secretion in stroke patients. Further studies to assess salivary redox homeostasis of stroke patients are necessary.

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## **CASE REPORTS ABSTRACTS**

## 1. Implant-supported dental prostheses in a patient with recessive dystrophic epidermolysis bullosa. Seven-year follow-up

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**Aim:** Seven-year follow-up oral rehabilitation of a 35-years old female patient with Recessive Dystrophic Epidermolysis Bullosa (RDEB) is described.

**Case report:** In April 2013, after removal of all remaining teeth, three mini-implants in the mandible and four in the upper jaw were installed (transition implants IT, ByW Argentina). A period of minimal prosthetic loading was set to allow osseointegration of the implants. A set of upper and lower removable overdentures was provided to the patient during this waiting period mainly for socializing but advised her to wear them the least possible. Three months after installation of the 7 implants, a shortened-arch metallic-ceramic bridge (10 teeth for each arch) was cemented over the maxillary and the mandibular implants, respectively. General anesthesia was not needed neither for the extractions or implant surgeries nor for the prosthetic procedures. However, techniques and use of dental materials were adjusted accordingly due to reduced mouth opening. Stability of the fix-prosthetic design as well as integration of the implants were assessed by means of clinical and radiographic evaluation every six months. Microbiologic studies searched for the development of peri-implantitis or pathogenic flora around the implants in yearly follow ups. At the seven-year follow up, all the implants maintained their osseointegration as well as absence of periodontopathic biofilm.

**Conclusions:** The success achieved in this case encourages the use of dental implants for oral rehabilitation in patients with genodermatoses such as RDEB, providing new resources to improve their quality of life.

## 2. Oral self-factitious trauma in severe learning disability; an unexpected diagnosis during the COVID-19 pandemic

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**Aim:** This case report highlights the difficulties faced by clinicians managing acute oral complications in those affected by severe learning disability. The effect of COVID-19 on emergency care provision and the associated

impact on those with additional care needs is also discussed. Whilst self-injurious behaviour can be a common manifestation in those affected by autistic spectrum disorder diagnosis can be difficult. This case demonstrates how one incident of long standing self-factitious trauma resulted in an acute facial swelling misdiagnosed as a dental abscess.

**Case report:** A 24-year-old male patient with severe learning disability attended the community dental service after carers reported a 10-day history of facial swelling. The patient had severe autistic spectrum disorder and was non-verbal. He lived with his mother, an eastern European national with limited English. The patient had a history of anxiety resulting in aggressive and challenging behaviour. He was penicillin allergic with a BMI of 36.4. The patient had been prescribed antibiotics by his GP with no improvement after 7 days. There was limited cooperation for examination. A visual assessment showed extensive facial swelling affecting the left buccal space and carers reported increased aggression and poor sleep. As a result of the COVID-19 pandemic Special-Care Dentistry provision was significantly reduced with no available general anaesthetic lists. The patient was referred to the regional Oral and Maxillofacial unit with concerns regarding acute spreading infection. Oral sedation was administered prior to transfer. A provisional diagnosis of a suspected dental abscess was made. He was placed on an emergency list for EUA +/- any necessary treatment. Consent was gained after discussion with his mother via a telephone translation service. Current guidelines advised a negative COVID-19 PCR test prior to surgery however due to cooperation this was not possible. The patient was managed as suspected COVID-19 positive. He was accompanied by a 5 person handling team, all members of staff he was familiar with from his residential day facility. This team were provided with full level 2 PPE and accompanied the patient to theatre. EUA identified a non-homogenous indurated mass to the lower left buccal sulcus with no collection. LL6 and LL7 were grade 2 mobile with no obvious caries. The wide range of potential diagnoses and ongoing reduction in care provision warranted extensive special investigations. The lesion was biopsied, bloods sent, and CT of the head and chest carried out whilst the patient intubated. Subsequent pathology report showed non-specific chronic inflammation consistent with trauma. CRP was elevated at 117. Antibodies for p-ANCA and c-ANCA tests showed negative. A diagnosis of long standing chronic self-factitious trauma was confirmed. The patient was discharged on oral antibiotics and further management arranged with the community dental service.

**Conclusions:** Self injurious behavior is common amongst those affected by severe autistic spectrum dis-

order. Whilst less common, clinicians should be aware of the potential for acute exacerbations to present as facial swelling and the subsequent management going forward. COVID-19 has significantly impacted Special-Care patients in both how and where they have received treatment.

#### *Acknowledgements*

*I would like to acknowledge both Dr A Cullen and Mr E Qudairat for their clinical knowledge and surgical expertise in the management of this case. I would also like to acknowledge Mr D McAuley for his help in editing this case report.*

### **3. Oral manifestations of herbal medicine induced Steven Johnson syndrome in 3 Nigerian paediatric patients: Case series**

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Steven-Johnson syndrome (SJS) is a rare medical emergency that is characterized by widespread skin and mucosal lesions. Oral mucosal involvement is seen in 90% of SJS and it is often widespread and confluent. In the majority of the cases, the symptoms are associated with an adverse drug reaction, usually to non-steroidal anti-inflammatory drugs, sulfonamides, anti-epileptics, or antibiotics. Recently, SJS associated with herbal medicine has been reported.

