Poster Presentations

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1. Structure & Sensitivity Clinical Managing in MIH: A Successful & Innovative Tool in our Hands. Case Reports

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Preserving dental anatomy and facing with sensitivity in MIH affected teeth is nowadays still very challenging; particularly in type 2a (moderate, with loss of substance) and in type 3 (severe) the altered and damaged anatomy plus the disabling high sensitivity don`t allow a proper lifestyle in children: feeding and drinking are quite difficult, oral hygiene can be improper as well and, furthermore, the natural development of dentofacial apparatus is penalized.
Therefore, a prompt and proper managing of the situation ad interim, before final restoration, is required: sometimes the final restoration isn`t possible "at a glance" and right after the first visit, but a waiting period, for several reasons, is required. A new temporary "medicament" can provide either for saving tooth structure and sensitivity, allowing to the children the proper recovery of all mentioned conditions: feeding, drinking, oral hygiene, and mouth development.
The use of a new light-curing GIC, fluoride, calcium, and phosphate slow-releasing, allows a fast sensitivity relief and a suitable coating that preserves the remaining tooth structure before final restoration, besides it inhibits the demineralization of underlying and adjacent areas surrounding caries-like lesions in enamel and it decreases plaque adhesion not only itself but also for better hygiene possible right after the application. Several cases of type 2a and type 3 are presented, treated with this interim product before restoration and the same teeth with final restorations are showed as well.

2. Immediate Clinical Managing of the "Chain`s Weak Link": HSPM&MIH. Case Reports

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When MIH occurs on primary teeth there is a very high percentage of incidence on permanent ones as well (up to 80%). Very often, in HSPM-MIH severe cases, if a preventive approach isn`t immediately adopted at a very young age or if the first visit happens when the child is around six or seven years old, the clinical scenario can be very difficult because it is necessary facing with very damaged second primary molar and first permanent molar (the weak link of the chain...).
Not always a very conservative approach is possible and sometimes SSC is required on both molars, if not extreme extractions. When HSPM needs extraction a suitable space maintainer is required; when a first permanent molar needs extraction, it is necessary to wait for the right development of the second permanent molar root for proper timing. But, if the first permanent molar doesn`t need an extraction, it can be used for the second primary molar space maintainer support, either by a band or an SSC, depending on its clinical situation.
It`s also possible to choose the single or double unit and the clinical situation can suggest the best option. The space maintainer can be either chairside or lab-made. Bands can be used either on the natural tooth or on the SSC. Again, the clinical situation can suggest the best option. The use of still evergreen ortho lab pointer and solderer can be very useful in realizing single units with the band or SSC on 6` and space maintainer of HSPM extracted.
Several cases are presented with their decision-making choices: some with a single unit and others with the double unit, not only chairside solved but also by lab-made devices.

3. Changes in Oral Health-related Quality of Life After Treatment of Hypersensitive MIH-affected Molars with a Sealing

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Objective: The aim of this study was to investigate the changes in oral health-related quality of life (OHRQoL) before and after treatment of hypersensitive molars affected by molar incisor hypomineralization (MIH) with a sealing.

Methods: 38 children with two MIH-affected molars showing hypersensitivity and non-occlusal breakdowns were included. Hypersensitivity was assessed with an evaporative (air) stimulus. Two affected teeth were sealed by two calibrated operators using a split-mouth design: Clinpro Sealant in combination with Scotchbond Universal, and Ketac Universal (3M), respectively. OHRQoL was measured using the German version of the Child Oral Health Impact Profile (C-OHIP) at baseline, and after one, four, eight, and twelve weeks. The total score can range from 0-76, with the higher score reflecting better OHRQoL.

Results: Mean values (±SD) for the C-OHIP sum as well as the four subdomains before and twelve weeks after treatment are shown in Table 1.

				Social/Emotional, school, and self-image
Baseline	61.6 (±5.7)	13.0 (±2.6)	12.6 (±1.8)	36.0 (±3.7)
After 1 week	68.4 (±5.3)	16.0 (±3.0)	14.4 (±1.7)	38.0 (±2.3)
After 12 weeks	71.9 (±4.5)	17.9 (±2.4)	15.5 (±1.1)	38.5 (±2.2)

After treatment, a significant increase (p0.05; paired, two-sided t-test) was observed in the overall C-OHIP sums and all subdomains except for the social well-being domain.

Conclusions: Sealing of hypersensitive MIH-affected molars revealed a significant improvement of OHRQoL immediately and throughout the twelve weeks follow-up.

The study was partly funded by 3M.

4. Hypomineralised Second Primary Molars (HSPM): Prevalence, Clinical Characteristics and Association with Molar Incisor Hypomineralisation (MIH) in Children in Jordan

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Background: Developmental defects of enamel are not uncommon. In the primary dentition, a relatively new qualitative enamel defect has been identified and termed Hypomineralized Second Primary Molars (HSPM). The defect is similar to Molar-Incisor Hypomineralization (MIH) in the permanent dentition. Several studies have reported association between the two defects. The prevalence of HSPM has been reported across countries worldwide. However, in Jordan, no prevalence data exists so far.

Aims: The purpose of this study is to determine the prevalence and the clinical characteristics of HSPM in schoolchildren in Jordan. The study also seeks to investigate the relationship between HSPM and MIH.

Materials and methods: This is a cross-sectional survey involving 500 six-to-eight-year-old children from various primary schools in Jordan. The short form of the MIH/HSPM index will be used for scoring index teeth. Five examiners (Paediatric dentists) will be trained and calibrated on the examination of HSPM and MIH. Following schools' approval, children with signed consent forms will be included in the study. Screening will be conducted in the classroom using artificial light source and a disposable dental mirror.

All infection control measures will be in place during the examination process. Data will be analyzed using SPSS.

Expected results: the study is currently ongoing. This survey is expected to provide an up-to-date prevalence data on MIH and HSPM in Jordan as well as report the association between the two conditions. **Conclusion:** Providing prevalence data on HSPM as well as association with MIH will inform early diagnosis of these conditions and help target at-risk children with preventive care and proper management strategies.

