

How much does it cost to study dentistry at a public university in the South of Brazil?

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Abstract Dentistry education requires significant financial investments due to the need to purchase various mandatory instruments for laboratory and clinical activities. This study aimed to estimate the financial investment students, and their families require to study dentistry at the Federal University of Rio Grande do Sul (UFRGS). This documentary research used the lists of instruments available at the School of Dentistry's UFRGS website, in force during the first 2023 academic semester. The lists contain the names and quantities of instruments requested in the disciplines per semester in the daytime and evening dentistry courses. In addition to instruments, general materials, stationery, and personal protective equipment are listed separately. The total amount invested in materials throughout the dentistry course, from the first to the last semester, was approximately 21.1 national minimum wages. The discipline with the highest investment was pre-clinical, with almost a third of the value. Dentistry continues to be an expensive and elitist course. Students and their families need to be financially prepared to buy the instruments on the lists when required. Other alternatives need to be considered to alleviate dentistry education costs at UFRGS and enable all students to complete their education, reducing dropout and delays in completing the course. In addition, adjustments related to the world of work are also necessary since today's graduates mostly don't use these personal instruments after training because they work in places that are already equipped.

Descriptors: Education, Dental. Student Dropouts. Public Policy. Teaching Materials. Equity.

¿Cuál es el costo de graduarse en Odontología en una universidad pública del sur de Brasil?

Resumen La formación en Odontología requiere una gran inversión financiera debido a la necesidad de adquirir diversos instrumentos obligatorios para realizar actividades de laboratorio y clínicas. Este estudio busca estimar la inversión financiera que los estudiantes y sus familias requieren para la formación en Odontología en la Universidad Federal de Rio Grande do Sul (UFRGS). Esta investigación documental utilizó las listas de instrumentos disponibles en el sitio web de la Facultad de Odontología de la UFRGS, vigentes para el semestre académico 2023/2021. Las listas contienen los nombres y las cantidades de instrumentos solicitados en las disciplinas por semestre académico, tanto en los cursos diurnos como nocturnos de Odontología. Además del instrumental, se detallan por separado los materiales generales, el material de oficina y los equipos de protección individual (EPI). La inversión total en materiales a lo largo de la formación en Odontología, desde el primer semestre hasta el último, fue de aproximadamente 21,1 salarios mínimos nacionales. La disciplina con mayor inversión fue la preclínica, con casi un tercio del costo. La Odontología sigue siendo una carrera costosa y elitista. Los estudiantes y sus familias deben estar preparados financieramente para adquirir el instrumental de las listas en el momento solicitado. Se deben considerar otras alternativas para reducir el costo de la formación en Odontología en la UFRGS y permitir que todos los estudiantes completen su formación, reduciendo así las tasas de deserción y los retrasos en la finalización del curso. Además, también son necesarios ajustes en el ámbito laboral, ya que actualmente los graduados, en la mayoría de los casos, no utilizan este instrumental personal después de graduarse, ya que ejercen su profesión en centros ya equipados.

Descriptores: Educación en Odontología. Abandono Escolar. Política Pública. Materiales de Enseñanza. Equidad.

Qual o custo para se formar em Odontologia em uma universidade pública do Sul do Brasil?