**Aim:** This paper aims to report 3 cases of SJS with marked oral manifestations, following the use of local herbal medicine, diagnosed in a children's hospital in Nigeria within a year. Case reports: 3 children aged 1.5, 9 and 10 years presented in our emergency unit with features of SJS, history of the use of local herbal medicine to cure an ailment was elicited in all cases before admission into our hospital. All the cases presented with cutaneous exfoliating exanthema and bullous eruptions with oral mucosa appearing as painful crusted erythematous lesions. One of the 3 cases, a male patient; presented clinically with septicaemia complicated with anaemia as well as nasal involvement. Discontinuation of herbal medicine in all cases resulted in a relief of symptoms. A multidisciplinary approach of management was instituted with resultant total recovery of patients.

**Conclusions:** This case series addresses the fact that severe hypersensitivity reactions can occur with the use of herbal medicine. Emphasis should be placed on active vigilance in the use of herbal medicine.

### **4. Special-needs patients: contribution of digital dentistry**

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**Aim:** Description of indications, advantages, limits and practicability of digital dentistry for patients with special needs. This presentation shows how using optical impression and CAD/CAM technology permitted a full oral rehabilitation.

**Case report:** A 39 year old woman with psychomotor impairment consulted the Special Care Unit. She presented severe tooth wear due to bruxism. At the request of the parents, a treatment was set up with functional and aesthetic objectives. The vertical dimension should be increased. So, all the teeth had to be rehabilitated. All the previous treatments were performed under general anaesthesia. Sedation using equimolar mixture of oxygen and nitrous oxide was not enough to improve cooperation. Two general anaesthetics were necessary: the first one for the optical impression. Dental tissue was preserved: premolars and molars were not prepared. Peripheral preparations were performed on the maxillary anterior sector for mechanical reasons. The bonding with rubber dam was realized during the second anaesthesia. Following a therapeutic hazard, the anterior maxillary sector had to be redone. The risk-benefit ratio for a new intervention was such that it was attempted to manage the follow-up without any sedation. A new digital impression of the teeth was succeeded and the crown bonded in another appointment. The optical impression is particularly well suited for general anaesthesia, contrary to the conventional impression technique. It is more hygienic and the organization is easier. There is no need for impression paste, nor trays. Also, the practitioner can immediately validate the impression. For this patient with severe impairment, the optical impression without any sedation would not have been possible with the conventional impression technique. Indeed, the latter generates anxiety and nausea reflex and must be undertaken with sedation for patients with developmental disabilities. Optical impression allows timeliness and precision in the same time. It allows breaks without losing any information. In this case, working on the maxillary anterior sector facilitated the optical impression and the bonding. The limits of digital dentistry depend on the ability to have an efficient bonding and not on the CAD/CAM technology itself.

**Conclusions:** Digital dentistry is not a widespread routine yet, even less in the field of special care dentistry.

However, along with adhesive restorative materials, it gives new opportunities of care. Sedation using equimolar mixture of oxygen and nitrous oxide or general anesthesia do not stop from setting it up. New technologies facilitate equitable oral health outcomes for patients with special care.

## 5. Oral myiasis in patients with special needs

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Oral myiasis (oral means “mouth” in Latin; myia means “fly” in Greek), a term first introduced by Rev. Frederick William Hope in 1840, is a rare pathology whereby tissues of the oral cavity are infested by the larvae of Dipteran flies, commonly known as maggots. The predisposing factors of oral myiasis in patients with special needs, on top of being intellectually, physically and/or mentally disabled, include medical co-morbidities, low socioeconomic status, malignancy, facial trauma, persistent mouth opening and poor oral hygiene.

**Aim:** This case report aims to highlight the challenges and importance of modified delivery of oral healthcare for special needs patients in the management of oral myiasis. Oral health education to caregivers of patients with special needs is also emphasised in the management of oral myiasis. This report discusses two cases of oral myiasis seen at the Special Needs Dentistry Unit.

**Case reports:** The first case involves a 27-year-old Bidayuh male patient, who is quadriplegic and cognitively impaired due to hypoxic ischemic encephalopathy as a complication of severe asthmatic attack. He presented with swelling of his upper lip and palate with infestation of maggots. In the second case, oral myiasis occurred on the palate of a 65-year-old Malay male who is under palliative care and ventilated following subtotal colectomy. The challenges in management include positioning of wheelchair-bound and bed-bound patients during treatment and barriers in communication with non-verbal patients with reduced cognitive capacity and cooperation. The extent of the lesion also required greater palatine artery ligation and fabrication of appliance as a barrier and to facilitate healing. Anxiety of caregivers is another aspect to be addressed as part of holistic management. The patients underwent wound debridement, mechanical removal of maggots following turpentine application and wound closure. In addition to the standard treatment protocol, a splint was fabricated to enable healing by secondary intention. Advice on oral hygiene, wound and splint care was given to caregivers via tell-show-do technique.

