

Research Article

Evaluation of the themes chosen for the dissertation of the Integrated Master's Degree of the Children's Oral Health and Prevention Service, at IUCS-CESPU

Mariana Azevedo ^{1,†} , Maria João Ferreira ^{1,†} , Juliana Cantante ^{1,†}, Ana Catarina Oliveira ^{1,2,†} , Ana Paula Lobo ^{1,2} , Primavera Sousa-Santos ^{1,2}  and Teresa Vale ^{1,2,*} 

¹ University Institute of Health Sciences (IUCS), CESPU, Rua Central de Gandra, 1317, 4585-116 Gandra, Paredes, Portugal; a28346@alunos.cespu.pt (MA); a28159@alunos.cespu.pt (MJF); a28737@alunos.cespu.pt (JC); acatarina.oliveira@cespu.pt (ACO); ana.lobo@iucs.cespu.pt (APL); primavera.santos@iucs.cespu.pt (PSS)

² UNIPRO, Oral Pathology and Rehabilitation Research Unit, University Institute of Health Sciences-CESPU (IUCS-CESPU), 4585-116 Gandra, Portugal

[†] these authors contributed equally to this work

* Correspondence: teresa.vale@iucs.cespu.pt

Abstract: The Children's Oral Health and Prevention Service at IUCS-CESPU comprises three areas – Pediatric Dentistry, Orthodontics and Preventive Dentistry –, which, in the final years of the Integrated Master's Degree in Dental Medicine, are taught within the scope of a single subject, the Pediatric Dentistry Clinic. Many of the topics covered here have stagnated due to a lack of knowledge, making it essential to recognize which areas are less popular, to captivate the interest of the students and fill these gaps. This study aimed to assess which topics in this service have more interest from dental students for their dissertations over the past eleven years. To do this, we collected all the dissertations between 2013-2023 in the Scientific Repository from the abovementioned service. Our study revealed a dominance of Orthodontics, followed by Preventive Dentistry and Psychology and Behavior Control. On the other hand, Pulpar Therapy, Diagnosis and Growth and Development are areas of little focus to students. We concluded that Orthodontics has always been the area of choice, while Preventive Dentistry, ranking second, has been in constant decline since 2015, as have Cariology and Conservative Treatments. Evaluating these choices allows us to better target teaching and meet the needs of the population.

Keywords: pediatric dentistry; trends; bibliometrics; dentistry education; undergraduate; publication

Received: 29 April 2024; Accepted: 08 July 2024; Published: 23 July 2024

Introduction

The Dental Medicine course emerged in Portugal in 1976. Until that year, it was General Medicine, in the specialty of Stomatology, that covered this area.

The independent and private teaching of Dentistry began at the University Institute of Health Sciences (IUCS-CESPU) in 1984. Initially, it was presented as a six-year degree program. However, following the implementation of the Bologna Declaration, it was restructured into a five-year Integrated Master's Degree in Dental Medicine (IMDDM) [1]. With this declaration, made official in Portugal in 2007, a more efficient and flexible education system, more competitive in the global knowledge market, has emerged in Europe [1]. At IUCS-CESPU, it lasts ten semesters, with a total of 300 ECTS.

To complete the course, the presentation of an internship report was implemented, which was later replaced, already within the scope of the IMDDM, with the writing and defense of a dissertation. In this context, one of the most frequently selected services is the Children's Oral Health and Prevention Service (SOIP). It is important to note that, as of 2019-2020, there was a limitation on the number of students who could choose each area, making it impossible for all to opt for the same service.

The SOIP is composed of the Pediatric Dentistry, Orthodontics and Preventive Dentistry areas, which, from the 4th year of training onwards, are integrated into the Pediatric Dentistry Clinic I, II and III course units.

In Dentistry, the primary focus is essentially on clinical practice and many areas stagnate due to a lack of knowledge of the existing gaps. It is therefore extremely important to recognize which areas make students more enthusiastic, and, above all, the ones that least attract them, to encourage them to invest in these fields, with the aim of filling these gaps.

According to the General Dental Council, Pediatric Dentistry is defined as “the practice, teaching and research of comprehensive therapeutic oral health care for children from birth to adolescence, including care for those who demonstrate intellectual, medical, physical, psychological and/or emotional problems” [2]. Pediatric Dentistry is a vast specialty that works in many different areas and serves a wider audience than common sense tends to consider. It is crucial that students show an interest in this area, given that any changes occurring at these ages will have repercussions on the permanent dentition and the individual’s general and systemic health [3,4]. In 2019, a study was carried out by Perazzo *et al.*, which showed that the most cited article in the field of Pediatric Dentistry dealt with dental fear and anxiety. However, among the 100 most cited articles, caries were the subject of 30 [3].

Preventive Dentistry focuses on minimizing the development of dental caries lesions and reducing the need for more invasive treatments. Poor oral health can harm individuals with systemic diseases, such as diabetes mellitus and cardiovascular disease [5]. This is a key area in a country where, according to the Oral Health Barometer published by the Portuguese Dental Association (OMD) in 2022, more than 65% of children under the age of 6 have never had a dental consultation [6]. However, in 2023, the Oral Health Barometer revealed a growing concern about oral health among younger people [7].

Orthodontics is the area of treatment and prevention of occlusal alterations. This area includes interceptive orthodontics, which aims to prevent abnormalities in dental development and craniofacial growth and to interrupt parafunctional habits.

