

การวิเคราะห์เปรียบเทียบผลงานวิจัยระดับนานาชาติ  
ของคณะทันตแพทยศาสตร์ในประเทศไทย  
ระหว่างพ.ศ.2543-พ.ศ.2551  
Comparative Analysis of International  
Research Publications from Thai Dental  
Faculties between 2000 and 2008

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### บทคัดย่อ

**วัตถุประสงค์:** งานวิจัยนี้เป็นการศึกษาวิเคราะห์เปรียบเทียบผลงานวิจัยที่ตีพิมพ์ในระดับนานาชาติระหว่าง พ.ศ.2543 ถึง พ.ศ.2551 จากคณะทันตแพทยศาสตร์ในประเทศไทย ที่เป็นมหาวิทยาลัยของรัฐจำนวน 8 คณะ

**วัสดุและวิธีการ:** ทำการวิเคราะห์ผลงานตีพิมพ์ระดับนานาชาติจากคณะทันตแพทยศาสตร์ ซึ่งสังกัดมหาวิทยาลัยของรัฐจำนวน 8 คณะ โดยสืบค้นจากฐานข้อมูลของ Institute of Science Information Web of

### Abstract

**Objective:** To study and compare the international publications of research performance during the years 2000 and 2008 from the 8 dental faculties of state universities in Thailand.

**Materials and Methods:** Data were generated using computerized search of the databases of publications listed in the reports from Institute of Scientific Information Web of Science (ISI-WOS), Scopus and PubMed databases.

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**ผลการศึกษา:** การสืบค้นข้อมูลจากฐานข้อมูล ISI-WOS Scopus และ Pubmed พบว่าระหว่างพ.ศ. 2543-2551 คณะทันตแพทยศาสตร์ของรัฐ 8 คณะมีผลงานตีพิมพ์ในระดับนานาชาติดังนี้ จุฬาลงกรณ์มหาวิทยาลัยตีพิมพ์จำนวน 187 เรื่อง มหาวิทยาลัยมหิดลตีพิมพ์จำนวน 176 เรื่อง มหาวิทยาลัยเชียงใหม่ตีพิมพ์จำนวน 106 เรื่อง มหาวิทยาลัยขอนแก่นตีพิมพ์จำนวน 90 เรื่อง มหาวิทยาลัยสงขลานครินทร์ตีพิมพ์จำนวน 116 เรื่อง มหาวิทยาลัยธรรมศาสตร์ตีพิมพ์จำนวน 21 เรื่อง มหาวิทยาลัยศรีนครินทรวิโรฒตีพิมพ์จำนวน 19 เรื่อง มหาวิทยาลัยนเรศวรตีพิมพ์จำนวน 6 เรื่อง ซึ่งเมื่อทำการจัดกลุ่มคณะทันตแพทยศาสตร์ทั้ง 8 แห่งตามจำนวนผลงานที่ตีพิมพ์แล้วพบว่ามีความสอดคล้องกับระยะเวลาที่ก่อตั้งคณะเหล่านั้น โดยสามารถแบ่งจำนวนผลงานวิจัยได้เป็น 3 กลุ่มคือ กลุ่มที่ 1 ซึ่งมีผลงานวิจัยมากที่สุดคือ คณะทันตแพทยศาสตร์จากจุฬาลงกรณ์มหาวิทยาลัยและมหาวิทยาลัยมหิดล ซึ่งเป็นคณะที่ก่อตั้งขึ้นมา นานกว่าคณะทันตแพทยศาสตร์กลุ่มอื่นๆ กลุ่มที่ 2 ซึ่งมีจำนวนผลงานรองลงมาได้แก่ คณะทันตแพทยศาสตร์จากมหาวิทยาลัยเชียงใหม่ มหาวิทยาลัยสงขลานครินทร์ และ มหาวิทยาลัยขอนแก่น กลุ่มที่ 3 เป็นกลุ่มที่มีผลงานน้อยที่สุดคือคณะทันตแพทยศาสตร์ที่ก่อตั้งหลังสุดซึ่งได้แก่ คณะทันตแพทยศาสตร์จากมหาวิทยาลัยธรรมศาสตร์ มหาวิทยาลัยศรีนครินทรวิโรฒ และ มหาวิทยาลัยนเรศวร อนึ่ง เป็นที่น่าสังเกตว่าระหว่าง พ.ศ. 2543-2548 จำนวนผลงานวิจัยรวมที่ตีพิมพ์ในระดับนานาชาติจากคณะทันตแพทยศาสตร์ทั้ง 8 คณะไม่มีการเปลี่ยนแปลงมาก แต่พบว่าผลงานวิจัยในพ.ศ. 2549 มีปริมาณเพิ่มขึ้นอย่างมากในทุกคณะ อย่างไรก็ตามเมื่อพิจารณาคุณภาพของงานวิจัยโดยอาศัย impact factor ของวารสารที่ตีพิมพ์พบว่าไม่มีความแตกต่างอย่างชัดเจนระหว่างคณะทันตแพทยศาสตร์ในมหาวิทยาลัยต่างๆ แต่พบว่าบทความวิจัยที่ตีพิมพ์ในวารสารที่มี impact factor สูงมักจะเป็นผลงานที่ตีพิมพ์จากวิทยานิพนธ์ของอาจารย์ที่เรียนระดับบัณฑิต