Patient was compliant for follow-up review and had good treatment outcome.

**Conclusions:** Patients with special needs are more prone to develop oral myiasis due to their neglected oral hygiene and the management can be challenging. As clinicians, it is our duty to raise awareness to caregivers on importance of oral health maintenance and regular dental check-up. Special care and modifications are needed in the overall management of oral myiasis in these patients to improve their quality of health and to prevent fatality.

## 6. Non-invasive prosthetic rehabilitation in a patient with a cleido-cranial dysplasia

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Cleido-cranial dysplasia is a rare genetic disorder with variable forms of expression. The main symptoms include numerous and progressive skeletal and cranio-facial abnormalities, but no cognitive or neuromotor impairment. Multiple dental signs (supernumerary teeth, ectopy, inclusion...) are systematically present. During adolescence, the therapeutic approach focuses almost exclusively on the orofacial sphere and requires multidisciplinary care to best understand the specific needs of the patient.

**Case report:** A 17-year-old woman with cleido-cranial dysplasia consulted the dental care unit of the Clermont-Ferrand University Hospital in March 2017 for aesthetic and functional rehabilitation. Her incisors had been extracted three years previously, but the impacted teeth had not emerged. A unimaxillary complete overdenture had already been proposed, but was never worn. The patient had delayed tooth eruption with numerous impacted teeth, especially in the anterior maxillary area, presence of maxillary and mandibular primary molars, supernumerary nuclei and a class III molar with a bilateral articulated inversion. The therapeutic project aimed to improve inter-arch relationships and aesthetics by adapting to the specific anatomy and physiology of the patient. All impacted teeth were kept to preserve bone potential and to limit maxillary endognathia. After obtaining consent, onlays using Design and Computer Aided Manufacturing were made without enamel preparation on the following teeth: 54, 55, 16, 64, 65 and 26 to increase the vertical dimension and to optimize maxillary arch retention. Partial removable dentures were designed to replace the missing teeth in the mandible and to cover the maxillary decidu-

ous teeth. The prosthetic rehabilitation was completed in July 2017 with composite restorations. Follow-up: The oral health related quality of life of the patient was significantly improved as shown by the increase of the Global Oral Health Assessment Index score. Masticatory efficiency, evaluated by chewing gum for 20 cycles, also improved and reached values closed to standard value for healthy fully dentate individuals. She was satisfied with the aesthetic and functional result. Maintenance is performed every 3 months to prevent caries, periodontal risk and to check the denture. At the end of 2019, an implant-prosthetic treatment plan was proposed. Implants will be placed directly into the dental germs without communication with the oral cavity. The others will be extracted. **Conclusions:** In the literature, surgical-orthodontic solutions are usually proposed for the aesthetic and functional rehabilitation of patients with cleido-cranial dysplasias. However, some patients refuse these solutions for financial and psychological reasons. This clinical case illustrated the comprehensive management of a patient in oral medicine, and offered an alternative solution for this type of patients.

#### *Acknowledgements*

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## 7. Lesch –Nyhan syndrome: A case report

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Lesch-Nyhan syndrome is a rare X linked recessive disorder of purine metabolism involving defective activity of hypoxanthine-guanine phosphoribosyltransferase (HPRT) enzyme and gene mutation of X chromosome. It is characterised by intellectual disability, spastic cerebral palsy, choreoathetosis and compulsive self-mutilation behaviour (SMB) which have implications towards dental care.

**Case report:** Patient A is a case of 23 years old Chinese young man with an underlying Lesch-Nyhan syndrome. He is presented with dystonic cerebral palsy, global developmental delay, epilepsy, nephrocalcinosis and an aggressive behaviour. As a child, he was managed under the care of Paediatric Dentistry team and subsequently referred to Special Needs Dentistry Clinic, Hospital Kuala Lumpur at the age of 16 for continuation of dental care. The challenges managing patient A is the presence of habitual biting his lip or rubbing his lip against rough surfaces as part of his compulsive SMB. The lip is distorted

in shape and may presented with ulceration. Dental management for him involves routine prophylaxis, preventive therapy and symptomatic relief for ulcer under behaviour guidance.

**Conclusions:** We would like to highlight on challenges and dilemma in managing Lesch-Nyhan syndrome patient, and the need of a teamwork effort in order to provide the best of care.