Resumo A formação em Odontologia exige grandes investimentos financeiros devido à necessidade de aquisição de diversos instrumentais obrigatórios para a realização das atividades laboratoriais e clínicas. Este estudo tem por objetivo estimar o investimento financeiro por parte de estudantes e seus familiares necessário para a formação em Odontologia na Universidade Federal do Rio Grande do Sul (UFRGS). Esta pesquisa documental utilizou as listas de instrumentais disponíveis no site da Faculdade de Odontologia da UFRGS, vigentes no semestre letivo de 2023/1. As listas contêm os nomes e quantidades de instrumentais solicitados nas disciplinas por semestre letivo nos cursos diurno e noturno de Odontologia. Além dos instrumentais, estão listados materiais gerais, papelaria e equipamento de proteção individual, separadamente. O valor total investido em materiais durante toda a formação em Odontologia do primeiro ao último semestre letivo foi de aproximadamente 21,1 salários-mínimos nacionais. A disciplina de maior investimento foi a de pré-clínica, com quase um terço do valor. A Odontologia continua sendo um curso caro e elitizado. Os estudantes e seus familiares necessitam estar preparados financeiramente para adquirir os instrumentais das listas no momento solicitado. Outras alternativas precisam ser pensadas para aliviar o custo da formação em Odontologia na UFRGS e possibilitar que todos os estudantes concluam a formação, reduzindo a evasão e atraso na integralização do curso. Ainda, adequações relacionadas ao mundo do trabalho também são necessárias, uma vez que atualmente os egressos, na maioria das vezes, não usam estes instrumentais pessoais após a formação porque exercem a profissão em locais que já estão equipados.

Descritores: Educação em Odontologia. Evasão Escolar. Política Pública. Materiais de Ensino. Equidade.

INTRODUCTION

The beginnings of dentistry in Brazil are directly linked to medical schools. In the mid-19th century, the cities of Rio de Janeiro and Bahia started medical schools, which were considered the beginning of higher education in the country's health field¹. During this period, dentistry was not a specific area of knowledge. It functioned as an annex to medicine, with procedures being carried out by barbers, surgeons, or practitioners without the need for technical-scientific academic education¹. Only in 1884, with decree 9,311 of October 25, the first undergraduate dentistry courses were created in Brazil, based at the medical schools in Rio de Janeiro and Bahia². The School of Dentistry at Rio Grande do Sul Federal University (UFRGS, for its acronym in Portuguese) was created in 1898 and, like the others, was also based at the medical school in Porto Alegre³.

From this year until 1900, two more universities were created. By 1970, there were already 49 courses; in 2020, there were 544 authorized courses, 82 of which had not started their activities in the same year⁴. This increase in dentistry courses has accompanied the expansion of higher education that has taken place in Brazil in recent decades, with more accelerated growth in the late 1990s and the first years of the new century⁵.

Despite the increase in places available with the expansion and extension of universities in this period, higher education still remained practically for the elite. University campuses contained most white students, many from families with incomes of more than ten minimum wages and parents with complete higher education⁵. More recently, with policies on access to higher education for historically excluded groups, the student profile has begun to change. In 2012, Law No. 12.711, known as the Quotas Law, was passed, establishing a reserve of places for federal universities⁶. Before this, the Universities of Brasilia, Bahia, Rio de Janeiro, and Rio Grande do Sul had already adopted affirmative policies, but an important step was taken with the enactment of the Quotas Law⁷.

One study showed that the rates of students entering higher education by reserving places for public school students who finished secondary school have increased over the last five years8. The same authors identified that in the same

period, there was an increase in enrollment in the public primary education network and, at the same time, a five-fold increase in the private higher education network. The increase in places in higher education was greater in private institutions, and the number of private institutions increased in these years, unlike in the public sector, where the increase was in the other education levels⁵. Access to education, especially at higher levels, remains historically unequal, maintaining advantages for the privileged social classes⁹.

The Quotas Law has contributed to the reduce elitization of higher education in Brazilian public universities. Other public policies such as the Higher Education Student Financing Fund (FIES, for its acronym in Portuguese), the University for All Program (Prouni), and the Program to Stimulate the Restructuring and Strengthening of Higher Education Institutions (Proies) are also changing the students' profile at private universities⁵.