Thus, the aim of this study was to evaluate the most frequently defended topics, which helps to identify the subjects that students are most inclined to choose for their dissertation work in the SOIP service at IUCS-CESPU.

It is imperative to acknowledge that the selection of a dissertation topic and field is exclusively guided by the interests of the students. Following the submission of a project delineating the topic chosen, the faculty assigns the student to a professor who is specialized in that area, thus being able to offer guidance. Subsequently, the student may proceed with the chosen topic, or the professor may suggest alternative topics, better suited to the student’s interests, or continue research already initiated in previous years, or even switch areas if there are no more vacancies in the initially chosen area. The rationale behind student choices can only be validated through student surveys.

Materials and Methods

Data collection

This research work is a documentary analysis, focused on a study to assess the interest of the IMDDM students in carrying out their dissertation work on the SOIP themes. In this way, all the dissertations carried out over the last eleven years were collected. Subsequently, the topics more frequently chosen by the students were assessed, to understand which ones attract more interest and whether there has been an increase or decrease in the choice of each topic over time.

Sample selection and characterization

The sample selected consisted of 505 dissertations, which corresponds to all the dissertations defended at the SOIP between 2013 and 2023. It was collected from the IUCS-CESPU Scientific Repository, in the IMDDM sector, as well as using tables provided by the course director’s office. The inclusion and exclusion criteria of the sample are indicated in Table 1.

Table 1. Inclusion and exclusion criteria.

Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none"> • Dissertation work between 2013-2023 • Dissertation work at the Children’s Oral Health and Prevention Service • Dissertation work at IUCS-CESPU 	<ul style="list-style-type: none"> • Dissertations outside the 2013-2023 timeframe • Dissertations that do not belong to the Children’s Oral Health and Prevention Service • Dissertations that do not belong to IUCS-CESPU

Data structuring

Data analysis began with a breakdown of the various dissertations into six Major Classes of SOIP themes, referred to as Craniofacial Development and Orthodontics, Conservative Treatments, Oral Medicine, Psychology and Prevention, Oral Rehabilitation and Others.

Subsequently, these Major Classes were singularized into 21 more specific Subclasses, namely: Orthodontics, Dental Alterations and Developmental Anomalies, Systemic Diseases and Specific Needs, Maternal and Child Health, Growth and Development, Dental Materials, Cariology and Conservative Treatments, Pulpar Therapy, Dental Trauma, Oral Surgery, Periodontology, Drug Therapy, Diagnosis, Nutrition and Eating Disorders, Infectious Diseases and Oral Microbiology, Psychology and Behavior Control, Preventive Dentistry, Oral Rehabilitation, Occlusion and Temporomandibular Disorders (TMD), Sports Dentistry and Others.

These Subclasses were grouped into the abovementioned Major Classes, as shown in Table 2.

Table 2. Major Class structuring.

Craniofacial Development and Orthodontics
<ul style="list-style-type: none"> • Orthodontics • Dental Alterations and Developmental Anomalies • Systemic Diseases and Specific Needs • Maternal and Child Health • Growth and Development
Conservative Treatments
<ul style="list-style-type: none"> • Dental Materials • Cariology and Conservative Treatments • Pulpar Therapy
Oral Medicine
<ul style="list-style-type: none"> • Dental Trauma • Oral Surgery • Periodontology • Drug Therapy • Diagnosis • Nutrition and Eating Disorders • Infectious Diseases and Oral Microbiology
Psychology and Prevention
<ul style="list-style-type: none"> • Psychology and Behavior Control • Preventive Dentistry
Oral Rehabilitation
<ul style="list-style-type: none"> • Oral Rehabilitation • Occlusion and Temporomandibular Disorders (TMD)
Others
<ul style="list-style-type: none"> • Sports Dentistry • Others

Statistical analysis

The data were analyzed using SPSS Statistics for Windows, version 29.0 (IBM®; Armonk, New York, USA).

In the descriptive analysis, the absolute frequency (n) of the Major Classes and the absolute (n) and relative frequencies (%) of the indicated variables, i.e., the Subclasses, were calculated for the entire eleven-year period, as well as for each year.

To determine whether the differences observed between the frequencies of each Major Classes of data were statistically significant, the Chi-square test was employed ($p < 0.05$).

Results

Between 2013 and 2023, the most frequently selected topic for dissertations was Orthodontics, chosen by 143 students, out of a total of 505 (28.3%). This was followed by Preventive Dentistry ($n = 47$, 9.3%) and Psychology and Behavior Control ($n = 39$, 7.7%). Some topics were less frequently represented, namely Pulpal Therapy ($n = 4$, 0.8%), Diagnosis ($n = 3$, 0.6%) and Growth and Development ($n = 3$, 0.6%). Table 3 presents the topics along with their absolute (n) and relative (%) frequencies, while Fig. 1 shows the distribution of absolute frequencies.

Table 3. Absolute Frequency of Subclasses.