5. Effect of CPP-ACP Treatment on Microhardness of the Transition Zone in MIH Lesions

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Background: The aim of this research was to evaluate the efficacy of CPP-ACP mousse in remineralizing enamel in cases of Molar-incisor-hypomineralization using a Vickers microhardness test. **Methods:** Hypomineralized permanent molars with yellow opacities (n= 14) went through a 28 daily treatment protocol with GC Tooth Mousse containing CPP-ACP.
Before and after treatment microhardness was measured in two different areas of each tooth (4 outside of the hypomineralized area and 4 in the transition of the hypomineralized area) using a Vickers test. A Shapiro-Wilk test for normal distribution evaluation was performed. The values obtained for the transition area presented normal distribution while the post treatment outside hypomineralized area results could not be assumed as normally distributed. Data was analyzed using a Paired Student t-test for the results of the transition area and Wilcoxon Sign Rank was used for outside of the hypomineralized area results. A significance level of p 0.05 was considered.
Results: There was a significant increase (p0,05) in the mean values of microhardness of the transition area, which suggests an improvement in the enamel mineralization. There was no statistically significant difference (p0,05) in the enamel mineralization outside of the hypomineralized area. **Conclusions:** The analysis of the microhardness using a Vickers test showed a statistically significant increase of the physical strenght of the transition area of the hipomineralized enamel after treatment with CPP-ACP tooth mousse, suggesting a remineralization of the area.
Funding: This research project was supported by Cuf Academic center, Lisbon

6. Development of a Protocol for Hypomineralized Enamel Imaging by Scanning Electron Microscopy

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Background: The aim of this research was to establish an effective protocol for observation by scanning electron microscope (SEM) of enamel microstructure in permanent teeth affected by molar-incisor hypomineralization (MIH).
Methods: Four specimens of healthy teeth and four specimens of MIH affected teeth were randomly distributed by two groups (A and B). In group A, teeth surfaces were treated with 2mL of 5,25% sodium hypochlorite for 60 seconds as the deproteinizing substance and 2mL of 10% phosphoric acid for 30 seconds as the demineralizing substance. Teeth in group B were treated with the same solutions but the phosphoric acid solution was applied for 20 seconds. Before being distributed, teeth were subjected to pumice prophylaxis with a polishing brush and ultrasound cleaned with 100% ethanol. SEM microphotographs of the specimens were obtained and analyzed.
Results: Both protocols led to the removal of the majority of residues, enabling a good observation with SEM. Regardless, group B specimens displayed better preserved enamel. This difference was particularly evident in the MIH affected enamel.
Conclusions: Protocol B seemed to be more suitable for revealing enamel microstructure while preserving its structure.

7. Impact of Molar Incisor Hypominerlization and Hypomineralized Second Primary Molars on Dental Caries: A review

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Aim: To estimate the impact of Molar Incisor Hypomineralisation (MIH) and Hypomineralised Second Primary Molars (HSPM) lesions on dental caries in children.

Methods: Electronic databases, including Medline via PubMed, Cochrane Library, Scopus and Science Direct, were searched. Studies published in English language including children with MIH-HSPM and dental caries were considered as eligible. Two reviewers independently extracted data according to the PRISMA statement and assessed the bias risk using the Newcastle-Ottawa Scale (NOS) criteria.

Results: Out of 535 studies identified in initial research, only two articles were included in the present review.

A significant association between MIH-HSPM lesions and dental caries, among children aged between 6 and 12 years in mixed dentition, was reported in the two included studies (AOR=3.70, p0.001). Children with MIH-HSPM expressed significantly higher DMFT/dmft and PUFA/pufa values than children without MIH-HSPM.

Conclusion: MIH-HSPM lesions were correlated with a higher prevalence and more severe carious lesions. However, results should be interpreted cautiously since the findings were generated by a low number of included studies. Thus, further weel-designed studies with larger samples are highly recommended.

10. Hypodontia Prevalence in a Group of Turkish Children with Molar Incisor Hypomineralization

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Background and Purpose: Clinical observations imply that Molar incisor hypomineralization (MIH) may be accompanied by hypodontia. This study aimed to detect the prevalence and variety of hypodontia on panoramic radiographs in a sample of Turkish children presenting MIH with different severity.

Materials and Methods: Panoramic records of 439 patients, aged between 6 and 16 who were clinically diagnosed for MIH between 2020 September and 2022 January at Marmara University Dentistry Faculty, Department of Pediatric Dentistry- were examined retrospectively to identify hypodontia. All permanent teeth were investigated except third molars. The numbers and types of teeth missing were noted. Descriptive statistics for frequencies and chi-square test were carried out to detect associations between hypodontia, gender, jaw and MIH severity.

Results: Of 439 patients (243 girls, 196 boys), the prevalence of hypodontia was 5,7% (girls 52,2% and boys 47,8% P 0.05). There was no significant difference between the gender, MIH severity, jaw and hypodontia respectively (p=0.753, p=0.265, p=0.537; p0.05.) The most frequently missing teeth were mandibular second premolars (40,9%), followed by maxillar laterals (36.36%).

Conclusion: The identification of genetic and environmental factors may be especially useful in the future for the early prediction of combined anomalies and the development of prevention strategies and novel treatments. Also, more research is required to test for significant differences in hypodontia according to MIH severity in young patients.

11. The Role of Bleaching in the Clinical Workflow for Vestibular MIH Lesions

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Discolorations of anterior teeth often have a considerable psychosocial impact on affected patients. Studies have shown treatment to improve children's overall health and oral health-related quality of life. Recommendations for therapeutic interventions include non- and microinvasive treatments such as micro abrasion, resin infiltration, etch-bleach seal technique and external bleaching, as well as more invasive approaches such as composite restorations. Due to the variability of opacities and discolorations, a combination of techniques may be necessary. However, a minimally invasive approach, i.e. choosing the least invasive technique depending on the clinical situation, should be preferred as it allows conservation of tooth structure for future restorative options.
External bleaching is a proven non-invasive option that can be used to successfully camouflage white opacities by increasing the overall whiteness of the teeth, thus reducing the color difference between affected and healthy enamel areas.In a practice-based setting 12 patients with MIH affecting anterior teeth (age 10-18) were treated with external bleaching. The major goal of the intervention was esthetic improvement of the affected anterior teeth. The clinical protocol included diagnosis, photographic documentation, and establishment of individual bleaching protocols for each patient based on the predicted clinical outcome and patients' satisfaction. Bleaching reagents (between 5 and 10 percent carbamide peroxide) were applied using individual trays. The average duration of treatment was 4-6 weeks for a basic case and 8-12 weeks for advanced MIH lesions.
It was shown that tooth bleaching is a suitable technique to improve the esthetic appearance of vestibular MIH lesions. As a non-invasive technique bleaching should thus be considered a viable technique to be implemented in individual treatment protocols that are based on the baseline findings, patient's expectation and predicted satisfaction.