**Results:** A total number of publications from the years 2000 to 2008 from 8 dental faculties were as followings: Chulalongkorn University (CU) = 187; Mahidol University (MU) = 176; Chiang Mai University (CMU) = 106; Khon Kaen University (KKU) = 90; Prince of Songkla University (PSU) = 116; Thammasat University (TU) = 21; Srinakharinwirot University (SWU) = 19; and Naresuan University (NU) = 6. Based on these data, the dental faculties could be roughly divided into 3 groups: CU and MU; CMU, KKU and PSU; and the 3 recently established TU, SWU and NU. Although the combined number of publications from these 8 dental faculties did not change much from 2000 to 2005, there was a big jump in the number between the years 2005 and 2006 and this phenomenon was observed for all faculties. In general, the quality of publications, based on journal impact factors, did not vary considerably among these dental faculties. However, it was noted that the research with results leading to publications in journals with high impact factors were mostly performed by staff members who were on leave of absence for higher degrees and/or oversea training.

**Conclusion:** This comparative analysis of publications from the 8 Thai dental faculties between 2000-2008 provided unbiased appraisal of quantity and quality of research publications which roughly paralleled with the time when they were established, from the oldest Chulalongkorn University to the youngest Naresuan University. It is hoped that some of our suggestions and criticisms will be useful in upgrading research performance in Thai dental faculties, thus making them more competitive in

ศึกษาในต่างประเทศ หรือเป็นผลงานจากการที่อาจารย์  
ลาไปทำงานวิจัย ณ ต่างประเทศ

**บทสรุป:** การศึกษานี้พบว่าจำนวนผลงานวิจัยที่ตีพิมพ์ในระดับนานาชาติของคณะทันตแพทยศาสตร์ของรัฐ 8 แห่งมีความสัมพันธ์กับระยะเวลาที่สถาบันนั้นก่อตั้งมา คณะทันตแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัยซึ่งเป็นสถาบันที่เก่าแก่ที่สุดมีผลงานวิจัยระดับนานาชาติมากที่สุด ในขณะที่คณะทันตแพทยศาสตร์ มหาวิทยาลัยนครสวรรค์ซึ่งเป็นคณะทันตแพทยศาสตร์ของรัฐที่ก่อตั้งหลังสุด มีผลงานวิจัยระดับนานาชาติน้อยที่สุด ผู้วิจัยหวังว่า คำแนะนำและคำวิพากษ์จากผลการศึกษานี้ จะเป็นประโยชน์เพื่อยกระดับพฤติกรรมกรรมการทำวิจัยของบุคลากรจากคณะทันตแพทยศาสตร์ในประเทศไทย เพื่อให้เกิดการแข่งขันกันมากขึ้น ทั้งในระดับประเทศและนานาชาติ

**คำสำคัญ:** คณะทันตแพทยศาสตร์ในประเทศไทย  
ISI-WOS ผลงานตีพิมพ์ระดับนานาชาติ การอ้างอิง  
ผลงานวิจัย

national and international arena.