These affirmative actions for entry to higher education promote social equity, helping to reduce structural social barriers and democratize higher education¹⁰. A study using data from three Enade (National Student Performance Exam) cycles showed that the student's profile has changed in practically all courses over the years but with significant variation between them⁵. This same survey showed that the percentage of dentistry students with a monthly family income of more than ten minimum wages went from 56 to 28 percentage points from the first to the third Enade cycle. It can be seen that the socio-economic profile has changed dramatically in recent years, and courses such as Dentistry have more and more students from lower-income backgrounds. This has shown the progress made in including students through different affirmative policies. However, besides admission, it is necessary to check whether these students who access higher education remain at university and manage to graduate. Permanence actions are critical, especially for those courses that require a high financial investment, such as dentistry. To become a dental surgeon, students need to acquire a vast list of materials and instruments specific to the area. The cost of training in dentistry varies at each higher education institution, as dental instruments may be required in greater or lesser quantities, may be made available by the institutions, and may require different types.

Another study found that the amount spent on dental instruments throughout undergraduate studies is approximately R\$12,000.00¹¹. Estimating the financial investment required for dental training is important so that students and their families can organize the family budget to enable the desired higher education. The aim of this study is, therefore, to describe and discuss the financial investment required by students and their families to study dentistry at UFRGS.

METHODS

This is documentary research, which is used mainly in the social sciences, as it makes it possible to carry out a historical investigation and describe social facts. This type of research efficiently analyzes the financial investments necessary for dentistry training at UFRGS. Even so, documentary research serves as an important cut-off process for analyzing a given theme, and the data can be used to develop tables, graphs, and new perspectives¹².

For this study, we used the instrument lists available on the UFRGS School of Dentistry website 13, in force for the first 2023 academic semester, which began on November 17, 2022, and ended on April 19, 2023. These lists can be updated every semester, and the old versions are replaced, so it is possible to find slight variations in the current consultation. The lists used in this research were downloaded in April 2023. Prices were obtained from Dental RS, Dental Web, Kalunga, Amazon, Dental e CIA, Shopee, Dental Cremer, Click Impresso, Dental Speed, Casa do Papel, Loja Quero Quero, Casa do Mecânico. Most of the prices of instruments were consulted on the Dental RS website and through WhatsApp contact with their employees. Data was collected from April 2 to 20, 2023.

The lists are divided by semester, with the evening course comprising 16 semesters and the daytime course comprising 10 semesters, each comprising a disciplines group. The curriculum structure of the UFRGS Dentistry courses can be consulted on the faculty's website¹³. The disciplines on the daytime and evening courses are the same and have the same workload, but the training time for the daytime course is 5 years, and for the evening course, it is 8 years.

The instrument lists describe, by semester, the academic disciplines that require instruments to carry out practical laboratory and clinical activities. In addition to the instruments listed for each subject, general materials, stationery, and personal protective equipment (PPE) are listed separately. These materials are considered general use, which students need in all the practical subjects on the list. For example, in the third semester of the daytime course, the general materials consist of a metal lamp and a lighter used in two disciplines in the same semester. These will also be used in other disciplines during the course, so the materials requested in the first semester are also considered for the others, avoiding being repeated in the lists for different semesters.

In both tables, the values for each discipline and semester were added. The quantity of items requested was added up, not the individual value. Some items required an adjustment to the value, as there are instruments for collective use, such as the surgical motor, whose value is divided between a group of students, and the list used the individual value of each student in the group.

RESULTS

The value of the financial investment in acquiring instruments necessary for dental training at UFRGS will be presented by discipline. The values per semester, including the total values of the list, with the sum of general materials, stationery, and PPE, will also be presented.

Table 1 shows the total cost of each course. Clinic 3 had the lowest cost in the 2023 first semester, with an investment of R\$20.80. Pre-Clinic had the highest cost for the student, with a total value of R\$8,065.07. The total amount invested in the subjects, excluding PPE, stationery, and general materials, was approximately R\$25,605.79.

Table 1. Budget in Reais (Brazilian currency) and values in percentages for dental materials divided by disciplines for the evening and daytime dentistry courses at UFRGS in the 2023 first academic semester.