Subclasses	n	%*
Orthodontics	143	28.32
Preventive Dentistry	47	9.31
Psychology and Behavior Control	39	7.72
Dental Changes and Developmental Anomalies	36	7.13
Systemic Diseases and Specific Needs	32	6.34
Maternal and Child Health	30	5.94
Cariology and Conservative Treatments	20	3.96
Dental Trauma	18	3.56
Dental Materials	17	3.37
Occlusion and TMD	16	3.17
Periodontology	16	3.17
Drug Therapy	15	2.97
Oral Surgery	15	2.97
Nutrition and Eating Disorders	14	2.77
Infectious Diseases and Oral Microbiology	10	1.98
Oral Rehabilitation	9	1.78
Others	9	1.78
Sports Dentistry	9	1.78
Pulpal Therapy	4	0.79
Diagnosis	3	0.59
Growth and Development	3	0.59
Total	505	100.00

*The value is rounded to two decimal places

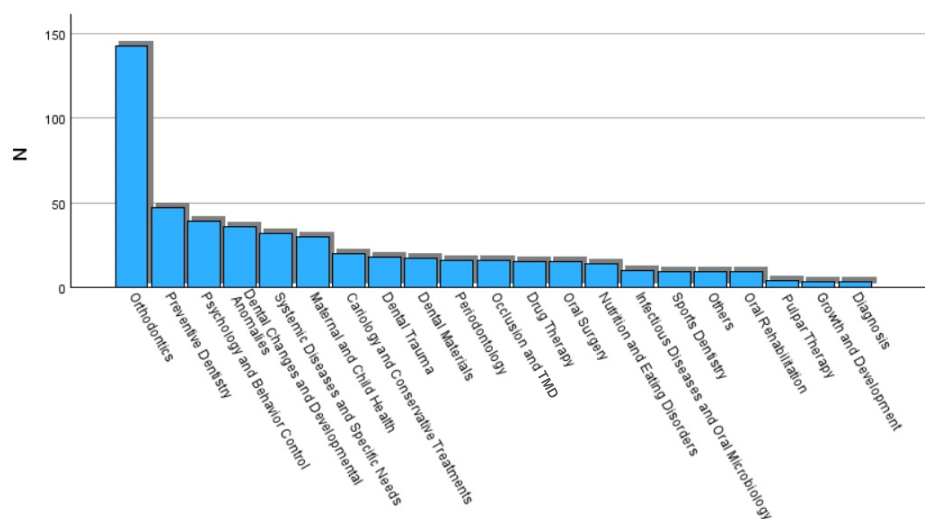


Figure 1. Absolute Frequency Distribution of Subclasses.

Analysis by years

Table 4 provides a detailed analysis of the topics chosen by students for their dissertations from 2013 to 2023. The results are presented in terms of the absolute frequency of choices (n) and their relative frequency for each year (%).

Orthodontics emerged as the most chosen topic from 2015 to 2023, with its representation increasing from 17.0% in 2015 to 35.7% in 2023, peaking at 43.4% in 2022. In contrast, Preventive Dentistry, which was the most chosen topic in 2013 (27.8%) and 2014 (16.3%), experienced a decline in representation over subsequent years, ranging between 2.1% and 11.4%. Although a decrease in the number of dissertations associated with Preventive Dentistry is noted, its significance is not quantified in terms of percentages. However, statistical analysis using the Spearman's rank correlation coefficient reveals a highly probable decreasing trend for Preventive Dentistry over time, with a coefficient of -0.86 and a significance level of $p < 0.001$. Similarly, a significant increasing trend is observed for Orthodontics, with a Spearman's rank coefficient of 0.82 and a significance level of $p < 0.001$. These trends provide insights into the evolving preferences in dissertation topics within the field of dentistry. Additionally, it is noted that no other subclasses exhibit Spearman's rank coefficients exceeding 0.8 in absolute value, and no time trends are identified when the data is grouped into broader classes.

The topic of Psychology and Behavior Control maintained a consistent presence over the years, fluctuating between 2.5% and 14.6% (in 2019 and 2021, respectively). Another topic that showed persistent interest was the Systemic Diseases and Specific Needs, with an annual frequency varying between 1.9% (year 2020) and 12.5% (year 2021).

The remaining themes were less consistent and less frequently chosen over the years, with the Pulpar Therapy theme being selected in 2016 (8.6%) and 2021 (2.1%) only.

Table 4. Absolute and Relative Frequency of Subclasses by year.

