A Critical Appraisal of Holistic Teaching and Its Effects on Dental Student Learning at University of Bergen, Norway

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Abstract: The curriculum of the dental faculty at the University of Bergen, Norway, was revised and a new curriculum implemented in 1998 based on the principles of holistic teaching and patient-centered treatment. The first candidates graduated in 2003. The change of curricula, experience gained, and lack of an evidence base for holistic teaching justify a general discussion of all relevant aspects associated with this approach. The purpose of this article was to make a contribution towards such a discussion. A PubMed search regarding holistic teaching in dentistry was performed. Of the 211 entries on holistic teaching, few discussed holism in depth; none reported outcome measures comparing old and new curricula. Data collected from students graduating in 2003 (new curriculum) and 2000 (old curriculum) on their satisfaction with the teaching comprise a possible outcome measure. In most respects, using prosthodontics as an example, no differences between the two groups of students were found. Students studying under the new holistic curriculum were less satisfied than those studying under the old one regarding the number of available teachers and teachers’ feedback on student performance. Both holistic teaching/patient-centered treatment and a more traditional subject-specific approach have advantages and disadvantages, and neither can be practiced in its pure form for ethical and practical reasons. The quantitative results of this study did not support the hypothesis that holism improved students’ satisfaction with the teaching. A wide discussion of holism in dental education is needed, along with outcome measures when curricula are changed.

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Holism refers to a philosophical trend that claims that wholeness is more than the sum of its parts. The word stems from the Greek word *holos*, meaning all, whole, entire, total. Over the last decade, holism has received more attention in both medicine and dentistry. In the medical context, the concept means that all aspects of the patients’ needs should be taken into account—not only the ones directly related to a specific symptom or disease. This means that psychosocial or other aspects that might be related in some way to the disease are considered and should influence choice and implementation of treatment. In dentistry, the same principles apply: holism indicates that the dentist looks beyond the specific treatment problem at hand to consider other dental conditions as well as medical and behavioral aspects that might be relevant. A related but narrower concept is “patient-centered” treatment, particularly relevant in dental education. This term means that all the patient’s dental and other needs are met in the proper sequence as opposed to “student-centered” teaching, in which the student’s need to demonstrate competence in a specific sub-discipline governs the treatment given, regardless of other needs the patient may have.

Both purely patient-centered and student-centered approaches to teaching represent caricatures of treatment philosophies and are never practised in any dental school for practical and ethical reasons. However, the balance in teaching dentistry has shifted significantly towards a more holistic way of thinking. Considering the widespread interest in holism in dentistry, particularly after the turn of the millennium, it is surprising that limited research has been published on the efficacy of holistic teaching and patient-centered treatment over the more traditional approach.

An opportunity to contribute to the literature in this area arose with the new holistic five-year curriculum implemented at the School of Dentistry, University of Bergen, Norway, in 1998. This change was not motivated by any identified inadequacies in
the old curriculum, but rather as a consequence of the prevailing trends, ideas, and visions at the time. In the mandate for the curriculum planning committee, there was no mention of the philosophy behind these ideas. The revisions to the curriculum, nevertheless, reflected a more holistic, patient-centered approach, as opposed to the previously more fragmented student-centered teaching, in which treatment and teaching were generally separated in the subdisciplines of dentistry. The curriculum revision included an overall plan but also the detailed structure and content of the preclinical and clinical courses, lecture and seminar series, and teaching blocks. The change mainly affected the clinical part of the curriculum, which takes place in the fifth through tenth semesters of study.

The new curriculum called for earlier contact between student and patient, as well as integration of theoretical teaching and preclinical training, integration of some of the clinical disciplines, and emphasis on promoting patient care. Accordingly, the clinical teaching was considerably altered. Under the old curriculum, a clinical course in prosthodontics, for example, crossed the seventh through tenth semesters and comprised about 400 hours. In the revised curriculum, the clinical course in basic prosthodontics was reduced to 170 hours, which was assigned to the sixth and seventh semesters. The main part of clinical prosthodontics teaching was moved to and integrated with the course in comprehensive dentistry taking place in the eighth through tenth semesters. Similar short subject-specific basic courses were established for the other dental subdisciplines.