13. Aesthetic Alternative for Therapeutic Approach to Enamel Development Defect: Case Report in Adolescent, with Follow Up of 4 Years Old

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Dental fluorosis is an enamel development defect (DDE) caused by the effects of excess fluoride on ameloblasts during enamel formation, resulting in superficial and subsurface porosities and, consequently, physical and optical changes, compromising aesthetics and appearance. often present in the same individual along with the HMI, affecting their quality of life. The aim of the present study was to describe the aesthetic therapeutic approach of dental fluorosis in a 20-year-old male adolescent, followed up since the age of 2 in a private clinic, with a diagnosis of dental fluorosis when the permanent teeth erupted, with parents presenting HMI. His main complaint was dissatisfaction with the esthetics of the smile due to the whitish lesions on the anterior teeth (grade 2 fluorosis by Dean`s index). The treatment plan was associated with enamel microabrasion (Opalustre®, Ultradent Products Inc., USA) and use of a resin infiltrant (Icon®, DMG, Germany) involving up to the region of the second premolars in the maxillary and mandibular arches. The infiltrant is a low-viscosity resin that penetrates the interior of the lesion by capillary forces and creates a diffusion barrier not only on the porosity surface, but in depth, masking the whitish appearance. It was used to monitor lesions before and after treatment: transillumination (Raddi Plus® with diagnostic tip, SDI, Australia). 4 year follow-up. The Free and Informed Consent Term was signed authorizing the documentation and disclosure of the case. It can be concluded that minimally invasive approaches to the management of dental fluorosis are of great importance in current dentistry, aiming at satisfactory esthetic results in a single session for individuals who present chromatic alterations by DDE, without any preparation or damage to the dental structure.

14. Information Content of Dental Website on the Topic of Molar Incisor Hypomineralization

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Background: Molar incisor hypomineralization (MIH) is an endogenous structural disorder in which there is a systematic malformation of the molars and/or incisors. The increasing incidence of MIH has led to an increased need for public information. Combined with the trend of patients increasingly seeking information on the Internet, the provision of information via dentists` websites has become an increasing focus. The aim of this study was to analyze the information content of the topic MIH on the websites of German dentists.
Method: The search was conducted using three electronic search engines. The search terms were "MIH/cheese molars/dentist". Using predefined filter criteria, only results from German-language websites were analyzed. The websites were evaluated with modified validated questionnaires (LIDA, DISCERN) for technical, functional aspects generic quality and risk of bias. To ensure objectivity, the evaluation was conducted by 2 independent investigators. In addition, content-related statements on MIH were evaluated using a checklist, i.e., general information on MIH, treatment offers, etc. were examined.
Result: A total of 70 websites were selected. The analysis showed that more single-treatment practices (84%) and franchise practices (100%) mentioned the focus on MIH than multi-treatment practices (more than one dentist, 67%). Younger dentists (40 years(y)) all had a focus on MIH on their website, followed by older (50y, 83%) and middle-aged dentists (40-50y, 69%). When looking at specialization, it was found that general specialized dentists (42%) mentioned MIH severity more often than dentists without specialization (33%) or Pediatric dentist (33%). The maintenance system for MIH patients was mentioned most frequently by dentists without specialization (85%), followed by Pediatric dentist (66%), and finally by dentists with other specializations (25%).
Conclusion: The analysis revealed that MIH is mentioned on a large proportion of dentists` websites, but little information is provided about severity levels and maintenance system.

15. Blended Approach to Management of Aesthetic Concerns of Incisors of Patients with MIH

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Introduction: Molar incisor hypomineralization affects the development of enamel. Incisors can present with various degrees of demarcated discoloured areas on the labial surface ranging from white to brown shades. The number of children who describe a psychosocial impact due to the appearance of their teeth appears to be rising.
Options for management of aesthetics include microabrasion, bleaching, etch-bleach-seal, resin infiltration and resin composite restorations. These options can be used alone or in combination.
Often a blended approach is adopted to achieve better aesthetic results. The following cases were treated using microabrasion and minimal composite-resin restorations.
Case reports: Two patients were referred due to aesthetic concerns. Their medical history was unremarkable. Patients reported no sensitivity. Each patient was asked to self-assess their aesthetic concerns on a scale of 1-10. Lesions on maxillary incisors were selected for treatment. Risks and benefits of any dental intervention were discussed with patients and their parents. Treatment plans including microabrasion followed by bleaching or composite-resin restoration were agreed upon.
Microabrasion was performed in the first instance, followed by fluoride varnish application. Aesthetic improvement was deemed insufficient by patients, at the four weeks recall. A second microabrasion round was performed for one patient. After another four weeks, as the patients were still not fully satisfied with the result, a layer of composite resin was applied in a bleaching shade.
Patients were satisfied with the results and their self-assessment scores improved.
Discussion: How to address the aesthetic concerns of patients with MIH should be carefully considered.
Minimally invasive procedures such as microabrasion can be repeated but preservation of healthy enamel is a priority. Composite-resin restorations require good oral hygiene and maintenance long term.
Conclusion: A blended approach for management of aesthetic issues in the anterior teeth is an effective treatment strategy for some cases of MIH.

16. Knowledge, Attitudes and Practices Towards MIH Among Paediatric Dentists in Tunisia and Morocco

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Background: Molar-Incisor Hypomineralization (MIH) is a developmental dental disease that might challenge paediatric dentists among the countries. This study aimed to investigate the awareness, knowledge, attitudes and practices (KAP) in the management of MIH patients and to evaluate the perceived need for training in MIH in Tunisian and Moroccan paediatric dentists.
Method: A self-administered questionnaire survey was done among paediatric dentists in Tunisia and Morocco. The survey consisted of 4 sections of questions regarding the characteristics of the population, knowledge, practice and attitudes towards MIH. Information about the diagnosis, the etiology and the therapeutic options were collected.
Results: Sixty-two (62) participants, 41 practicing in Tunisia, 17 in Morocco and 4 outside the Maghreb replied to the questionnaire. Forty-one (66%) were between 25 and 35 years old. Only 16 (26%) didn't yet finish their specialty. Concerning knowledge, while 61 (98%) of the participants were confident making diagnosis and 59 (95%) clearly identifying severity degrees, 35 (56%) were cautious about the etiology with 22 (35%) thinking viral infection may be incriminated. About practices, 54 (87%) have touched MIH during their initial training, 26 (42%) declared having at least one case of MIH per day, 61 (98%) treat severe cases with stainless steel crown and 58 (93%) treat less severe cases with resin. Analysis of attitudes showed that 47 (76%) of the participants disagree to make genetic tests for MIH with pregnant women, 45 (72%) think that they deserve additional fees carrying for these patients and 59 (95%) agree to participate in a clinical training, even if it is proposed in english.
Conclusion: Practitioners in paediatric dentistry in Tunisia and Morocco were familiar with the diagnosis, and treatment of MIH. Most respondents were highly enthusiastic to take additional clinical training on MIH by specialist.