Subclasses		Year										
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Dental Materials	n	0	1	1	1	0	0	2	5	2	5	0
	%	0.0%	2.3%	1.9%	2.9%	0.0%	0.0%	5.0%	9.4%	4.2%	6.6%	0.0%
Orthodontics	n	4	3	9	6	14	16	12	17	14	33	15
	%	11.1%	7.0%	17.0%	17.1%	41.2%	35.6%	30.0%	32.1%	29.2%	43.4%	35.7%
Maternal and Child Health	n	4	6	6	2	2	2	0	1	0	5	2
	%	11.1%	14.0%	11.3%	5.7%	5.9%	4.4%	0.0%	1.9%	0.0%	6.6%	4.8%
Psychology and Behavior Control	n	1	6	3	2	4	3	1	3	7	5	4
	%	2.8%	14.0%	5.7%	5.7%	11.8%	6.7%	2.5%	5.7%	14.6%	6.6%	9.5%
Systemic Diseases and Specific Needs	n	3	3	4	1	1	4	3	1	6	4	2
	%	8.3%	7.0%	7.5%	2.9%	2.9%	8.9%	7.5%	1.9%	12.5%	5.3%	4.8%
Occlusion and TMD	n	0	1	1	2	1	0	3	2	1	2	3
	%	0.0%	2.3%	1.9%	5.7%	2.9%	0.0%	7.5%	3.8%	2.1%	2.6%	7.1%
Drug Therapy	n	0	0	2	3	0	2	0	4	3	0	1
	%	0.0%	0.0%	3.8%	8.6%	0.0%	4.4%	0.0%	7.5%	6.3%	0.0%	2.4%
Preventive Dentistry	n	10	7	6	4	3	4	3	4	1	3	2
	%	27.8%	16.3%	11.3%	11.4%	8.8%	8.9%	7.5%	7.5%	2.1%	3.9%	4.8%
Periodontology	n	1	0	2	1	0	1	1	4	1	2	3
	%	2.8%	0.0%	3.8%	2.9%	0.0%	2.2%	2.5%	7.5%	2.1%	2.6%	7.1%
Oral Surgery	n	1	1	4	1	0	2	0	2	1	1	2
	%	2.8%	2.3%	7.5%	2.9%	0.0%	4.4%	0.0%	3.8%	2.1%	1.3%	4.8%
Diagnosis	n	0	1	1	0	0	0	1	0	0	0	0
	%	0.0%	2.3%	1.9%	0.0%	0.0%	0.0%	2.5%	0.0%	0.0%	0.0%	0.0%
Dental Trauma	n	1	2	2	2	3	2	1	2	0	2	1
	%	2.8%	4.7%	3.8%	5.7%	8.8%	4.4%	2.5%	3.8%	0.0%	2.6%	2.4%

Dental Changes and Developmental Anomalies	<i>n</i>	3	5	5	2	3	1	5	2	4	5	1
	%	8.3%	11.6%	9.4%	5.7%	8.8%	2.2%	12.5%	3.8%	8.3%	6.6%	2.4%
Nutrition and Eating Disorders	<i>n</i>	1	2	1	1	0	3	2	0	2	2	0
	%	2.8%	4.7%	1.9%	2.9%	0.0%	6.7%	5.0%	0.0%	4.2%	2.6%	0.0%
Infectious Diseases	<i>n</i>	0	0	2	0	0	0	0	0	2	3	3
	%	0.0%	0.0%	3.8%	0.0%	0.0%	0.0%	0.0%	0.0%	4.2%	3.9%	7.1%
Oral Rehabilitation	<i>n</i>	0	3	1	0	1	0	1	2	1	0	0
	%	0.0%	7.0%	1.9%	0.0%	2.9%	0.0%	2.5%	3.8%	2.1%	0.0%	0.0%
Cariology and Conservative Treatments	<i>n</i>	7	2	3	3	0	2	0	1	1	0	1
	%	19.4%	4.7%	5.7%	8.6%	0.0%	4.4%	0.0%	1.9%	2.1%	0.0%	2.4%
Pulp Therapy	<i>n</i>	0	0	0	3	0	0	0	0	1	0	0
	%	0.0%	0.0%	0.0%	8.6%	0.0%	0.0%	0.0%	0.0%	2.1%	0.0%	0.0%
Others	<i>n</i>	0	0	0	0	0	2	1	2	0	2	2
	%	0.0%	0.0%	0.0%	0.0%	0.0%	4.4%	2.5%	3.8%	0.0%	2.6%	4.8%
Growth and Development	<i>n</i>	0	0	0	0	1	0	1	0	1	0	0
	%	0.0%	0.0%	0.0%	0.0%	2.9%	0.0%	2.5%	0.0%	2.1%	0.0%	0.0%
Sports Dentistry	<i>n</i>	0	0	0	1	1	1	3	1	0	2	0
	%	0.0%	0.0%	0.0%	2.9%	2.9%	2.2%	7.5%	1.9%	0.0%	2.6%	0.0%
Total	<i>n</i>	36	43	53	35	34	45	40	53	48	76	42
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Major Classes

We started by defining the six Major Classes and then divided these into Subclasses, as presented in Table 3. To assess the statistical significance of differences in observed frequencies among the various Major Classes, we employed the Chi-square test. The results obtained provide evidence of significant differences ($\chi^2(5) = 419.867, p < 0.001$).

This test was conducted to ascertain whether the distribution among classes follows a uniform distribution, specifically, whether the observed proportions for the specified classes are equal (Null Hypothesis H_0 : 'The observed proportions are equal'). The alternate hypothesis for this test is H_1 : 'At least one proportion is not equal'. The test results overwhelmingly rejected the null hypothesis, indicating that at least one proportion is unequal, with particular emphasis on Craniofacial Development and Orthodontics. Table 5 shows the predominance of Craniofacial Development and Orthodontics ($n = 244$), followed by Oral Medicine ($n = 91$) and Psychology and Prevention ($n = 86$). Craniofacial Development and Orthodontics stood out as a key area for almost half of the sample, with 48.3%. This was followed by Oral Medicine (with 18.0%) and Psychology and Prevention (with 17.0%). In significantly lower percentages, we find the Major Classes of Conservative Treatments (with 8.1%), Oral Rehabilitation (with 5.0%) and, lastly, Others (with 3.6%).

Table 5. Absolute Frequency of Major Classes.