To make the curriculum more holistic and patient-centered, the treatment needs of patients were to be diagnosed in the widest sense, and all treatments were carried out in an appropriate sequence. In this process, clinical teachers from the subdisciplines of cariology, periodontics, endodontics, and prosthodontics did not limit their teaching to their special subjects, but to some extent also taught within the other subdisciplines involved in the case. Under the new curriculum, the previous seven grades were replaced with a pass/fail grade for both clinical courses and theoretical exams. The minimum quantity of specified clinical prosthodontic procedures and restorations, which was a partial requirement for obtaining a passed grade, had to be somewhat reduced compared to the old curriculum and coordinated with similar adjustments for the other subdisciplines.

Another influence on the new curriculum was a government-promoted reform for improving the quality of higher education, which was implemented in 2001. Educational institutions were encouraged to practice new and varied forms of assessment and supply regular feedback to students to promote self-assessment and learning. Formal, scheduled, and institutionalized systems for feedback to the students in our schools were therefore put into practice. If a student’s progression was unsatisfactory, a formal warning was issued, which contained specific recommendations for how the situation should be remedied as well as an account of the rights and responsibilities of the students and the institution.

The first candidates studying under the revised curriculum graduated in June 2003. The purpose of our study, conducted in 2012, was threefold: 1) to initiate a general debate regarding holism and the associated concept of patient-centered treatment as applied to dentistry and dental education, with the pros, cons, and practical consequences of these approaches; 2) to discuss the general lack of outcome measures indicating the efficacy of possible changes in curricula based on holism (or indeed other teaching philosophies) in dentistry and dental education; and 3) to illustrate quantitatively one such outcome measure: student opinion on various aspects of their education, before and after a change in curriculum.

Materials and Methods

First, a PubMed search on holism in dentistry was undertaken in June 2012 with the search words “Holistic dentistry.” For the second, quantitative part of the study, the participants were candidates who graduated from the School of Dentistry, Faculty of Medicine and Dentistry, University of Bergen, Norway, in the years 2000 (n=33) and 2003 (n=36). Students graduating in 2000 studied under the old curriculum; those graduating in 2003 were the first ones who studied under the new curriculum.

A questionnaire was sent by mail to all prospective participants in 2003. A written enclosure outlining the purpose of the study and a stamped and addressed envelope for the responses were included. The deadline for the response was fourteen days. Those who did not respond received a second questionnaire. Registration numbers replaced the name of the participants in order to secure anonymity. The questionnaire contained six questions about various aspects of the clinical teaching of prosthodontics, along with demographic items. The specific wording of the questions appears with the figure.
Quantitative Study

Out of sixty-nine questionnaires that were mailed, fifty-five were completed and returned, for a response rate of 79.7 percent. The rates for the different years of graduation were as follows: for year 2003, 80.1 percent (n=29, female=16, male=13), and for year 2000, 78.8 percent (n=26, female=14, male=12). One of the graduates of year 2003 did not answer one of the questions, but this questionnaire was nevertheless included in the study. All the other questionnaires were complete. There were no statistically significant differences related to the rates of responses for the two years of graduation (p>0.05).

The vast majority of both groups (~96 percent) indicated there were too few or much too few available clinical instructors during clinical sessions (Figure 1). The 2003 group was significantly less satisfied with the number of available clinical teachers than the 2000 group (p<0.001). More than 50 percent of respondents in both groups expressed the opinion that the teachers were poorly or very poorly calibrated (Figure 2). Even though the 2000 group appeared to have a more favorable view of the level of calibration of teachers than their 2003 counterparts, the difference did not reach statistical significance (p=0.076).

More than 75 percent of the respondents in both groups were dissatisfied with the feedback from teachers on their progression in the clinical course in prosthodontics (Figure 3). The 2003 group was statistically significantly less satisfied with the feedback than the 2000 group (p=0.001). Regarding evaluation

Results

Literature Search

The PubMed literature search yielded 211 entries. Fifty-four of those (26 percent) were published between 2007 and 2012. The first entry dated back to 1951. Only eight entries were in some way related to undergraduate teaching. Only two of those reported outcome measures, and neither compared the effect of a more holistic teaching to a traditional one.
A relatively large proportion of the respondents reported their opinion that the teaching of prosthodontic principles was not satisfactorily up-to-date (2000 group: 35.7 percent; 2003 group: 53.9 percent) (Figure 5). On this point, there was no statistically significant difference between the two groups (p=0.517).