#### *Acknowledgements*

*The author would like to thank the Director-General of Health Malaysia for the permission to present this case report.*

## 8. The importance of the interdisciplinary team in Pediatric Dentistry regarding the detection of child abuse in a girl with disability

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According to the WHO, children with disabilities suffer any kind of violence with a frequency of 3.7 more than who do not have this condition, and among this group, those with intellectual disability are the most affected. Pediatric dentist as a health agent, must be prepared and trained in order to observe and detect child maltreatment. **Aim:** The objective of this work is to demonstrate and highlight the importance of the interdisciplinary work, intervening in the early detection of suspected situations of child abuse, during comprehensive dental care treatment.

**Case report:** A 6-year-old girl with Noonan Syndrome and a history of acquired syphilis at 2 years of age, who attended the Special Care Unit-Quinquela Martin Hospital- with her grandmother, presented in her screening poor oral health (ceod: 14) and lack of basic care. The social worker's intervention was required by taking the infectious disease as an indicator of abuse, and the amnesia was done in an interdisciplinary way. From the evaluation it was known that the girl is being cared by her grandmother due to the negligence of the parents (addiction, personal neglect, lack of hygiene, feeding problems) by decision of the Child Welfare Service. In the following interviews, it was revealed that the girl's father was living with her and the grandmother, and he was also being psychological and symbolic violent to both them. The Argentinian legislative framework establishes the priority of protecting children in situations of violence in order to guarantee their rights. The interdisciplinary health team decided on a plan with two areas of intervention: a) identify the obstacles operating in the girl's caregiver (grandmother) in order to report the suffering violence

and b) recover the diagnosis elaborated by the welfare child services in front of the suspicion of sexual abuse. To achieve these aims, the social worker contacted the hospital where the girl was hospitalized for syphilis at 2 years of age and her records and also contacted the Welfare Child Service that determined the grandmother as caregiver. Besides, through the interviews, the violence situation risk has been monitored, strengthening the grandmother's child to report the violence and encouraging her to use the backup form the welfare child service had offered her.

**Conclusions:** The intervention with a social worker in the interdisciplinary team gave the legal and contextual tools to determinate the existence of maltreatment/neglect or abuse to this girl. The interdisciplinary work favored the pediatric dentist to act in a safe way, without blaming the family. This vision of interdisciplinary work transcends the dental treatment for which the girl went to the hospital, ensuring the physical, emotional and social well-being of the child.

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*Special Care Unit Team: Daniela Verardo, Laura Fedelli, Ana Clara Zabala.*

## 9. Minimally invasive dentistry for Maximally affected children/adults with special needs

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**Aim:** To demonstrate simple, easy yet effective ways to manage complex issues like severe early childhood caries in infants, toddlers, and young children with special needs and late consequences of the same in adulthood and rest of the life.

**Case reports:** This multi-centric case series comprises cases of SDF (silver diamine fluoride) treatment in patients with a range of ages and different conditions: a young child (2-year-old) with intrauterine growth restriction/preterm, children with an autism spectrum disorder, with sensory processing disorders, and with Down's syndrome, an adult (38-year-old) with cerebral palsy and others. The highlight of all these cases is to do minimally invasive procedures with maximal longevity and effectiveness. Apart from the above, the emphasis would be to highlight the significance of anticipatory guidance and establishing a dental home for them at an early age. Usage

of Papoose board, nitrous oxide-oxygen sedation, SDF/ SDF modified ART, chemomechanical caries removal, Hall's technique, and bioceramics in series of cases.

**Conclusions:** Minimally invasive dentistry is not a luxury. Especially in special care dentistry. It is something which we owe to them i.e. patients and their parents. In the end, doing "too much" won't help but "doing just enough" would do wonders for our superstars.

## 10. Newer therapies in management of haemophilia opens up prosthodontic opportunities

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A historic lack of access to preventive oral care and reliance on hospital based dental extractions as the first line treatment option has resulted in extensive tooth loss for adults with haemophilia. Alongside well documented higher mortality, morbidity and high costs of providing surgical rather than restorative care, reduced treatment options have also impacted significantly on longer term oral health outcomes. This is especially evident in the first generation of older people with haemophilia who have unimpaired life expectancies due to the extraordinary advances in medical treatment, but who have experienced widespread tooth loss over their life-course.

**Aim:** This case report details a 65-year-old male living with haemophilia A and a significant bleeding phenotype, who presented with aesthetic and functional concerns related to tooth wear and repeated failure of extensive restorations in his anterior teeth. He had not tolerated a series of removable devices and a lack of posterior support had resulted in tooth wear, loss of occlusal vertical dimension and limited food choices. While implant-retained prostheses have rapidly evolved to become the standard of care to replace missing teeth, there has been a scarcity of evidence to inform implant placement for people with haemophilia. Clinical implications: The development of new haemophilia therapies has opened up opportunities for multi-stage procedures in dentistry. The use of low cost, readily available oral and topical antifibrinolytic therapies used together with local measures has decreased the risk of post-operative bleeding complications for procedures which carry low or medium bleeding risk such as subgingival margin preparation, second stage (implant exposure) procedures or placement of healing abutments. Novel longer-acting factor replacement therapies extend the half-life of coagulation factors using the body's own mechanism where the constant region of the monomeric form of IgG fuses to the Factor VIII molecule. The half-life extension of Efmorotocog

alfa (Elocta) compared to traditional recombinant FVIII is 1.6 fold meaning patients can receive surgical care with a single dose of factor pre-operatively and retain its benefit for longer post-operatively.