Major Classes	<i>n</i> noted	<i>n</i> expected	Residual
Craniofacial Development and Orthodontics	244	84,2	159,8
Conservative Treatments	41	84,2	-43,2
Oral Medicine	91	84,2	6,8
Psychology and Prevention	86	84,2	1,8
Oral Rehabilitation	25	84,2	-59,2
Others	18	84,2	-66,2
Total	505		

Fig. 2 shows the absolute frequencies (n) for each major class, over the years.

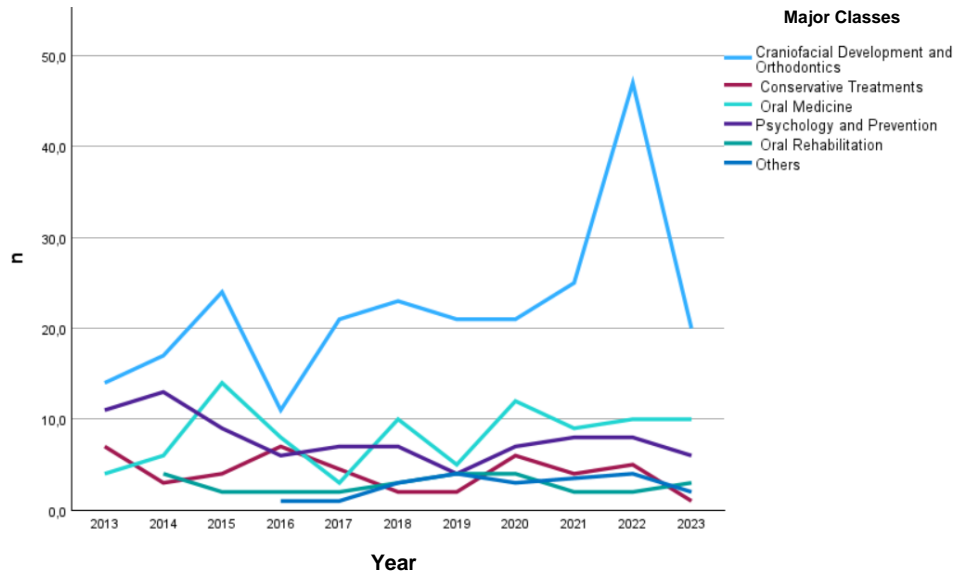


Figure 2. Absolute Frequency of Major Classes.

Fig. 3 illustrates the relative frequencies concerning the total number of dissertations in the field of SOIP within each given year. It is evident that the Major Classes of Craniofacial Development and Orthodontics consistently comprised 30-60% of all SOIP dissertations per year. Similarly, Psychology and Prevention exhibited substantial percentages, ranging from 10 to 30%. Notably, Oral Medicine achieved a peak of 26% in 2015, while Conservative Treatments fluctuated between 2 and 20%. Conversely, Others and Oral Rehabilitation maintained consistently low percentages, ranging between 0 and 10%.

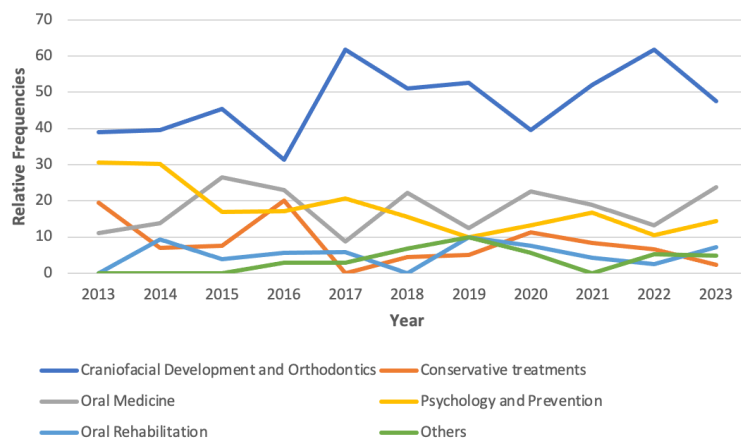


Figure 3. Relative Frequency of Major Classes.

Fig. 4 shows the relative frequency of dissertations carried out at the SOIP, compared to the total number of dissertations presented within the scope of the IMDDM.

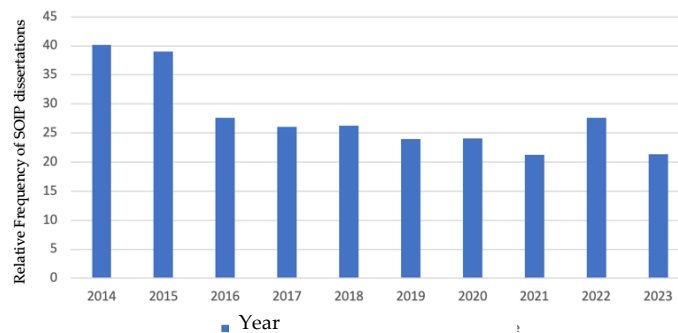


Figure 4. Relative Frequency of SOIP dissertations.

It can be seen that, over these eleven years, the percentage has been around 20-30%, with the highest figure being reached in 2014, with 40.2%. We were unable to calculate the value for 2013 due to a lack of data.

Discussion

The SOIP service at IUCS-CESPU consists of three areas: Pediatric Dentistry, Preventive Dentistry and Orthodontics. These areas are initially studied in a pre-clinical phase, where the theoretical foundations and basic skills are introduced, and progress to the clinical phase, when an interconnection between them occurs. This structure allows students to apply their knowledge comprehensively in a single subject, the Pediatric Dentistry Clinic, providing a more complex and broader approach to this field.