Academic Disciplines	Values (in R\$)	Relative values	
Pre-Clinical	8.065,07	31.5%	
Dental Materials	4.369,03	17.0%	
Clinic 1	4.244,20	16.5%	
Anesthesiology and Introduction to Exodontics	2.380,23	9.3%	
Children and Youth Clinic	1.739,97	6.8%	
Clinic 2	1.233,59	4.8%	
Radiographic Technique	1.093,08	4.2%	
Exodontia	980,10	3.8%	
Anatomy of Permanent Teeth	638,38	2.4%	
Orthodontics and Preclinical Orthopedics	427,90	1.6%	
Orthodontics and Clinical Orthopedics	171,80	0.6%	
Introduction to Dentistry	165,65	0.6%	
Surgery 1	75,99	0.3%	
Clinic 3	20,80	0.08%	
TOTAL	25.605,79	100%	

In Table 2, the budget was separated by evening and daytime courses, each with its respective semesters. There are ten daytime courses and sixteen evening courses, but each semester has specific disciplines. The values of all the disciplines for each semester were added together with the value of general materials, stationery, and PPE to obtain the total cost for the semester.

Looking at Table 2, it can be seen that there was no need to buy materials in some semesters, and there was no cost. In the case of the second semester of the evening and day courses, students did not have to pay for materials because there was little practical activity, and it was limited to laboratory activities. In this study, the tenth semester of both courses had no costs, but replacement materials such as gloves, masks, caps, bibs, and other PPE were not considered. From the 9th semester of the daytime course and the 13th semester of the evening course, internships begin. Students doing internships outside the college do not need replacement materials, as the place provides all the materials and PPE needed for the service, while internships inside the college require replacement materials if necessary.

The semester with the highest cost for evening students was the 6th semester and the 4th semester for day students, with R\$10,603.74 and R\$10,554.10, respectively. The total amount invested in dentistry training at UFRGS was R\$27,437.60, equivalent to 21.1 national minimum wages (R\$1,302.00 minimum wage in April 2023). The average cost of an evening course student was R\$1,714.85, and the average semiannual cost of a day course was R\$2,743.76, although some disciplines taken halfway through the course accounted for more than a third of the costs.

Table 3 shows the total number of items and instruments requested and the quantities needed for each discipline. The first column lists the disciplines, and the second and third columns show the total number of items (including instruments

and consumables) and the quantity requested. The last two columns show the total number of instruments, and the amount requested, excluding items considered consumables, such as drills, disposable materials, endodontic files, and others. A total of 413 different items were requested in the disciplines, and when considering only instruments, this total was 240. Pre-clinic discipline requires the most significant quantity and type of materials to carry out practical activities, followed by Clinic I and Child and Adolescent Clinic.

Table 2. Budget for dental materials per semester for the evening and daytime dentistry courses at UFRGS, in the 2023/1 academic semester.

Semester	Evening	Daytime	
1st semester	938.08	938.08	
2nd semester	0.00	0.00	
3rd semester	0.00	6,309.45	
4th semester	1,873.54	10,554.10	
5th semester	4,369.03	5,782.18	
6th semester	10,603.74	1,317.34	
7th semester	5,717.29	599.68	
8th Semester	1,389.47	1,774.97	
9th semester	20.80	171.80	
10th semester	0.00	0.00	
11th semester	578.88	-	
12th semester	1,774.97	-	
13th semester	171.80	-	
14th semester	0.00	-	
15th semester	0.00	-	
16th semester	0.00	-	
Total	27,437.60	27,437.60	

Table 3. Type of item and quantity of instruments requested, divided by discipline in UFRGS Dentistry courses, in the 2023/1 academic semester.