**Keywords:** Thai dental faculties, ISI-WOS, International research publications, Impact factor

## Introduction

There is no need to emphasize that nowadays research is one of the very important function of modern universities and practically every university in Thailand is now upgrading research performance by encouraging their staff members to be active in research and to publish their research. Research parameter now represents a considerable proportion of weight used in ranking a university, both at the global and regional levels.<sup>(1)</sup> Therefore, publication of research articles in peer-reviewed international journals has become an acceptable indicator of research quality and performance. However, these activities in most Thai institutes still fall short of their international counterparts in both quantity and quality. Detailed analysis of the international publications from Thailand between 1985 and 1994 was first reported by Ruenwongsa

and Panijpan<sup>(2)</sup> and most recently updated in 2006 by Svasti and Asavisanu.<sup>(3)</sup> According to the latter report, Thailand was in 43<sup>rd</sup> position in the world and in 7<sup>th</sup> position among Asian countries with regard to its contribution to publications in science and technology. We ranked number two among the 10 ASEAN countries, trailing only to Singapore. However, between 1999 and 2005, the total number of Thai publications were only about one-third of those of Singapore. In 2005, we contributed only about 0.22% of world publication, compared with 0.55% for Singapore.

The present communication represents an update and a modification of a talk delivered by the first author at the First Conference of the Thai Society of Oral Biology at Nakhon Ratchasima Province in November 2007.<sup>(4)</sup> The data presented at that time covered the computerized literature

search of international publications in Thai dental faculties from 2000 to September 2007. In the present report, we extended our search from the databases to include the information up to the end of 2008. We would like to emphasize at this point that the comparative analysis presented herein was not intended to use for ranking the various dental faculties in Thailand or to evaluate research performance of any one individual staff member, because such undertakings would require many other parameters in addition to research publications. Our main objective was to get a bird's eye view of the international publications of research performance during 2000 and 2008 from the 8 dental faculties of state universities in Thailand. The two most recently established dental faculties in private universities, namely, Rangsit University and Western University, were not included, as there was very little information available in their databases. It is hoped that the information presented will be of some value for administrative decisions to improve research performance of their faculties and to make them more competitive. If one would like to evaluate a research performance of any one individual, one may have to include other parameters, such as, the "h-Index" (e.g., calculated from h-Graph of Scopus database) which takes into account the quantity, quality (citation) and even regularity of his/her lifetime research activity.<sup>(5)</sup>

## Materials and Methods

We limited our computerized search of the databases to publications listed in the reports from Institute of Scientific Information Web of Science (ISI-WOS), Scopus and PubMed databases during this 9-year period, i.e., from the years 2000 to 2008. Although we would preferentially like to limit our search only to ISI-WOS as this database is more stringent and includes only those published

in high quality journals, in the present study we needed to expand our search to include those in other databases in order to have sufficient data for more reliable comparative analysis. In general, the computerized search for the "all document types" which included articles, reviews, letters, editorial materials, short surveys, clinical trials, case reports and conference abstracts was used. However, in our appraisal, we limited our analysis to only the data of the "articles, reviews and letters" section. The addresses used for the search were Faculty of Dentistry of the 8 state universities: Chulalongkorn University (CU), Mahidol University (MU), Chiang Mai University (CMU), Khon Kaen University (KKU), Prince of Songkla University (PSU), Thammasat University (TU), Srinakharinwirot University (SWU) and Naresuan University (NU).