17. Self-reported Oral Health-related Quality of Life and Perception of Esthetic Appearance among Children with Molar-Incisor-Hypomineralization (MIH)

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Molar-Incisor-Hypomineralization (MIH) impacts the everyday life and oral health-related quality of life (OHRQoL) in children. The aim was to analyze oral health-related quality of life, long-term, among children with severe MIH. In addition, to assess the perception of the esthetic appearance of the children with affected upper incisors.
Children, 6-9 years of age, diagnosed with severe MIH of at least one first permanent molar (FPM), answered a questionnaire about OHRQoL (CPQ11-14) prior to dental treatment (either extraction or permanent filling).
At the 11-year-old follow-up, affected incisors were registered and the children, along with matched control group, answered the CPQ11-14 and questions concerning self-perception of esthetic appearance. The controls were matched by age, gender and socio-economic factor.
55 study children and 110 controls were included in the study. No difference in CPQ11-14 was seen among the children at age 6-9 years (mean (SD): 10.3 (6.5)), and age 11 (mean (SD): 9.2 (6.3)). The study children reported a higher score of CPQ11-14 (mean (SD): 9.2 (6.3)), compared to the controls (mean (SD): 5.0 (6.3)), (T-test: p0.01).
In comparison, children with opacities (n=28) on their upper incisors reported higher scores of functional limitations (mean (SD): 2.6 (2.5)), than children with MIH without opacities (mean (SD): 2.0 (2.2)), (T-test: p0.05).

They also had a lower perception of their esthetic appearance due to the color of their teeth (median (max-min): 7.0 (3-10)), compared to children with MIH without opacities on the upper incisors (median (max-min): 9.0 (5-10)), (Mann-Whitney test: p0.05).
Children with severe MIH on their FPMs estimated their OHRQoL the same at ages 6-9 and 11, however lower, compared to children without MIH. Children with MIH including opacities on the upper incisors experience more functional limitations and had a lower self-perception concerning the color of their teeth, compared to children with MIH without opacities.

18. Bisphenol-A Disturbs Biomineralization in Mussels: Potential Implications for Molar Incisor Hypomineralization

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Objectives: The etiology of molar incisor hypomineralization (MIH) is currently unclear. To date, there are few suitable model systems to investigate potential MIH-causing factors. Zebra mussels (Dreissena polymorpha) as target organisms that biologically mineralize carbonate shells during growth could serve as such a novel model.
Methods: 252 zebra mussels were randomly divided into 36 groups (n=7) for three experiments (12 groups/experiment). Six groups per experiment were incubated with 100mg/l calcein (mineralization marker) solution for 96h, another six groups with tap water (negative controls). Then zebra mussels with and without calcein pre-incubation were exposed to cadmium sulfate hydrate (3CdSO4•8H2O, as positive control; 0, 0.01, 0.1, 1, 10 and 100mg/l), possible etiological factors of MIH including bisphenol-A (BPA; 0, 0.02, 0.2, 2, 20 and 200mg/l) and erythromycin (0, 0.1, 1, 10, 100 and 1000mg/l) as mineralization "disruptors" for 96h, respectively. After two weeks, mussels were sacrificed, the shells were collected and embedded with methylmethacrylate.
Results: Exposure of zebra mussels to 20, 200 mg/l BPA and 10, 100 mg/l 3CdSO4-8H2O resulted in a mortality rate of 100%. The median lethal concentration (96 h-LC50) was 6.3 mg/l BPA (95% confidence interval (CI), 1.3-34.4 mg/l), and that of cadmium was 3.1 mg/l (95% CI, 0.7-10.5 mg/l). Calcein fluorescence in shells significantly decreased after exposure to 2 mg/l BPA and 1 mg/l 3CdSO4-8H2O (p 0.05), whereas no increased mortality and no decreased fluorescence intensity were observed after erythromycin exposures.
Conclusion: Based on these results it can be suggested that BPA may act as potential causing factor for disturbed biomineralization. The biomineralization in zebra mussels appears to be an effective model for investigating potential causative factors of MIH.

20. Impact of Molar-incisor Hypomineralization on Oral Health-related Quality of Life

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Aim: Due to little evidence, the aim of this study was to assess the impact of molar-incisor hypomineralization (MIH) on oral health-related quality of life (OHRQoL) in children and adolescents.
Material and Methods: Forty-two eligible persons aged between 7 and 17 years with MIH could be identified from patient records at the Department of Conservative Dentistry, Heidelberg University Hospital, between 2015 and 2022 and were invited to participate in a cross-sectional examination. Thirty-five patients participated (response rate 83 %) and underwent a comprehensive oral examination. The severity of MIH was graded using the MIH Treatment-Need-Index (MIH-TNI).

The assessment of OHRQoL was performed by means of the 19-item version of the Child Oral Health Impact Profile (COHIP-19). The clinical quality of the restorations was assessed according to modified FDI-criteria, tooth sensitivity was assed using the Schiff Cold Air Sensitivity Scale (SCASS).
Results: The mean age of participants was 11.3 ± 3.0 years, 34% were female. On average, 6.9 ± 2.8 teeth were affected, 62.9% had a SCASS score ≥1 and thus hypersensitive teeth. Eighty-nine percent of patients had received restorative treatment on MIH-teeth, with a mean of 3.3 ± 2.1 teeth restored, most often with composite resin. Nine percent of restorations failed by the FDI-criteria (clinical quality rating 4 or 5). The mean COHIP-19 score was 64.3 ± 8.2 (max score = 76). A higher severity of MIH-TNI correlated significantly with impaired OHRQoL (r_s= -0.38, p = 0.027).
Conclusion: Despite a high rate of restorative treatment with an acceptable failure rate, OHRQoL seems to be reduced in children with MIH. Many teeth remain sensitive, even after restoration. Further studies are needed to assess the benefits of different restorative options.