**Case report:** This case report describes the optimal use of Elocta for gingival recontouring and first stage implant placement, followed by full mouth rehabilitation using local measures and oral antifibrinolytics alone. The surgical protocol involved a single infusion of Elocta 6000 IU to increase Factor VIII to 100% at least one hour before the procedure, careful peri and post-operative local measures, and cyclokapron tablets 1g three times a day for 5 days. No bleeding post-operatively was reported.

**Conclusions:** Tooth loss has impacted on the quality of life of patients with haemophilia. Implant-supported replacement of missing teeth results in the restoration of function and restores quality of life. Traditionally people with haemophilia were denied dental implants due to cost and lack of clinical guidance. Consequently, high levels of factor were used for every treatment stage and the cost of factor replacement vastly exceeded the costs of implant surgery. With careful planning and management, implant-retained dental prostheses now present a viable alternative to removable prostheses and presents opportunities for prosthodontic treatment in people with haemophilia.

## 11. Drooling: A multidisciplinary approach in a patient with oculopharyngeal muscular dystrophy

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Oculopharyngeal muscular dystrophy (OPMD) is a rare genetic disorder due to the progressive muscle weakness of the upper eyelids and the throat. Affected individuals usually first experience weakness in the muscles of both the eyelids. Together with ptosis, the affected individuals develop progressive weakness in the throat muscles that causes oropharyngeal dysphagia. The onset of this disorder is usually during adulthood around 40 years of age. **Aim:** This report presents a multidisciplinary approach for management of drooling in a 44-year-old Chinese man with underlying OPMD.

**Case report:** The patient complained that he was unable to close his mouth after his teeth became proclined due to long term intubation in the ICU and presence of drooling. Clinical examination revealed that there were four severely proclined lower anterior teeth causing incompetent lips leading to continuous drooling. A multidisciplinary team managing this patient included the Neu-

rologist, the Speech Language Therapist and the Special Needs Dentistry team of Hospital Kuala Lumpur. Multiple home visits were done in view of the patient's medical condition which required him to be on a continuous medical oxygen concentrator. Initial therapy was labial and lingual isometric exercises guided by the speech language therapist in order to improve the lower lip muscle strength and a functional swallowing pattern. However, the drooling was still persistent. Therefore, extractions of the four lower anterior teeth were carried out in the dental clinic to facilitate lip closure. Continuous oral motor exercises were guided by the speech language therapist post dental extractions during the follow up home visit. Final outcome was the patient had 50% improvement of his initial condition.

**Conclusions:** Hospital based dentistry can play a role in a multidisciplinary team to manage medically complex patients. Consideration for home visits as part of managing patients should be considered to minimise barrier to care.

### *Acknowledgements*

*We would like to thank the Director-General of Health, Malaysia.*

## 12. Nutrition and parents behaviour in pediatric patients with extracorporeal life support: a possible dental issue

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Heart transplantation remains the only viable long-term treatment option for children with end-stage heart failure. However, donor hearts are scarce and waiting list mortality in paediatric patients with end-stage heart failure is high. With the purpose to enlarge the life chances of patients, the artificial heart is largely used as a bridge for those who are in waiting list for transplantation. Since the first employment in 1990, tremendous progress has been made in artificial circulatory assist devices and extra corporeal life support (ECLS) has been proved to be an effective therapy in the form of short-term circulatory support. But what happen when the mandatory employment of anticoagulating drugs meets the physiological exfoliation of deciduous teeth?

**Case report:** To report the case of a young patient with ECLS, in waiting list for heart transplantation that during his hospitalization had an oral bleeding episode as a consequence of wrong nutrition and inadequate behaviour of his parents. To offer suggestions on behaviour and feeding for parents and practitioners who take care of a patient with an extracorporeal life support device.

**Conclusions:** Unfortunately there are no indication in Literature in order to prevent bleeding from deciduous teeth in exfoliation. In this paper we try to offer suggestions in order to ensure a proper nutrition without any risk for the patient.

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### 13. Effects of thickened food products on nutrient absorption when used for preventing aspiration in dysphagia: a study using the rat model

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Oculopharyngeal muscular dystrophy (OPMD) is a rare genetic disorder due to the progressive muscle weakness of the upper eyelids and the throat. Affected individuals usually first experience weakness in the muscles of both the eyelids. Together with ptosis, the affected individuals develop progressive weakness in the throat muscles that causes oropharyngeal dysphagia. The onset of this disorder is usually during adulthood around 40 years of age.