## Results

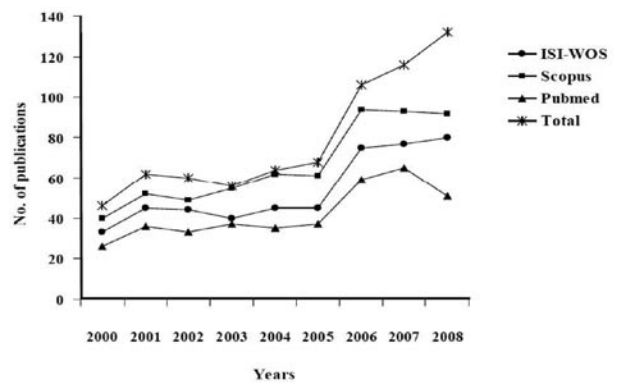
### *Number of research papers*

The profiles of publications of all 8 dental faculties in Thailand are shown in Fig. 1. The results of search using each of the 3 databases were shown for comparison. The number from the PubMed search was lower than it should be because using our approach we could only search for the first author's address through the PubMed database. Graph of the total number of publications in the figure had already been corrected for duplicates. When looking at these graphs, one should note that there was a big jump in the number of publications in 2006. The total number of publications by each Thai dental faculty during this period is shown in Fig. 2. Based on these numbers, we could roughly divide the Thai dental faculties into 3 groups. The first group was represented by CU and MU which produced the highest number of international papers. The second group included the 3 provincial universities,

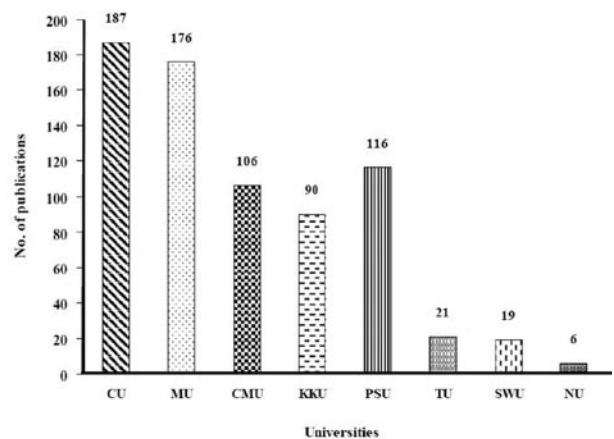
namely, CMU, KKU and PSU, all of which produced around 100 papers during this 9-year interval. The last group was the 3 most recently established faculties, i.e., TU in 1996, SWU in 1995 and NU in 2000. The low number of publications by these 3 dental faculties most likely related to their relatively shorter period of existence. It should be noted that the total number of conference abstracts that appeared in these international databases exhibited similar profiles (Fig. 3) as those found with those using the document type “articles, reviews and letters” search shown in Fig. 2. The publication growth of these 8 faculties (Fig. 4) paralleled the patterns shown earlier in Fig. 1. Again the big jump in the number of publications in 2006 was noted with all faculties, thus consistent with the total number plotted shown in Fig. 1. However, when the total numbers of papers in 2008 from each dental faculty (excluding the 3 newly established ones), were compared with those compiled in 2000, the increase was less than dramatic for all, as the number only doubled or tripled during this 9-year interval (data not presented).

### Quality of research performance

As mentioned earlier, our computerized search in this study included papers appearing not only in the ISI-WOS database but also those which are less stringent in journal inclusion as they include local and regional journals of low to medium quality<sup>(6)</sup>. In order to get some idea about the quality of research performance in different dental faculties, we calculated average journal impact factor (IF) from the Journal Citation Reports (JCR) Science Edition 2008 of the work performed during this time interval, and we found the average IF for all faculties to be rather similar, ranging between 1.3 to 1.7 (data not shown). From our experience, we have the impression that the average IF values of

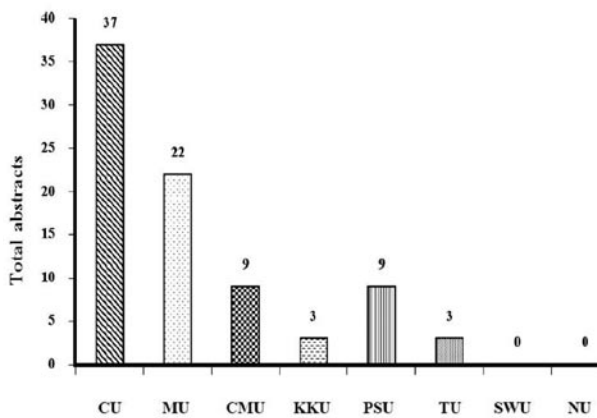


**Figure 1** Total number of publications of 8 dental faculties (CU, MU, CMU, KKU, PSU, TU, SWU, NU) in Thailand between 2000 and 2008. Profiles of the three individual databases are shown for comparisons.