21. A Micro-invasive Approach to Treating Anterior MIH Lesions: A Case Series

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MIH lesions in the anterior region often cause aesthetic and functional impairments that severely affect the oral health related quality of life (OHRQoL) of patients.
This case series presents a micro invasive treatment strategy of MIH lesions using a modified resin infiltration treatment protocol.
After diagnostics at initial presentation, patients were interviewed about their motivation of undergoing treatment. All patients stated that the lesions in the anterior region posed an aesthetic impairment, negatively affecting their OHRQoL. In some cases, hypersensitivity was reported.
Treatment involved the initial opening of the lesion body using either multiple etching steps or micro-abrasive pre-treatment followed by a single etching step, depending on clinical variables. Between etching steps, lesions were rinsed for 30s using water spray. Consequently, sufficient opening of the lesion body and the potential masking efficiency was evaluated by applying ethanol on the lesions ("ethanol test"). In case of increased translucency or disappearing opacity, the test was considered positive and infiltration treatment was performed. In all cases, a prolonged infiltration time of at least 10min was applied. Composite restorations were directly applied on the infiltrated surfaces in case of significant loss of tooth substance. All lesions showed aesthetic improvement resulting in satisfactory outcomes and improved OHRQoL for the patients, even if complete masking was not possible. All patients suffering from hypersensitivity stated drastic reduction facilitating complete functionality.
As MIH lesions present heterogeneous characteristics, challenges still lie in the reliable prediction of outcomes. Clinical variables such as opacity, color, lesion depth and thickness of the surface layer, for instance, seem to play a role in the outcome. Nevertheless, resin infiltration showed to be able to significantly improve the aesthetic appearances to patients' satisfaction and restore functional impairments due to hypersensitivity. Hence, resin infiltration should be regarded as a possible, conservative treatment alternative for MIH cases.

22. The Prevalence of MIH Among Children in Jewish and Arab Population in Israel

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Objectives: MIH (Molar Incisor Hypomineralization) has been deined as the occurrence of hypo-mineralization of one to four permanent first molars of a systemic origin and frequently associated permanent incisors.
HSPM (Hypomineralization of Second Primary Molars) affects between one and four second primary molars. Global prevalence of MIH is 2.9-44% and of HSPM 0-21.8%.
Aim: To describe the prevalence of MIH and HSPM in Jewish and Arab children in south and north regions of Israel.
Methods: The Jewish population from Ashkelon included 2671 children aged 6-16 years old. The Arab population from Nazareth and the surrounding 7km area included 2744 children, aged 6-16 years old. The children were examined by residents in pediatric dentistry from Barzilai Medical University Center in Ashkelon. The residents were calibrated by two senior specialists in pediatric dentistry. The examinations were performed at schools, in the classrooms, using a headlamp, wooden tongue depressor and a dental mirror. The results were analyzed according to the guidelines of the EAPD 2014.
Results: 17.1% of the Jewish children and 18% of the Arab children showed teeth affected by MIH. No differences were found between girls and boys in the Jewish population. In the Arab population boys showed higher % of MIH than girls. Earlier age (6-10y) showed higher prevalence of MIH in the Jewish and the Arab population of boys. The prevalence of HSPM was 2.7% in the Jewish population and 1.9% in the Arab population, with no differences between boys and girls.
Conclusions: The prevalence of MIH in Israel is 17-18%, in the middle of the world range.
The young children showed higher prevalence of MIH than that was found in older group. It implicates that MIH prevalence is increasing in the Israeli population.

23. Agents for Remineralizing and Desensitizing Teeth Affected with Molar Incisor Hypomineralization (MIH): A Scoping Review

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Background/Aim: Molar incisor hypomineralization (MIH) is a common condition affecting children and poses many management challenges. Previous publications often reviewed MIH management as a whole, encompassing different treatment modalities including preventive, restorative, orthodontics and extractions. Effective remineralization and desensitization therapy is an area of interest as it could preclude the need for more complex treatment. With newer agents emerging, it is necessary to understand the evidence surrounding this treatment approach. This scoping review aimed to explore and map the available evidence and provide an overview of the agents used for remineralizing and desensitizing MIH-affected teeth.
Method: The review was conducted in a systematic manner based on the Joanna Brigg's Institute (JBI) 2020 guidelines. The last search was performed in February 2021. Descriptive analysis was done.
Results: Of the 1545 potentially relevant references identified through the search strategy, 56 eligible references were finally included and categorized as completed (n=53) and ongoing (n=3) research. Completed research was further subdivided into: published (n=52) and unpublished (n=1); primary (n=21) and secondary (n=32). Review articles were most frequently occurring (n=25) followed by case reports (n=11). Clinical (n=8) and laboratory studies (n=2) were few and had methodological limitations and mixed findings. Various agents (fluoride and/or calcium-based, bioactive glass, arginine, ozone, laser) were reported with different recommended usages (professionally-applied/home-use) and application methods. The agents were typically used in MIH-affected teeth with sensitivity but without post-eruptive enamel breakdown and as initial management in severe MIH.
Conclusion: Within the limitations, there is maximum related evidence to support the use of products containing casein phosphopeptide amorphous calcium phosphate (CPP-ACP) on newly erupted MIH-affected teeth with intact enamel and/or white to brown demarcated lesions. More high-quality clinical research is needed to make stronger recommendations regarding the use of both existing and newer remineralizing and desensitizing agents on MIH-affected teeth.

24. Molar-incisor Hypomineralization (MIH): Prevalence and Etiological Factors in Central Pennsylvania, USA

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Background: Molar incisor hypomineralization (MIH) is a developmental condition characterized by demarcated enamel opacities in first permanent molars and permanent incisors. A variety of risk factors are thought to be associated with MIH but etiology and prevalence in the United States is still largely unknown. The aim of this study is to establish the prevalence of etiology of molar incisor hypomineralization in a rural population served by Geisinger Medical Center in Pennsylvania, USA.
Methods: This retrospective study evaluated participants ages 6-17 years who presented Geisinger Medical Center pediatric dental department over a period of 8 years and were diagnosed with MIH. Children with at least one first permanent molar (FPM), erupted or partially erupted, were included. Electronic medical records (EHR) of 564 patients were reviewed for demographics, medical history, hospitalizations, environmental factors, genetic correlation, and pregnancy-related data.
Results: Of the 564 charts reviewed, 182 participants met the inclusion criteria. First permanent molars were the most common presentation. The median age of diagnosis was 8.4 years. Further results are still to be determined as statistical analysis is still being completed.
Conclusion: Molar incisor hypomineralization is prevalent and clinically relevant in central Pennsylvania. It is critical that clinicians identify possible risk factors for MIH and develop guidelines for diagnosis to facilitate long-term research and increase treatment knowledge.