Over the last eleven years, students have consistently chosen this service to carry out their dissertation work, averaging around 46 dissertations per year, which corresponds to around 20-30% of the yearly total number of IMDDM dissertations (Fig. 4).

The methodology of this study involved collecting all the dissertations conducted over the last eleven years at the SOIP to determine the topics most frequently chosen by students of the IMDDM for their final work. Understanding these preferences and actively monitoring them brings certain benefits to the institution and beyond.

First and foremost, it allows for better-targeted teaching, leading to an improved learning process [8]. Identifying the most popular areas can help institutions adapt their curricula to meet students' needs, shortcomings, and interests. Recognizing less popular areas enables institutions to encourage alternative teaching tools and methodologies. In this way, professors play a crucial role in bridging the gap between knowledge and students, inspiring them to look for answers and to generate interest in these less-chosen areas. As Vochikovski *et al.* point out, it is their responsibility to train professionals with the necessary knowledge to handle all the realities they will encounter [9].

Additionally, understanding these trends meets the needs of the population, by finding solutions to the requirements of the pediatric dentistry population [10]. As an example, in an article published in 2016, Khokhar *et al.* argued that "the oral health of children with special health needs has been one of the gray areas in the field of pediatric dentistry". They also reported a higher prevalence of dental caries, poor oral hygiene, and more compromised gingival and periodontal health [2]. In the present study, it can be seen that this area ranks fifth among the twenty-one subclasses analyzed, showing significant student interest in finding solutions and developing skills to provide necessary and effective oral health care for pediatric dental patients [3]. This finding is consistent with that of Atkin *et al.*, who reported an increase in the prevalence of congenital and chronic diseases in children, requiring a deeper understanding from future dentists [2].

This study also highlights the potential professional development of these students. The higher ranking of Orthodontics over other subjects indicates a significant demand from future dentists for more in-depth knowledge in this area, suggesting a future large workforce in Orthodontics. Conversely, topics such as Pulpar Therapy, Diagnosis, and Growth and Development, which were less relevant in our study, may require these professionals to invest in more specialized training and courses in the future. In 2021, Atkin *et al.* supported this idea, noting that dentists specializing in Pediatric Dentistry recognized the need for additional specialized training, beyond their initial education [2].

By analyzing descriptive statistics, our study reveals that the Orthodontics subclass, which includes interceptive orthodontics, is a leading choice, consistent with the finding of García *et al.*, concerning increased interest in orthodontic treatment by pediatric dentists in 2022. Gradually, there is a successful collaboration between both areas, which is fundamental for a less complex and less invasive treatment, especially in the deciduous and mixed dentition phase [11]. This higher proportion of dissertations can be explained by various factors, such as a strong interest on the part of the students themselves or by the encouragement of professors in projects and research in the area, which can only be confirmed through a questionnaire.

In 2021, the Dental Press Journal of Orthodontics reported an increase in the publication of orthodontic articles over the previous ten years, driven by innovations in procedures and clinical applications. Interestingly, 80% of these studies were produced by academic institutions [12]. Factors such as intellectual stimulation, the constant challenge offered by the field, and the flexibility of the workload may justify the widespread interest in studying and seeking a professional career in this area.

However, a controversy arises when this subject has little educational exposure and a shortage of patients for practice at IUCS-CESPU, during the integrated Master's stage, yet it manages to occupy the first place. This result contrasts with the statement, by Wendling *et al.*, that positive educational experiences with orthodontics generate student interest [13]. This stance might be justified if students seek additional knowledge and tools to address existing gaps in this area. However, clarification on this matter could only be achieved by directly questioning the respective students about their reasons for choosing this topic. This situation mirrors the 42.3% of dental students who, in 2019, the American Dental Education Association counted as not being confident enough to deal with malocclusion and lack of space cases, due to the inadequate practical application of fundamental orthodontic principles [13]. The study of Orthodontics is rigorous and challenging, requiring the integration of various concepts and knowledge, as discussed by Kumar *et al.* [14].

Nevertheless, malocclusion, which is one of the main triggers for orthodontic treatment, has not been a major choice among our students since, in the last eleven years, only 3.2% of them have addressed this specific topic. It is important to note that this low selection may be the result of biases originating from the dissertation selection process, referred to in the Introduction. In 2020, Lombardo *et al.* observed that, between 2009 and 2019, there was a 72% prevalence of malocclusion in both jaws [15]. After observing prevalence values such as these, with little adherence from students – which is in line with an article by García *et al.*, stating that only 2.7% of the publications in pediatric dentistry journals refer to occlusion and the temporomandibular joint (TMJ) –, it is crucial and urgent to awaken the interest of these students so that there is earlier diagnosis, prognosis, and treatment [11]. Not only because of the impairment of oral functions such as chewing, speech, and swallowing, but also because of the aesthetic aspect, which harms the child's social life [15].

It is essential to highlight the second place occupied by Preventive Dentistry, with approximately 9% of the students' choice. However, it is important to note that the number of dissertations making up this percentage is significantly higher in the years 2013 to 2016, with a downward trend in subsequent years. This field is essential for avoiding dental problems and has gained importance in developed countries [16]. In a global society where caries are one of the most common non-communicable diseases and the most prevalent among oral diseases in childhood, current dental students must know how to prevent and warn both children and their parents [17]. The World Health Organization strongly advocates for prioritizing preventive over restorative dentistry [16], enabling greater conservation of the tooth structure and reducing the likelihood of suffering erosion and dental caries lesions [11].