**Case report:** This report presents a case of a 44-year-old Chinese man, with underlying OPMD. The patient complained that he was unable to close his mouth after his teeth became proclined due to long term intubation in the ICU and presence of drooling. Clinical examination revealed that there were four severely proclined lower anterior teeth causing incompetent lips leading to continuous drooling. A multidisciplinary team managing this patient included the Neurologist, the Speech Language Therapist and the Special Needs Dentistry team of Hospital Kuala Lumpur. Multiple home visits were done in view of the patient's medical condition which required him to be on a continuous medical oxygen concentrator. Initial therapy was labial and lingual isometric exercises guided by the speech language therapist in order to improve the lower lip muscle strength and a functional swallowing pattern. However, the drooling was still persistent. Therefore, extractions of the four lower anterior teeth were carried out in the dental clinic to facilitate lip closure. Continuous oral motor exercises were guided by the speech language therapist post dental extractions during the follow up home visit. Final outcome was the patient had 50% improvement of his initial condition.

**Conclusions:** Hospital based dentistry can play a role in a multidisciplinary team to manage medically complex patients. Consideration for home visits as part of man-

ing patients should be considered to minimise barrier to care.

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### 14. Full oral rehabilitation for a patient suffering for oral consequences of stercoral peritonitis: a case report

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Stercoral peritonitis is characterized by an abscess on a sigmoid diverticulum with communication between this abscess and the inside of the colon. Peritonitis can be primary or secondary, sometimes nosocomial or care-related. Mortality and morbidities are high and lead to major functional disabilities. Disability and poor medical condition cause difficulties maintaining good oral health or accessing oral health services. Frequent episodes of gastro-oesophageal reflux can lead to an acidic oral environment, which is very aggressive to the teeth. Thus, patients who have suffered from stercoral peritonitis or its effects are more at risk of presenting specific needs in terms of oral management.

**Case report:** This case report describes the complex and global oral rehabilitation of a 72-years-old woman, with a history of stercoral peritonitis due to nosocomial contamination after the removal of an ovarian cyst in 2013. An extensive cellulitis led to the resection of the abdominal wall and she underwent three skin grafts without success. She suffered in every movement and she presented a depressive syndrome. She was multi-medicated with central analgesics and antidepressants. The patient had a good cognitive level and reasonable financial resources and had high aesthetic and functional expectations. She lived an hour and 40 minutes away from the dental department and the trips were made by ambulance. For this patient, special needs in oral health were related to the obligation to live in a horizontal position (due to the lack of abdominal muscles) and to frequent episodes of gastro-oesophageal reflux, that led to a severe dental alteration with important loss of the vertical dimension. Firstly, seven initial root canal treatments and two retreatments were firstly undertaken, under endodontic microscope. Secondly, a 4 mm increase in vertical dimension was obtained with temporary mandibular and maxillary prostheses, made and worn for some time to validate the

increase. Dental impressions were taken with 3D digital camera (Trios 3Shape) for crowns, veneers and bridges. Finally, a multi-disciplinarity approach including bonded restorations, implants (after sinus lift and guided bone regenerations) and CAD/CAM fixed prosthesis allowed the complete oral rehabilitation. Thirty-five sessions were necessary to achieve the treatment which costed 14738 € with a health insurance cover of 1064 €.

**Conclusions:** Full oral rehabilitation contributed to the increase of the number of functional dental units from 2 to 6 and of quality of life related to oral health that was shown with an improvement of the GOHAI score from 16/60 to 41/60.

### 15. Taking reasonable adjustments when managing an adult in acute dental pain with severe mental health history and an aversion to face-masks during the COVID-19 pandemic

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**Aim:** To highlight barriers faced by patients with complex mental health and behavioural issues requiring urgent dental treatment and demonstrate reasonable adjustments as best practice when managing such patients.

**Case report:** This report follows the multidisciplinary approach taken for a 50-year-old male patient's urgent dental treatment while accounting for his aggressive behaviour towards those wearing face coverings. In light of the COVID-19 pandemic, face coverings became mandatory for hospital staff and members of the public. This posed a significant challenge ensuring safety of the patient, staff and the public alike when facilitating this patient's care. He had been detained under Section 2 of the Mental Health Act for 10-years prior to living in his current specialist learning disability and autism residence. Patient Journey The referral was emailed mid-June from the Learning Disability Liaison Nurse to the Consultant in Special Care Dentistry (SCD). The patient was complaining of dental pain for 4-weeks, analgesia was no longer managing symptoms and oral intake had reduced. The General Practitioner was contacted but was unable to assist with a dental complaint. Telephone triaging was performed that day with the patient's key worker. The patient's past dental history was confirmed from his previous dentist stating he had previously tolerated treatment with local anaesthetic however this was prior to deterioration in his mental health. Within the week, community dentistry colleagues carried out a domiciliary assessment which confirmed an unrestorable, verti-