Disciplines	Total items (consumption + permanent)	Quantity requested	Total instruments (permanent)	Quantity requested
Anatomy of Permanent Teeth	4	4	2	2
Anesthesiology and Introduction to Exodontics	30	35	30	35
Surgery 1	1	2	0	0
Clinic 1	97	201	62	105
Clinic 2	22	23	17	18
Clinic 3	2	2	0	0
Children and Youth Clinic	38	113	18	27
Exodontia	17	43	6	6
Introduction to Dentistry	6	6	5	5
Dental Materials	21	26	18	19
Orthodontics and Clinical Orthopedics	1	2	0	0
Orthodontics and Preclinical Orthopedics	9	14	5	5
Pre-Clinical	162	229	75	84
Radiographic technique	3	23	2	2
TOTAL	413	723	240	308

DISCUSSION

This study showed that dentistry education at a public university requires a high financial investment by the students and their families, amounting to more than twenty minimum wages throughout the course. The highest costs are concentrated in some semesters before the middle of the course, which precede the dental clinics, from the third to the fifth semester of the daytime course, and from the fifth to the seventh semester of the evening course. The discipline with the highest cost for the student was Pre-Clinic, taught in the fifth semester of the evening course and the fourth semester of the daytime course. This discipline also had the highest number and quantity of items requested. This discipline prepares students for subsequent clinical sessions, where they practice laboratory procedures. To do so, they need to purchase many instruments that will be used again in subsequent clinical sessions.

The total cost of training at the UFRGS Dentistry School in 2023 was estimated at R\$27,437.60, equivalent to approximately 21.1 minimum wages (minimum wage R\$1,302.00). In another study carried out at the Pernambuco Federal University in 2007, considering spending on dental materials and PPE, the investment was R\$10,047.91, approximately 26.4 minimum wages (minimum wage R\$380.00)¹⁴, slightly higher than the total invested at UFRGS. At Montes Claros State University, the estimated expenditure on instruments, dental consumables, and PPE was twelve thousand reais, equivalent to 17.6 minimum wages (minimum wage R\$678.00)¹¹, a lower value than the others.

This study did not analyze other expenses, such as food, transport, internet, printing, and housing per semester. A study at Pernambuco Federal University, which considered all these costs except housing, found a figure of approximately R\$19,832.36, equivalent to 52 minimum wages at the time¹⁴. However, considering these costs in the capital of Rio Grande do Sul, which has a high cost of the basic food basket and public transport, these figures could be higher for UFRGS students. The cost of housing in Porto Alegre depends on the region and varies between R\$663.33 and R\$3,150.00, which can be higher. The commuting cost depends on the transport means used, kilometers traveled, and the need for parking, which varies between R\$4.80 for those commuting by bus and R\$18.00 for an hour's parking in the central region¹⁵. These costs were estimated considering public universities. If you consider courses offered by private institutions, students have another fixed cost with tuition fees¹⁶, making many depend on scholarships and funding to stay on courses.¹⁷

The cost of dentistry training varies from one higher education institution to another, as does the required number and type of dental instruments. Our study showed that costs are higher in the disciplines that precede dental clinics and that there is a variety and quantity in the number of instruments requested. More than 240 types of items were requested during dentistry training at UFRGS, and this sum does not include consumables or PPE required for undergraduate dentistry. ABENO conducted a study analyzing the instrument lists of numerous Higher Education Institutions and presented a list of 157 instruments considered essential for dental training¹⁸. To estimate the instruments and serve as support for undergraduate courses, this study analyzed the frequency and importance of items among the lists of various faculties, analyzed the essential content for clinical practice and training in the Dentistry course, as well as the desired professional profile and the objectives of the Dentistry course. When analyzing the lists of materials requested in some disciplines that precede clinical activities at UFRGS, more than 176 items were requested in one discipline alone, in addition to finding instruments indicated for carrying out specialized and highly complex procedures, which would be outside the scope of generalist training.

The number of instruments needed for dental training makes dentistry expensive and elitist. However, with the inclusion of the quota policy since 2012⁶ and at UFRGS since 2008¹⁹, these expenses are inadequate for students entering higher education through low-income quotas. Even though a study on the profile of UFRGS dentistry students showed that most of them come from families with an income of more than ten minimum wages²⁰, with the implementation of the quota policy, these characteristics may be changing at the UFRGS Dentistry School. A study using ENADE data showed that the percentage of Dentistry students with this monthly family income has fallen over the years⁵. If families have lower incomes, supporting students during their dental training becomes difficult, and other support is needed for students to stay on the course.