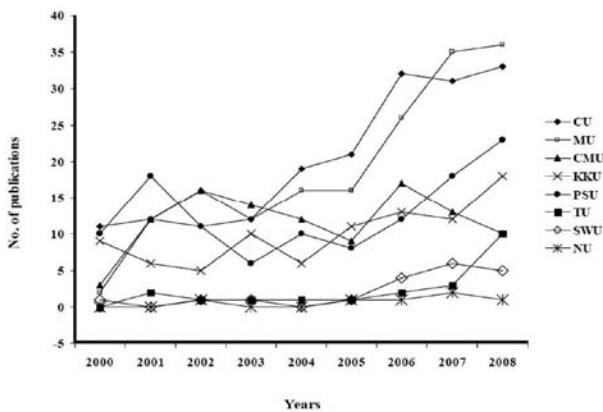


**Figure 2** Total number of publications by individual dental faculties in Thailand between 2000 and 2008.

research performed by these dental faculties are noticeably lower than those expected for other biological and medical science fields. However, this should not be interpreted to mean that the quality of dental research is poorer than others, but it may be just that our discipline is not as dynamic. With the exception of the 3 new faculties (i.e., TU, SWU and NU) whose total number of publications was relatively small which might influence the accuracy when we calculated the mean, the figures



**Figure 3** Total number of conference abstracts from dental faculties in Thailand between 2000 and 2008.



**Figure 4** Publication growth of 8 dental faculties in Thailand between 2000 and 2008.

calculated for the other 5 faculties should be fairly reliable and represented the true quality of the research performance at each institute. Before leaving this point, it should be mentioned that the mean value for TU was between 4 and 5, more than double of the number calculated for the other 7 faculties. This high average IF was most likely related to the fact that there were 5 papers with rather high IF which could profoundly influence the faculty average, as these 5 papers represented almost 25% of their total output. In fact, 4 of the 5 papers represented research conducted in the university in USA by a staff member of TU who was a recent recipient of a scholarship from the Anandamahidol Foundation under the Royal

Patronage of His Majesty the King of Thailand. Moreover, we noted that in all faculties, the research results published in journals with high to medium IF were usually conducted overseas. When we arbitrarily singled out from each faculty the 3 publications with highest journal IFs from JSR Web Edition 2008 for more detailed analysis, we found that from a total of 24 papers from these 8 dental faculties, only 7 papers were of research carried out totally in Thailand (Table 1). Of these 7 papers, only 4 were totally and independently done by Thai investigator groups (2 dental faculties and 2 in collaboration with principle investigators in other Thai institutes) while one paper was a product of a collaboration with oversea investigators. The remaining 2 papers were research carried out by one junior staff member who performed research under the supervision of senior principle investigators from another Thai institute. Most of the remaining 17 papers were performed by the staff members on leave of absence for further study for higher degrees or short-term research training in first class universities in developed countries. However, some represented works initiated by Thai investigators in Thailand, but the results needed to be validated using techniques or equipments available only in oversea institutes. We are proud to mention again that some of these young researchers involved in publishing their research in journals of high IF were also recipients of scholarships from the Anandamahidol Foundation.

## Discussion

Based on the dental journal median impact factor from the JCR Science Edition 2008, the overall research performance in all Thai dental faculties appears to lag behind or less dynamics than that in other disciplines, most notably our close relative in the medical faculties. This can be

**Table 1** Highest-impact publications from 8 dental faculties (CU, MU, CMU, KKU, PSU, TU, SWU, NU) in Thailand between 2000 and 2008\*

Number	Year of publication	Journal		Research performed	
		Name	Impact factor	Locally	Overseas
1	2000	Exp Cell Res	3.948		/
2	2000	J Biol Chem	5.520		/
3	2000	J Biol Chem	5.520		/
4	2001	J Clin Microbiol	3.945	/	
5	2002	J Nat Prod	2.843	/	
6	2003	Cancer Res	7.541		/
7	2003	Cancer Res	7.541		/
8	2004	J Bone Miner Res	6.443		/
9	2005	J Bone Miner Res	6.443		/
10	2006	Cell Microbiol	5.598		/
11	2006	J Cell Sc	6.247		/
12	2006	J Cell Biochem	3.540		/
13	2006	Cancer Cell	24.962		/
14	2006	Bioorg Med Chem Lett	2.531	/	
15	2006	Dev Dynam	3.018		/
16	2007	Caries Res	1.993	/	
17	2007	Oncogene	7.216		/
18	2007	J Immunol	6.000	/	
19	2008	Nucleic Acids Res	6.878	/	
20	2008	Int Endodon J	2.465	/	
21	2008	J Dent Res	3.412	/	/
22	2008	J Dent Res	3.412		/
23	2008	Blood	10.432		/
24	2008	Leukemia	8.634		/