25. The Prevalence of Molar Incisor Hypomineralization (MIH) among School Children in Monastir, Tunisia

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Background: The molar incisor hypomineralization (MIH) is defined as a qualitative defect of the enamel characterized by the progressive and simultaneous hypomineralization of the enamel structure of the first permanent molars which is of systemic origin, which may be associated frequently with incisors. Although the prevalence of MIH was reported worldwide, very little data is available from Tunisia.
Aim: To determine the prevalence of molar incisor hypomineralization among school children aged 6 to 12 years in Monastir, Tunisia.
Methods: This cross-sectional descriptive study consisted of 880 school children aged 6-12 years selected by stratified cluster sampling procedure. The European Academy of Pediatric Dentistry (EAPD) criteria and the modified index of developmental defects of enamel (mDDE) index were followed for MIH diagnosis. Chi-square test was used to analyze the categorical data. $P \leq 0.05$ was considered for statistical significance.
Results: The sample consisted of 880 school children, with a mean age of 8.75 +- 1.78. A total of 20847 teeth were examined. The prevalence of MIH was 8.6% with no gender predilection. The children age group ranging between 10-12 years old showed the highest prevalence (8.5%) among all the age group. About 65.8% of the children with MIH have lesions in both molars and incisors with demarcated opacities and atypical caries being the most frequent defect type.
Conclusion: Prevalence of MIH was 8.6% in the 6-12-year child population in Monastir, Tunisia. Although the prevalence of MIH is not very high, there is a need for a proper planned preventive and restorative program about MIH.

26. Effectiveness of Casein Phosphopeptide-Amorphous Calcium Phosphate Fluoride (CPP-ACPF) and Photobiomodulation (PMBT) in the Treatment of MIH-Related Hypersensitivity in Children

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Background: Molar Incisor Hypomineralization (MIH) is a qualitative enamel defect that, in most cases, is accompanied by dentin hypersensitivity (DH). The aim of this randomized, controlled, clinical trial is to evaluate the effectiveness of CPP-ACPF (casein phosphopeptide-amorphous calcium phosphate fluoride), photobiomodulation (PMBT) and the combination of both, in DH treatment of children with MIH. **Method:** 39 children diagnosed with MIH and DH, aged between 6 and 17, were randomly allocated to three groups. Group A received the application of CPP-ACPF mousse (MI Paste®) and sham light therapy; group B got the application of placebo mousse (Elmex Junior®) and PMBT; group C received both CPP-ACPF mousse and PMBT. Treatments were performed every 7 days for three sessions. DH was evaluated in 5 steps through a Visual Analogue Scale (VAS): before (T0) and after the first treatment (T1) and after the treatment of the 7th (T2), 14th (T3) and 28th day (T4). Data were analyzed considering separately both total patients and total teeth and were exported in an Excel file and analyzed with STATA17. **Results:** In total patients we found a significant reduction ($p(T1) =0.001$, $p(T2)=0.05$, $p(T4) =0.004$) in the mean sensitivity score over time, except at T3 ($p=0.083$). Considering total teeth, values reduced significantly over time; no significant reduction of DH was found for maxillary teeth at T1 and T3, whereas values were all significant for mandibular ones.
Conclusion: All protocols led to a reduction of DH. PMBT had a major immediate desensitizing effect than mousse, which showed a late-onset effect. The combination of CPP-ACPF and PMBT had a greater desensitizing action on teeth with MIH.

27. Prevalence Data and Etiological Factors of MIH in Hungarian Schoolchildren Presented at the Semmelweis University Budapest

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Background: The Molar-Incisor Hypomineralisation Syndrome (MIH) is a developmental defect caused by enamel matrix malformation of the permanent first molars and incisors. There has been a wide variation in MIH prevalence to be reported. It seems to differ with regions and various birth cohorts. Complications for clinicians include complexity in treatment planning and treatment implementation, poor prognosis of the restorations, difficulty in achieving pain control during treatment and behaviour management problems. Aim: This research aims to provide a picture of the prevalence of MIH in Hungary. Furthermore, the study highlights on the most probable etiological factors of the disease and according to family history. Design: Patients age groups of 7 to 12 years arriving at Semmelweis University, Department of Paediatric Dentistry and Orthodontics for general dental examination were included in the study. The criteria for acceptance were the presence of MIH of the first permanent molars and incisors. Following photo documentations and detailed anamnesis, special attention was given to proper nutrition, oral hygiene and individualized dental prevention, thus eliminating the environmental factors. Statistical analysis was made by using Fisher's exact. Results: A total of 2603 patients were examined, male/female ratio 0.82. 17 of the girls (11.9%) and 10 of the boys (8.4%) presented MIH, for a total prevalence of 10.37%. In the main etiological factors, there was no statistically significant difference ($p\leq0.05$). Conclusion: Global prevalence rates are highly variable in the literature, ranging from almost 2 up to 40%. The MIH prevalence found in this study was lower compared with other countries. Both, prevalence results and those from the analysis of the etiological factors could be due to the geographical conditions and the number of the participants. For MIH patients' early diagnosis and treatment are essentially important. Therefore, the applied treatment methods should follow the principles of minimal invasive dentistry.