cally fractured first permanent molar which would very likely require surgical extraction under intravenous sedation. Mental capacity assessment (MCA), virtual best interest meeting (BINTM) and formal risk assessment was conducted and the proposed treatment carried out without complication within 3-weeks of the original referral. Barriers: 1) Limited access to conscious sedation during COVID-19; 2) No access to dental general anaesthetic theatre lists; 3) Face coverings became mandatory within the hospital; 4) Reducing footfall meant a restricted number of chaperones permitted within the hospital; 5) Considerable burden of time sensitive, pre-operative planning required (MCA, BINTM and risk assessment). Reasonable Adjustments: 1) Staff photographs with and without personal protective equipment were provided for acclimatisation; 2) The patient was permitted to enter the hospital via an entrance away from the public thoroughfare; 3) Photographs of the patient's route from carpark to surgery were used to prepare a social story for the day of treatment; 4) Routine blood tests were conducted as an additional procedure maximising the sedation opportunity; 5) 3 chaperones were permitted to attend with the patient. Reflection Lack of knowledge of local dental care pathways resulted in a 4-week delay in carers actioning any referral. The UDC hub was in fact located in the local hospital less than 5 miles from the patient's residence. Fortunately, prompt action within the UDC hub avoided escalation in the patient's challenging behaviours.

**Conclusions:** The success of streamlining this patient's care relied largely upon the close relationship between the local learning disability team and Community and Special Care Dentistry colleagues and their willingness to provide flexible patient-centred care.

### 16. Dental, orthopedic and speech/language treatment in a patient with Autistic Spectrum Disorder. A case report

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Autism spectrum disorders correspond to neurodevelopmental disorders characterized by alterations in social interaction and communication patterns, in conjunction with restrictive, stereotyped and repetitive interests or activities. Being a spectrum, there is a wide degree of expression, making the approach that professionals must have towards these patients more complex.

**Case report:** A 10-year-old woman, pre-pubertal peak with a diagnosis of Autism Spectrum Disorder. Mother consults with speech therapist due to difficulty in feed-

ing. Presents a diagnosis of epilepsy, right hemiparesis, severe language disorder and external hearing loss of the right ear. She has an abnormal gait and overweight. Presents hypodivergent facial biotype, skeletal Class II, 2nd phase mixed dentition with multiple maxillary diastemas, proinclined and protruded upper incisors, 12 mm overjet, 3 mm overbite. Dental care began with adaptation techniques that helped to increase work time and hygiene instruction, with the mother's active participation because she is the one that brushes her daughter's teeth. This was followed by the preventive phase, which consisted of scaling, prophylaxis and application of fluoride varnish. She did not present cavities. Controls were indicated every 6 months, which she always attended in a timely manner. Regarding the orofacial functions, it can be observed that it has a predominantly oral respiratory mode, without evident obstruction of the airway, adapted swallowing with interposition of the lower lip to generate seals during the swallowing of food and the management of saliva at rest. The chewing pattern is chronic unilateral, in addition it has altered cycles, due to little chewing, generally having large bolus swallows. Regarding speech, she has a speech sound disorder, of phonetic and phonological origin, together with a language disorder that affects understanding and expression of language. A myofunctional treatment was planned, focused on the management of solid foods, promoting bilateral and alternate chewing, and the mechanics of bolus formation was also taught through foods with proprioceptive, visual and auditory stimulation inputs. An upper Hawley Plate was installed, retruding the incisors based on compression of the handle. It was complemented with speech therapy and a lower lip bumper to control lip suction. After 8 months and an appliance fracture, it was possible to reduce the overjet by 6 mm, improve the masticatory function and avoid labial interposition. The control of the resting position was the objective after the removal of the Hawley plate due to the occupation of the functional spaces. It has also begun with the stimulation of language and speech through augmentative-alternative communication systems.

**Conclusions:** Health teams must reflect on treatment alternatives adapted to the functional needs of the patient. In this case, through the team's consensual resolution, a significant change was generated that made it possible to improve food handling and safe swallowing.

### **17. Identifying Wolf-Hirschhorn syndrome (WHS) in children: case report**

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Wolf-Hirschhorn syndrome (WHS) is a developmental disorder, extremely rare, caused by deletion of part of the short arm of chromosome 4 (4p). This syndrome's symptoms vary from person to person based on the size and location of the missing piece of chromosome 4. WHS presents characteristics to the disease phenotype making it difficult to be diagnosed. A WHS diagnosis may be suggested by the characteristic facial appearance, growth failure, developmental delays, and seizures. Most individuals affected by this disorder have distinctive facial features like wide-set eyes, a distinct bump on the forehead, a broad nose, and low-set ears.