At UFRGS, students who are members of the Benefits Program of the Dean of Student Affairs (PRAE, for its acronym in Portuguese), i.e., those who entered through low-income quotas and are actively enrolled in undergraduate courses, have benefits such as student housing, granted in two forms: vacancy in the university student's home or temporary housing allowance to cover part of the housing costs, the transport allowance which consists of a monthly financial incentive to cover part of the student's travel costs to regular academic activities during the school term and the food

allowance which gives exemption from paying for meals in the university restaurants¹⁹. Students who are not PRAE beneficiaries pay R\$1.30 per meal.

Another benefit for PRAE student beneficiaries is AME Odonto (aid for teaching materials—dentistry), which consists of receiving financial resources to buy dental materials requested for use in compulsory disciplines. This amount partially covers the costs of the requested materials, and this will depend on other factors such as the total value of the requests and also the income of each student¹⁹.

Benefits are essential but don't cover all dental training costs. One study concluded that students emphasized family support for obtaining instruments, and help from colleagues was also mentioned, especially among quota students, some of whom mentioned buying as little as possible and borrowing the rest²¹. Dental instrument banks have been crucial in helping students stay on the course, avoiding dropouts, and reducing training costs¹⁸. At the UFRGS Dentistry School, an dental instrument bank has recently been set up to support students with various materials, reducing the need to buy many items from the lists. Reducing dropout rates and investigating why students drop out of the course is necessary, as these may be associated with high training costs.²²

In addition, one study showed that a third of those interviewed would not recommend a dentistry course because of the training cost, which they found to be high. Strategies must be devised to reduce these costs for students and their families by purchasing instruments²³. It is, therefore, urgent to think about an essential list of instruments for dentistry courses to de-elitize training and make it more equitable. In addition, analyzing the changes that have taken place in the world of work also implies rethinking the investments made to acquire instruments' lists.

This is because recent studies have shown that most graduates work in the public service or third-party clinics, and this has also been seen in other studies with graduates from other institutions²⁴. As a result, it should be emphasized that these spaces where dental surgeons will work are already equipped, i.e., they already have all the instruments needed for professional practice, so all the instruments acquired during the course no longer have a function after training.

This study has some limitations, such as the search for prices on dental websites and the fact that they don't consider the cost of shipping to deliver the products, which would further increase the cost of purchasing the instruments. Another limitation is that we chose to use the value of the minimum wage as a comparative price between institutions in different years. It is known that the purchasing power of the minimum wage has varied dramatically over the years, with an increase between 2003 and 2018 and a decrease in more recent years, with an upward trend at present²⁵.

This study's contribution lies in its ability to help students starting the dentistry course at UFRGS plan their spending during the course. It will also be a reference for AME Odonto and discussions on improvements in the preparation of materials lists by teachers and other academic community members.

The material lists published on the college website may be updated each academic semester. The current public list is different from the one used in this study, as it underwent minor changes. At the college, a committee composed of faculty members and a student representative was created to review the lists of instruments. However, there was no reduction in the number of instruments, only a better distribution of the items across the courses. Given this situation, it is necessary to review the instruments that are rarely or never used by students during the program and make their purchase feasible for collective use, thereby reducing costs.

Another alternative for students to reduce dentistry training costs is the dental instrument bank, which has donated instruments for collective use to some disciplines and also makes personal loans, thus reducing the need to purchase them. This is in addition to other affirmative policies, such as AME Odonto, which has a major impact on reducing costs for socioeconomically vulnerable students.

CONCLUSION

The total amount invested in materials throughout the dentistry course, from the first to the last semester, was approximately 21.1 national minimum wages. The discipline with the highest investment was pre-clinical, with almost a third of the value. Dentistry continues to be an expensive and elitist course. Students and their families need to be financially prepared to buy the instruments on the lists when required. However, with the Quotas Law and the changes in the labor market, it is essential to reduce the lists of instruments and strengthen student retention policies in order to promote a more equitable education in Dentistry.

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