28. Prefabricated Zirconia Crowns as a New Modality for Permanent Molars in Children with Molar-Incisor Hypomineralization: A Case Report

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Introduction: Molar-incisor hypomineralization is defined as a demarcated qualitative defect of the enamel affecting the first permanent molars and often the permanent incisors. The clinical features of MIH in molars are enamel lesions with a severe mineral deficit, rapid progression to post-eruptive enamel breakdown (PEB) can occur, and opacities ranging from white to yellow/brown in appearance. The etiology of MIH can be related to systemic factors and prenatal/perinatal complications.
Case report: A 10-year-old female patient attended our private clinic suffering from severe pain and sensitivity from her permanent molars especially the lower ones but refused to treat them as she was not satisfied with an old treatment of her deciduous molars with stainless steel crowns. So, parents and the patient were concerned about esthetics. After examination, it was found that 63,64 were badly decayed and sensitive, 61,62 were badly decayed and upper 11,12,21,22 were treated with composite fillings due to white and yellow opacities as the mother described. The decision was to treat her 63,64 with prefabricated zirconia permanent crowns rather than stainless steel ones. As for 61,62 composite fillings were done.
Conclusion: The introduction of prefabricated permanent zirconia crowns and adhesive systems in dentistry offers a new reconstructive alternative for severely destroyed teeth. Providing pleasing esthetics and comfortable functional restoration increases the confidence of both children and parents in dental management.

29. MIH Diagnosis and Treatment: What do Greek Dentists Know?

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Background: Molar incisor hypomineralization (MIH) still remains a contemporary topic for researchers and a challenge for clinicians, underlining the gap in the literature regarding various aspects of the condition. The aim of the study was to record knowledge and attitudes of Greek dentists regarding diagnosis and treatment of MIH and correlate findings with non-dental characteristics.
Methods: It is a cross-sectional study that involved the completion of a computer-based questionnaire by dentists, active members of the three largest Greek Dental Associations. The questionnaire consisted of 37 multiple-choice questions collecting data on diagnosis, aetiopathogenesis, and clinical management of MIH. Clinical photos were also available to help respondents decide upon answering. Chi- square was used to test correlation between responses and practitioners' demographic characteristics and statistical significance was set at p 0.05.
Results: The sample consisted of 128 general dental practitioners (GDPs) and 175 dental specialists (59 paediatric dentists (PDs), 38 orthodontists and 78 dentists of other specialties). Respondents were females (64%), aged between 41 to 50 years (33%), with a working experience of 11 years (70%) in their majority. They encountered MIH as a clinical problem mainly attributed to genetics (80%), and epigenetics (47%). Permanent molars and incisors (44%) were reported the teeth most commonly affected with yellow/brown demarcated opacities (68%) the most common clinical feature. Differential diagnosis from fluorosis and amelogenesis imperfecta was a problem mainly for GDPs. Achieving sufficient anaesthesia and hypersensitivity were the most frequently reported barriers to management. General agreement between GDPs' and specialists was found on less invasive treatment of anterior lesions. For the treatment of severely affected posterior teeth, bulk-fill restorations and onlays were preferred by non-paediatric dentists and preformed crowns for PDs.
Conclusions: There is a great need for continuing education courses to help clinicians provide high quality dental care for children with MIH

30. Preterm Birth as Risk Factor for Developmental Defects of Enamel in 7- to 9- Year Old Children

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Introduction: More than 25 percent of children born preterm (PTC) suffer from long term health restrictions due to prematurity and intensive care during the first months of life. Children with extreme low birthweight are more susceptible for diseases or disabilities caused by preterm birth. Different international studies revealed a higher prevalence of Developmental Defects of Enamel (DDE) in PTC.
Methods: This case-control study assessed DDE in both dentitions of 7- to 9-year old PTC (n=38) compared to children born full-term (FTC). PTC were divided into three birthweight groups. DDE was scored using the modified DDE-Index and extension of DDE in the tooth crown was assessed. Statistical analysis was based on mean, standard deviation and 95 % confidence interval. Differences between the groups were tested with McNemar`s test and Poisson regression. Significance level was set $p \leq 0{,}05$.
Results: Prevalence of DDE in deciduous teeth was higher in PTC that in FTC (PTC: 55.3 %, FTC: 28.9 %; p=0.008). Severity of DDE increased with decreasing birthweight (deciduous tooth surfaces with DDE in PTC with extreme low birthweight: 324 vs. in FTC: 281; p=0.001).
Conclusion: Prematurity is a risk factor for DDE in the deciduous dentition.

32. Masking MIH Opacities with Resin Infiltration: Randomized Clinical Trial

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The aim of this randomized controlled trial was to evaluate the impact of masking MIH opacities in permanent incisors on the child's and parent's aesthetic perception. Thirty-nine patients, 8-18 years old, with at least one permanent incisor with white opacity were randomly allocated to test (microabrasion + resin infiltration) or control group (placebo). The primary outcome, the perception about the teeth appearance, was assessed by the "Child`s and Parent`s Questionnaire about Teeth Appearance". The masking effect was quantitatively analyzed calculating ΔE between the opacity and a sound area of the enamel before and after treatment. Two calibrated examiners did the qualitative in clinical photographs. Wilcoxon, Chi-square, and Mann Whitney tests were used for comparisons between groups. A significant reduction in the questionnaire scores in relation to physical (p=0.01), psychological (p=0.02), and social (p=0.04) domains in parents` point of view was observed in the test group after treatment. In the social domain a significant reduction was also seen in the children`s opinion (p=0.00). Parents (p=0.01) and children (p=0.04) from test group reported significantly less concern with tooth color after treatment. Before treatment, the mean ΔE was 6.45 ± 3.53 in the test and 5.98 ± 2.57 in the control group (p=0.88). A significant difference between test and control groups was seen after 15 minutes application time. After treatment, the mean ΔE was 4.22 ± 2.96 in the test and 6.06 ± 2.52 in the control group (p=0.002). A total masking was achieved in 16 (57.1%) and 13 (46.4%) teeth of the test group, according to examiner 1 and 2, respectively. As a conclusion, the study observed a positive impact of resin infiltration on parents' and children's perception about tooth appearance. Resin infiltration was able to reduce de color difference between MIH opacities and sound enamel.