\*Three papers with highest impact factors from each faculty making up a total of 24 were analyzed, using JCR Web Edition 2008. The results were listed, not by faculty, but by the year published. It should be noted that a majority of these high-impact papers were published between 2006 and 2008.

attributable to many factors including in particular inadequate supporting infrastructure and, at least in the past, less than adequate moral support and motivation from dental administrators. Moreover, many of these faculties are located physically far away from their biomedical science counterparts. This fact alone made researchers of these faculties carry out their research by themselves with insufficient collaboration and expertise from closely related disciplines. Moreover, due to

insufficient number of teaching staff in the past, compounded with the necessity to earn an additional income through the private practice after the office hours, many researchers had insufficient time for serious in-depth research. All of these factors make it very difficult for them to be competitive when applying for research funding at all levels, i.e., institutional, national or international levels. However, the situation is now being alleviated and the problem is now not as

severe as it is used to be. Lastly, the research in dental discipline is still relatively young compared with other disciplines. For instance, the first international publication in the dental field in Thailand did not appear in the databases until 1956 and this was performed by the CU staff under guidance by a well-known American dental educator and researcher who was requested by the Royal Thai Government to upgrading teaching of its dental faculty which was the only one existing at that time.<sup>(7)</sup> It is therefore not surprising that CU appears to be doing well as it has a head start, and this is followed by MU which was the second dental faculty established. The authors of the present study also had a chance to visit several dental faculties and found that a large number of them now have excellent research facility and infrastructure geared for modern basic and applied research. Moreover, we also had a chance to be associated with many well-established dental researchers in all faculties and found them superb investigators and capable in establishing themselves on a par in quality with those in other disciplines in this country or overseas. Looking at their curriculum vitae together with research output and quality, we feel that they are very impressive and have potential to carry out good research independently. Besides there are also a large number of young staff members in all faculties with double doctoral degrees. These individuals have very impressive research training and background and have published a large number of high-quality papers while on training overseas. It is a bit disappointing to note that many of these individuals cannot sustain their superior performance upon returning. However, there are some who appear to be on the right tract and are now able to get settled in their own faculties in Thailand. It is very satisfying to note that many of these young staffs are now receiving highly

competitive research support from Thailand's leading granting agencies, e.g., Thailand Research Fund (TRF) and National Science and Technology Development Agency (NSTDA). We feel that what is lacking and needs improving for them are to get more serious about starting on independent research and to show capacity to have independent publications in high quality international journals. This situation is apparent when we analyzed in more detail about the research output from each faculty. We hope that our appraisal will not go unnoticed by our dental administrators responsible for research and to give a serious thought on ways and means to motivate their young staff members who have not yet able to get started, and to sustain those already on their ways to be successful and keep them on the right tract. It should be interesting to see their research performance, say, 10 years from now, e.g., by observing an increase of their "h-index" compared with the current one or with those in other professional fields. The "h-index" was initially proposed by Hirsch as a reliable index to quantify an individual's scientific research output.<sup>(5)</sup> It was pointed out that for faculty at major research universities, the h value of around 12 should be an acceptable value for advancement to tenure, i.e., associate professor. However, several other factors should be considered in combination in evaluating an individual. Moreover, one should keep in mind also that h value acceptable for one discipline may be different from the others.