This warning should not just start with pediatric dentistry, but with pediatrics. An articulation between these specialties is important, since controlling pathologies of the oral cavity helps to prevent systemic pathologies and vice-versa [16,17], which is in line with the definition of holistic dentistry that understands the oral cavity as an integral part of a whole, and not as an isolated system [3]. The preference for prevention among students at IUCS-CESPU may mirror a heightened demand for confidence in preventive treatments. This inclination could be further explored through surveys, aiming to align with the confidence levels exhibited by students in the United States regarding such treatments [4].

It is important to emphasize the third position in the rank – Psychology and Behavior Control. Behavioral control techniques aim to reduce the fear and anxiety that anticipates a dental appointment, promoting a change in the attitude of children and parents, especially when it comes to restorative and invasive procedures, such as tooth extractions and pulp therapies. Concern for this area is beneficial in a society where, according to Kohli *et al.*, 30-40% of children refuse to go to the dentist for fear of pain [18]. This increases the incidence of dental pathology and reduces the overall quality of oral health. As is to be expected, the psychology taught should be applied considering the cultural, legal, and philosophical requirements of the country in question [19]. Furthermore, a lack of confidence in controlling children's behavior results in a stressful environment for the students, affecting their clinical practice [4].

Significantly, themes such as Pulp Therapy, Diagnosis, and Growth and Development accounted for only 0.6 to 0.8% of dissertations over the last eleven years. These areas often correspond to lower confidence during consultations, as corroborated by Janesarvatan *et al.*, who found that 80% of students did not feel adequately prepared to handle diagnosis during clinical practice [20].

However, it is essential not to underestimate topics such as Pulp Therapy, crucial for preserving deciduous teeth affected by caries or trauma, in line with modern pediatric dentistry. Encouraging the study of this area can lead to therapeutic advances and more effective protocols for child dental treatment and care. Considering the results of this study, Orthodontics has not always been the most popular topic, but over the last eleven years, it has increased substantially. In contrast, interest in Preventive Dentistry has declined progressively after topping the table in 2013 and 2014. It is also interesting and predictable to note that the subject of Infectious Diseases and Oral Microbiology has increased during the pandemic and post-pandemic times of COVID-19, namely 2021, 2022 and 2023.

The relevance of this study is reflected more in educational and institutional terms. Undoubtedly, diligent observation of student preferences plays a crucial role in raising the quality of teaching, the effectiveness of clinical practice and the continuous progress of the Pediatric Dentistry Clinic as a whole, favoring the creation of a more enriching and stimulating educational environment.

Restricting the research to the last eleven years limits the full understanding of the study, as it does not allow us to assess whether the results observed are a recent trend or whether this has always been the case since the Bologna Treaty. In addition, only the dissertations of IUCS-CESPU students were evaluated, which does not allow us to see whether these results converge with or diverge from the interest of dental students at other faculties nationwide.

The results of the study allow us to conclude that areas such as Pulp Therapy, Diagnostics and Growth and Development were rarely chosen by students. There has been a growing take-up of subjects, such as Periodontology, Oral Infection and Microbiology, Systemic Diseases and Specific Needs, as well as Dental Materials; on the other hand, there has been a sharp drop in the take-up of some subjects – Preventive Dentistry and Cariology and Conservative Treatments.

The other subjects not mentioned maintained a constant number of dissertations over the last eleven years. The prospect of guiding teaching and learning processes, leveraging the insights gleaned from comparing

trends and needs with the observed frequencies, aims to enhance the training of professionals. This, in turn, enables them to be better equipped to meet the evolving needs of society in the field.

Acknowledgments

This work was not funded.

Author Contributions

MA planned the overall design and conception of the work, acquired, analyzed, and interpreted the data, and drafted the present manuscript. MJF, JC, ACO, APL and PSS revised the manuscript. TV conceived and designed the work, drafted, and substantially revised the manuscript. All authors read and approved the final manuscript.

Conflicts of interest

The authors declare no competing interests.