33. Possible Etiological Factors of Molar Incisor Hypomineralization in Austrian Children

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Background: The term molar incisor hypomineralization (MIH) describes an enamel defect of systemic origin affecting the first permanent molars and, frequently, permanent incisors. The second permanent molars and permanent canines can also be involved. MIH is a relatively common condition with a world prevalence ranging from 2.8% to 44%. Due to the rising prevalence worldwide, this disease has an increased clinical relevance. Despite numerous studies, the etiology is still unknown. The literature so far suggests that a possible cause of MIH could be of pre-, peri- or postnatal origin.
Aim: The aim of this study was to determine the influence of possible factors on the manifestation of MIH in evaluating the medical history of affected Viennese children using a questionnaire.
Material and Methods: Children aged 6-12 years, who presented themselves at the Department of Pediatric Dentistry of the University Dental Clinic, Medical University of Vienna, Austria and who were diagnosed with MIH during dental examination, were included in the study. The patient`s caregiver was asked to complete a two-page questionnaire about possible etiological factors of MIH. The results were compared with a control group that consisted of children without MIH, that were comparable to the test group for age and sex.
Results: 100 children (52% female; 48% male) diagnosed with MIH and 100 children in a control group were included in the study (42% female; 58% male). The optimized binary logistic regression analysis showed a significant relationship between MIH development and caesarean section delivery (OR=3; CI= [1.5-6.2]) and sixth disease (Roseola) (OR=3.5; CI= [1.5-8.0]). Children under the age of 8, with these factors present, showed a 3.3-fold increased chance of having MIH (OR=3.3; CI= [1.7-6.5]).
Conclusion: The present study shows that a cesarean section and sixth disease (Roseola) may increase the chance of developing MIH.

35. Molar Incisor Hypomineralization: A Survey on Knowledge, Clinical Experience and Management of Swiss Dental Practitioners

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Aim: The aim of this survey was to identify the level of theoretical knowledge as well as the level of competence and way of management of patients presenting with molar incisor hypomineralisation, amongst the swiss dentists in relation to their level of postgraduate training.
Materials & Methods: An anonymous online survey was sent through the swiss dental association and the swiss paediatric society to all the registered members. The questionnaire consisted of 18 questions with multiple choice answers.
Results: 349* graduate dental practitioners responded to the online survey. The majority of them had their own practice and had no further postgraduate specialist training upon graduation. Almost all participants showed knowledge of the MIH as a distinguished and well-defined dental condition (only 4 participants were not aware of the term). Graduates from year 2000 and on already reported having received the basic information on MIH within their undergraduate training. Furthermore, the ones who graduated after 2010 received additional training (seminars, postgraduate training) that they specifically and actively chose on the topic. More than half of the dental practitioners faced at least once difficulty in pain management when treating patients with MIH. There seems to be a rising awareness in relation to the MIH as dental condition. Most of the undergraduate training programmes have integrated basic information within their curriculum. However, it is important to provide as much as possible clinical exposure together with constant update on the theoretical background at both undergraduate and postgraduate level, since MIH cases may trigger a lot of costs for both families with children affected but also for the individual health systems, if there is need of repetitive dental appointments and consequently dental treatment.

36. Silver Modified Atraumatic Restorative Treatment (SMART) vs Atraumatic Restorative Treatment (ART) as Temporary Management for Hypomineralised Molars (MIH) in Children

Tengku Nurfarhana Nadirah Tengku Hamzah

Background/Aim: A less-invasive treatment using glass ionomer cements (GIC) in combination with remineralization and desensitizing agents which in line with the minimally invasive treatment approach has gained attention among clinicians when dealing with children diagnosed with Molar Incisor Hypomineralization (MIH). This study aims to evaluate and compared the effects of Silver Modified Atraumatic Restorative Treatment (SMART) with/without papain-based gel and Atraumatic Restorative Treatment (ART) for management of MIH-affected molars.

Method: This was a single centre, three-arm, parallel-group randomized controlled trial involving children, diagnosed with MIH affected molars with pain, sensitivity, post-eruptive breakdown, caries, or unsatisfactory restoration. Sixty-three MIH affected molars were included in 38 children. Using tooth as the unit, the samples were randomized (1:1:1 via blocks) across three arms: Group 1 received High Viscous Glass Ionomer Cement (HVGIC) restoration; Group 2 was treated with 38% SDF (RivaStar®) and restored with HVGIC, and Group 3 received papain-based gel, Papacarie Duo™ followed by 38% SDF application and HVGIC restoration. Hypersensitivity and clinical assessments of SMART and ART were evaluated in all groups using Schiff Cold Air Sensitivity Scale (SCASS) and ART index. The findings were further described as success, and failure.

Results: At 12 months, using intention-to-treat (ITT) analysis, Group 3 had the highest clinical success with the absence of failure (100%), followed by Group 2 (95.2%) and Group 1 (76.2%), with a statistically significant difference were found between intervention groups (p.05). Pairwise comparison showed a significant difference between Group 1 and Group 3 (p.05) and not with other pairs. The odds of success were 13 times more likely in the SDF-treated molars than non-SDF molars.

Conclusion: The application of SDF with and without papain-based gel improves the outcome of the HVGIC restoration. The use of SDF negated the association of the restoration quality with clinical success.

37. Challenges of Dental Caries Treatment in Patients with Bleeding Disorders

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Introduction: Patients with uncontrolled bleeding disorders present a challenge for dental caries treatment. Aim: To describe several bleeding control strategies when treating patients with uncontrolled bleeding disorders

Case Report: Eight children (2-11 yo) with different coagulation disorders were treated at our pediatric dentistry department. Their dental treatments included proximal composite restorations, strip crowns, Stainless steel crowns, and extractions. Several approaches to control their bleeding during treatment were used: I. Platelet transfusion II. Administration of Tranexamic acid (Hexakapron®) via intravenous transfusion or topically III. Intravenous transfusion of Recombinant activated factor VIIa (NovoSeven®) IV. Intravenous transfusion of Factor VIII V. Suturing of the extraction sites with synthetic absorbable sutures (Vicryl®) VI. Insertion of retraction cords in the gingival sulcus of the treated teeth VII. Placement of absorbable gelatin dental sponge (Gelfoam®) VIII. Application of biological fibrin glue into the socket of an extracted tooth.

Discussion: Several approaches to control bleeding during restorative treatments may be considered. Some of them can be used only in specific disorders (such as infusion of thrombocytes in patients with thrombocytopenia or infusion of NovoSeven in patients lacking coagulation factors and/or dysfunction of Thrombocytes). Other methods can be used in all of these patients (such as suturing, application of Hexakapron via IV or topically, inserting retraction cords, rubber dam, auto-matrix, wedging, and Gelfoam. Biological fibrin glue is expensive and therefore is usually used only in extreme bleeding disorders. Another approach to ease the treatment is to change the treatment sequence, i.e postpone the treatments which are associated with increased bleeding to the end of the treatment.

Conclusion: Bleeding control approaches should be used according to the systemic disorder of the patient and the type of treatment planned. One must prepare in advance to use these approaches.