It should be mentioned that our analysis here has a number of limitations. For instance, the number of papers compiled by our computerized searching using affiliation search would most likely be different from the number of papers if one is to manually compile the data from each individual staff member from each faculty and then add all these numbers together. The latter approach



had already been done and the data compiled as such are now available in a book published by the Subcommittee on Academic and Research of the Dental Faculty Consortium of Thailand chaired by Special Professor Dr. Visaka Limwongse.<sup>(8)</sup> However, this manual analysis is very time consuming and requires more effort. Recently, Svasti and Asavisanu compared the two methods using information from the ISI-WOS databases but found only minor difference.<sup>(9)</sup> We suspect that with our search using a combination of ISI-WOS, Scopus and PubMed databases which is more complicated, the difference between the two methods would be greater as the discrepancy would be further amplified. Moreover, because we limited our search to only one discipline, i.e., dentistry, we had to indicate the dental faculties in our search fields. Therefore, the author's address should be complete and have both faculty and university names in order to be credited. For example, the paper with the address name Faculty of Dentistry, Mahidol University will be credited, while Mahidol University alone will not be credited. Moreover, some papers state the address name incorrectly and this too will not be credited by our search. It is quite alarming to learn that the variations of institution names found in the address fields of these international databases publication are very high, for example, for Mahidol University, there were more than 10 different names found.<sup>(9)</sup> The followings are examples of some incorrectly spelled names or incomplete names of the 8 universities found in the databases: Chulalongkorn Univ Hosp for Chulalongkorn University, Siriraj Univ Hosp (incomplete) or Sriraj (misspelled) for Mahidol University, Chiangmai Univ for Chiang Mai University, Prince Songkhla or Songkhla University for Prince of Songkla University, Thammasart University for Thammasat University, University Srinakarinwirot for Srinakharinwirot

University and lastly Narsuan University for Naresuan University. Svasti and Asavisanu emphasized further that the authors should be more careful in using complete and correct address or using common name of their university if they are to be properly credited by international databases.<sup>(9)</sup> The use of non-standard addresses, whether incomplete or incorrectly spelled, can lead to omission of a paper from standard searches using common names. One cannot expect these organizations to make searches to find absent, incomplete or incorrect institution names, but this is the sole responsibility of the authors to put correct common names of their institute in their publications. Svasti and Asavisanu commented further that "administrators should ask their staff members to put in the name of their institution, and in the correct form in all publications".<sup>(9)</sup> Lastly, one should realize that in addition to these man-made errors, errors in the databases themselves will add up to incorrect data collection. Database errors in transforming the format of addresses in the journals to the format of the addresses in the database have been reported.<sup>(9)</sup> In fact, we found, for example, that a paper by Thai investigators at TU was not credited even when the address used was correct using Faculty of Dentistry, Thammasat University.<sup>(10)</sup> Despite all these limitations, the information obtained from our unbiased analysis of the data from this computerized search should make us look critically at our own performance and ways and means to improving it. The readers may disagree with some of our suggestions and criticisms, but we sincerely did this appraisal with good intentions and hope it will be constructive in upgrading research performance in Thai dental faculties.

One last point that we would like the readers to think about is the explanation for the big jump in both the quantity (Figs. 1 and 4) and quality (Table

1) of publications in all faculties in the year 2006. There must be many reasons contributing to a change in research performance during this interval. Is there a common factor(s) that influences this most welcome performance? If we have time, we would like to look into this matter in more details and hope to find the most probable answer for this observation. Last but not least, we also noted a significant improvement of research performance, as presented and discussed by Thai investigators from various faculties at the 2<sup>nd</sup> Conference of the Thai Society of Oral Biology held during 26-28 November, 2008 at Prachuabkirikhan province<sup>(11)</sup> and at the most recent conference, the 9<sup>th</sup> Dental Faculty Consortium of Thailand Academic Meeting and Research Presentation, held during 18-20 February, 2009 at Rayong province<sup>(12)</sup>. Taken together, it is not unrealistic to predict that dental research, particularly in oral biology, in Thailand is now on its way to take a number one spot in this part of the world.

## Conclusion

The present analysis provides a bird's eye view of the overall research performance of different dental faculties in Thailand. With exception of the 3 newly established faculties, namely, TU, SWU and NU, a substantial contribution was obvious for the 5 well-established ones and a noticeable growth could be readily observed from 2000 to 2008, particularly notable between 2005 and 2006. It is hoped that our unbiased appraisal of the research performance and publications will be of some value for administrative decisions to improve the performance of their faculties, thus making them more competitive in national and international arena.

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