References

1. Zunic, L.; Donev, D. Bologna Model of Medical Education-Utopia or Reality. *Mater Sociomed* **2016**, *28*, 316-319, doi:10.5455/msm.2016.28.316-319.
2. Atkin, P.A.; Simms, M.L.; Reeve-Brook, L.J.; Ezzeldin, M. Paediatric dentistry trainee views on training relating to the medically compromised child and oral medicine elements of specialty training curricula. *Eur J Dent Educ* **2023**, *27*, 594-600, doi:10.1111/eje.12845.
3. Perazzo, M.F.; Otoni, A.L.C.; Costa, M.S.; Granville-Granville, A.F.; Paiva, S.M.; Martins-Junior, P.A. The top 100 most-cited papers in Paediatric Dentistry journals: A bibliometric analysis. *Int J Paediatr Dent* **2019**, *29*, 692-711, doi:10.1111/ipd.12563.
4. Kaur, H.; Mohanasundaram, D.; Hossain, N.; Calache, H.; Zafar, S. Understanding the building blocks of the paediatric dentistry curriculum for undergraduate students in an Australian University. *Eur Arch Paediatr Dent* **2022**, *23*, 317-324, doi:10.1007/s40368-021-00688-1.
5. Pourat, N.; Choi, M.K.; Chen, X. Evidence of effectiveness of preventive dental care in reducing dental treatment use and related expenditures. *J Public Health Dent* **2018**, *78*, 203-213, doi:10.1111/jphd.12262.
6. Ordem dos Médicos Dentistas. *Barómetro da Saúde Oral - 7ª Edição*; Porto, Portugal, 2022.
7. Ordem dos Médicos Dentistas. *Barómetro da Saúde Oral - 8ª Edição*; Porto, Portugal, 2023.
8. Ersin, A. The Preferences of Dentistry Students in Different Academic Period on Learning Conditions. *ADO Klinik Bilimler Dergisi* **2022**, *12*, 39-47, doi:10.54617/adoklinikbilimler.1097848.
9. Vochikovski, L.; Burey, A.; Maran, B.M.; Matos, T.d.P.; Able, F.B.; Wambier, D.S.; Stadler, R.d.C. Didática no ensino superior: desafios e perspectivas dos docentes de Odontologia da Universidade Estadual de Ponta Grossa. *Revista da ABENO* **2018**, *18*, 12-23, doi:10.30979/rev.abeno.v18i3.471.
10. Daryakenari, G.; Batooli, Z. A bibliometric and subject analysis of 3300 most-cited articles in dentistry. *Clin Exp Dent Res* **2022**, *8*, 1302-1310, doi:10.1002/cre2.633.
11. Garcia, E.; Paredes, V.; Bellot, C.; Garcia, V.; Aura, J.I.; Borrell, C.; Dioguardi, M.; Garcovich, D.; Aiuto, R.; Marques, L. Bibliometric analysis in paediatric dental journals listed in journal citation reports. Current trends. *Eur J Paediatr Dent* **2022**, *23*, 262-268, doi:10.23804/ejpd.2022.23.04.02.
12. Almotairy, N. International trends of orthodontic publications: A bibliometric observational study of the last decade (2011-2020). *Dental Press J Orthod* **2023**, *28*, e2321175, doi:10.1590/2177-6709.28.1.e2321175.oar.
13. Wendling, N.; Kim-Berman, H.; Inglehart, M.R. Dental students' interest in orthodontic careers: do orthodontic-related experiences and faculty and practitioner role models matter? *Angle Orthod* **2022**, *92*, 787-795, doi:10.2319/030822-206.1.
14. Kumar, T.; Tomer, G.; Singh, V.; Prasad, P.N.; Rawat, A.; Joshi, S. Evaluation of Challenges Encountered by Dental Students in The Study of Orthodontics. *J Adv Zool* **2023**, *44*, 1355-1361, doi:10.17762/jaz.v44iS-5.1268.

15. Lombardo, G.; Vena, F.; Negri, P.; Pagano, S.; Barilotti, C.; Paglia, L.; Colombo, S.; Orso, M.; Cianetti, S. Worldwide prevalence of malocclusion in the different stages of dentition: A systematic review and meta-analysis. *Eur J Paediatr Dent* **2020**, *21*, 115-122, doi:10.23804/ejpd.2020.21.02.05.
16. Bashir, T.F.; Khalid, S.; Lal, A.; Saleem, M.K.M.; Sheikh, R.; Ahmed, N. Knowledge, Attitude and Practices Regarding Preventive Dentistry among Dental Undergraduate Students. *EC Dent Sci* **2021**, *20*, 03-11.
17. Cagetti, M.G.; Balian, A.; Cirio, S.; Camoni, N.; Salerno, C.; Tartaglia, G.M. Is Pediatric Dentistry a Topic of Interest for Pediatric Journals? A Scoping Review. *Children (Basel)* **2021**, *8*, doi:10.3390/children8090720.
18. Kohli, N.; Hugar, S.M.; Soneta, S.P.; Saxena, N.; Kadam, K.S.; Gokhale, N. Psychological behavior management techniques to alleviate dental fear and anxiety in 4-14-year-old children in pediatric dentistry: A systematic review and meta-analysis. *Dent Res J (Isfahan)* **2022**, *19*, 47.
19. Preda, D.-M.; Dragnea, A.; Dănilă, D.I.; Muntean, A.; Ștefănescu, C.O.; Buică, A.M. Child behavior management technology in pediatric dentistry. Review of non-pharmacological techniques. *Psihiatru.ro* **2022**, *69*, doi:10.26416/Psih.69.2.2022.6632.
20. Janesarvatan, F.; Hassanabadi, H.; Mokhtari, S.; Van Rosmalen, P. Critical aspects of educating clinical management and clinical reasoning in primary teeth pulpotomy: A qualitative study based on the perspectives of experts and novices. *Eur J Dent Educ* **2022**, *26*, 354-360, doi:10.1111/eje.12710.



In *Scientific Letters*, articles are published under a CC-BY license (Creative Commons Attribution 4.0 International License at <https://creativecommons.org/licenses/by/4.0/>), the most open license available. The users can share (copy and redistribute the material in any medium or format) and adapt (remix, transform, and build upon the material for any purpose, even commercially), as long as they give appropriate credit, provide a link to the license, and indicate if changes were made (read the full text of the license terms and conditions of use at <https://creativecommons.org/licenses/by/4.0/legalcode>).