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EDITORIAL

# Doctoral training in dentistry and its role in the development of clinical and applied research.

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Clinical and applied research requires professionals capable of studying and understanding diseases from their molecular basis to their clinical manifestations.[1] In addition, they need solid evidence-based clinical training.[2] The latter are critical to conducting good quality research. In order to acquire all these skills (which are not usually included, or only partially taught, in undergraduate programs or specialization courses), it is essential to study academic postgraduate programs, either at master's or doctoral level. Training that, by definition, is conducive to research and measurable scientific production.

However, only one doctoral program in dentistry is available in Chile: *Doctorado en Ciencias Odontológicas* (PhD in Dental Sciences) offered by the School of Dentistry of Universidad de Chile. The program has been recently accredited for two years (March 2016 to March 2018) by the National Accreditation Commission (CNA-Chile). Its syllabus includes compulsory courses, among which we find advanced cellular, molecular and genetic biology related to the stomatognathic system; methodological bases and the ethics of scientific research; microbiology and immunology applied to dental sciences, and stomatological pathology. These compulsory subjects along with a series of elective courses and the writing of a postgraduate thesis seem to effectively contribute to the training of researchers in clinical and applied research.

While it is true that postgraduate enrollment in Chile has increased from 20.693 in 2007 to 46.806 in 2014 (more than double in 8 years), enrollment in doctoral programs in the same period only grew from 3.029 to 4.925 (which is just a 10.5% of total postgraduate enrollment in 2014).[3]

Clearly, a single doctoral program in dentistry is insufficient for the training of the human capital required to generate high-quality research in the field. As a consequence, Chilean dentists seeking to continue their training at doctoral level had to apply for programs abroad; or at national level, but taking programs in other fields. Consequently, dentists have studied and are studying PhDs in Public Health, Morphological Sciences, and Medical Sciences, among others.

As a result, Chilean dentists have studied or are studying in at least two of the four doctoral programs in Medical Sciences accredited in Chile (Universidad de Chile, Pontificia Universidad Católica de Chile, Universidad de La Frontera, and Universidad Austral de Chile).[4] I am going to refer to the programs of Universidad de La Frontera and Universidad Austral de Chile.

Now, regarding the *Doctoral Program in Medical Sciences* of Universidad de la Frontera, it is worth commenting that, as has been reported in a recent study concerning the enrollment of dentists in this program,[5] since 2008 (date of its creation) until today, dentists account for 66.7% of the 55 applicants; a total of 12 dentists (9 of them (75.0%) with a specialty or Master's degree, and a median of 8 years of professional experience) have joined the program; four of them (33.3%) have obtained their PhD to date. They have published 28 WoS articles (ex-ISI), which accounts for 41.8% of the total productivity of the program graduates in this type of journals during this period. The total productivity of these graduates is 8.4 WoS publications and 5.7 SciELO publications each (an average of 14.1 publications per graduate during their stay in the program). In addition, these dentists did internships at the following centers while being enrolled in the PhD program: University of Sao Paulo, Federal University of Sao Paulo and University of Campinas (Brazil); and University of Valencia (Spain). And, one of them was awarded an UFRO postdoctoral fellowship granted by an established scientific productivity performance program. However, it should be noted that 3 of them (25.0%) left the program at the end of the first semester for different reasons.

Additionally, of the students who are currently enrolled in the program (N=5), three have been awarded scholarships from CONICYT; two are writing their doctoral theses and the remaining three are about to start working on their respective thesis work. They have already published 10 WoS articles during their stay in the program.

I believe the information provided makes clear the importance of doctoral training in the generation of knowledge and scientific productivity. Therefore it seems logical to increase the quality and availability of postdoctoral training, but how? One option is to create new quality academic postgraduate programs; another is innovating in the professional-academic training process. For example, with initiatives such as those developed in the United States,[6] Canada,[7] Switzerland[8] and Brazil,[9] through combined MD/PhD programs for physicians and DDS/PhD for dentists, which allow the training of professionals with high interest in science.[10] The experience with these combined programs has been positive, so it seems interesting to try an extra-curricular integration during the first 4 or 5 years of undergraduate training and that the most qualified students enter a combined program of Internship and PhD for 5 to 6 years more. Whatever the strategy, it seems that the best thing to do is to venture into some of these options.

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