**Case report:** This case report aims to describe the characteristics of a female child diagnosed with Wolf-Hirschhorn syndrome with a stable clinical picture, absence of seizures and cardiac problems, emphasizing her facial and oral characteristics and the role of a multidisciplinary team approach in this context. Because WHS is so variable, health care must be designed to the affected patient's needs.

**Conclusions:** A multidisciplinary team approach involving several professionals is essential to ensure an appropriate care plan, adequately advised and guided parents and patients. An early diagnostic and adequate information on the nature and implications of inherited genetic disorders makes the prognosis more favourable for the patient with WHS.

### **18. The role of Photonic Therapies applied pre, trans, and post-surgery to manage osteonecrosis associated with bisphosphonates in cancer patients: Series of clinical cases**

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**Aim:** This study aimed to present 3 cases of osteonecrosis of the jaws associated with the use of bisphosphonates in cancer patients treated with the association of pre, trans, and post-surgical photonic therapies - discussing the therapeutic purpose of the applications in different parameters and times of treatment. All patients agreed, through a free and informed consent term, with the treatments and use of their images and data.

**Case reports:** The cases were treated at the "Sorrir Para Vida Institute", São Paulo, Brazil. Photonic therapies

were: Photobiomodulation Therapy (PBMT) at red ( $\lambda = 660$  nm, V) and infrared ( $\lambda = 808$  nm, IV) wavelengths and Antimicrobial Photodynamic Therapy (aPDT). The laser parameters were: power = 100 mW; spot size = 0.028 cm<sup>2</sup>, energy density  $\approx 71$  J / cm<sup>2</sup>, energy = 2 J per point, time = 20 seconds per point. During the pre-surgical phase, PBMT was used in both wavelengths, to modulate the soft tissues surrounding the lesion. aPDT was used for infectious control. During the trans-surgical procedure, after removing the necrotic bone portion, aPDT was applied immediately before the suture for decontamination. Subsequently, the 3 photonic therapies were applied on intercalated days in order to photobiomodulate the bone (PBMT IV) and gingival tissue (PBMT V) and to control microorganisms (aPDT), until the total closure of the lesion. The number of sessions, irradiated points, and frequency of applications were individualized for each patient. Initial imaging exams were taken, before surgery and after the closure of the lesion.

**Conclusions:** All cases presented complete regression of the lesion, without recurrences. Besides, photonic therapies in the pre-surgical period seem to have favored the surgical procedure by controlling infection and stimulating the rapid formation of granulation tissue responsible for “detaching” bone sequestrations and allowing the identification of healthy tissue in the surgical bed.

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## **19. New technologies at the service of the handi-cap: an illustrative case report**

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The development of new technologies and materials gave new impetus in dentistry in its different fields, particularly into the prosthesis, but also in conservative dentistry. The Er:YAG laser, is a class IV laser with a wavelength of 2940 nm located in the deep infrared portion and defining a strong affinity for water and for hydroxyapatite and a great absorption in the hard dental tissues, together with a poor penetration in depth (1-2 micrometers): this peculiarity allows the efficient ablation of dental tissues (as well as bone), in particular those affected by caries (precisely due to greater presence of water), together with the certainty of not causing damage in depth. This laser is used with an air-water spray integrated in the handpiece and incident on the target tissue

at the point of impact of the beam allowing to increase its performance by creating micro-explosions in the water of the tissues and in that produced by the spray, while maintaining the temperature at a safe level. The harmless use of the Er:YAG laser in conservative dentistry is made possible by its superficial action, with the removal of sub-millimetre layers and the possibility for the operator of direct control of the action. Again thanks to the peculiarities of the wavelength 2940 nm it is possible to use the Er:YAG laser for truly minimally invasive treatments, as in the case of cervical lesions and class V cavities, defining a tissue removal minimal, but functional to subsequent adhesive reconstruction. With the rise of optical cameras, the question has arisen of its possible use for removable prosthesis thanks to an optical impression based on the emission of a light beam on the object and the disturbances relating to the surface of the object recorded and converted into a 3-dimensional image. In relation to the optical impression technique, the ability to stop and resume the impression as soon and frequently as necessary, coupled with the small size of the camera, optimizes its use. In addition, the optical camera is less troublesome than an impression tray filled with material and the patient compliance is increased through greater involvement in their treatment. This new impression system also allows the practitioner better ergonomics, since there is no longer any need to prepare impression materials, choose an impression tray of the right size, and decontaminate impressions. The possibility of erasing and partially taking over the imprint represents a considerable time saving.

**Aim:** The aim of this case report is to illustrate the advantages that these 2 techniques could bring to dental practice in special needs patients.

**Conclusions:** The different tactile sensation of Er:YAG laser compared to bur and rotating instruments, the different noise and the possibility of not extensive carious evictions achievable without the use of infiltrative anaesthesia, constitute further advantages. The optical impression represents an alternative to conventional impression techniques allowing a quick and comfortable acquisition for the patient and making it possible for example in patients with strong gag reflexes.

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