Of students’ clinical performance, a majority of the respondents in the 2000 group expressed the opinion that passed/not passed was not a suitable scale. In the 2003 group, on the other hand, the majority expressed the opposite opinion although many were uncertain. The difference between the groups was not statistically significant (p=0.638) (Figure 4).

Figure 2. Opinions of 2000 and 2003 graduates regarding level of calibration of clinical teachers

Note: Question was worded as follows: Do you consider that the clinical teachers were sufficiently calibrated?

Figure 3. Opinions of 2000 and 2003 graduates regarding feedback from teachers in clinical course in prosthodontics

Note: Question was worded as follows: Do you think that you received sufficient feedback on your progression from the teachers during the clinical course in prosthodontics?
expressed the same opinion (Figure 6). However, this difference only approached significant statistical difference (p=0.059).

The original idea was that every instructor, after a period of calibration, should become adequately competent in all relevant dental subdisciplines. How-

In both groups, the majority (80 percent in the 2000 group; 72 percent in the 2003 group) reported that the amount of clinical procedures required in prosthodontics was suitable. Whereas 24 percent of the 2003 group reported that the requirements were excessive, only 8 percent of the 2000 group expressed the same opinion (Figure 6). However, this difference only approached significant statistical difference (p=0.059).

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Figure 4. Opinions of 2000 and 2003 graduates regarding use of a pass/not pass dichotomous scale in evaluation of student performance on prosthodontics in clinic

Note: Question was worded as follows: Do you consider that the use of a pass/not pass scale is suitable for evaluation of the performance of dental students in the clinic?

Figure 5. Opinions of 2000 and 2003 graduates regarding to what extent teaching of prosthodontic principles was updated

Note: Question was worded as follows: Do you think that the teaching in prosthodontics was satisfactorily updated and in line with the current clinical practice?
Discussion

The holistic idea that all relevant aspects associated with the disease should be taken into account when diagnosing and implementing treatment appears both sensible and humane. Holism is also akin to the World Health Organization’s definition of health, which refers to not only absence of disease or infirmity but the impact of social and environmental factors. The opposite idea—that a disease should be diagnosed and treated exclusively based on its specific symptoms and etiology without regard for other factors—seems out of touch with present-day consensus on the matter. Such an approach would no doubt tend to depersonalize patients, reducing them to mere numbers with defects that needed to be remedied. Very little if any support for this approach can be found in current medico-dental literature, even if some practitioners still, to some extent, appear to adhere to it.

Although holism as a principle is almost universally embraced, its clinical practice is nevertheless not without problems in terms of teaching and clinical practice. The main problem is that no adequate treatment, holistic or otherwise, can be performed without the knowledge and technical competence of the practitioner. This basic requirement is especially relevant in teaching dentistry, in which the major part of the curriculum is allocated...
to attaining necessary manual skill and dexterity, so that students after graduation can practice dentistry with acceptable technical quality. If students were taught solely within the framework of holism and patient-centered teaching and received no subject-specific teaching other than preclinical training on mannequins, the lack of technical competence would be a predicament, particularly at the start of the clinical training. The practical consequences thereof appear undercommunicated in discussions on the merits of holism, but deserve serious consideration. The disadvantages associated with a completely subject-specific teaching model, as well as the uncertain technical competence of students educated in a purely holistic model, will in clinical practice be offset by the teaching staff, so that the patients would not be adversely affected. This mechanism tends to obscure true differences between the approaches. If these premises are acknowledged, the question may not so much be holism as opposed to a myopic focus on technical quality, but rather how quickly and efficiently basic technical competence can be achieved, while leaving sufficient time for the holistic approach. The traditional model, in which each dental subdiscipline is taught separately (subject-specific), may paradoxically have an advantage in this respect as it allows a continuous, uninterrupted, and concentrated focus on the subdiscipline in question.

The new curriculum at the School of Dentistry, University of Bergen, is in accordance with the idea of holism, but modified by the fact that approximately 40 percent of the clinical time allocated to prosthodontics is subject-specific, leaving the rest of the time to holistic teaching. With the other clinical disciplines, similar (if not identical) distributions between the two approaches were made. Regarding the related concepts of student- and patient-centered treatments, the same arguments apply. In their pure form, the former will most likely promote technical competence more efficiently than the latter. However, the tendency that the patient’s needs then become a secondary priority cannot be allowed for ethical and legal reasons. As a consequence, these problems have to be met by selecting patients with only one subject-specific treatment need, having the teaching staff perform some of the treatment, or having the patient treated by more than one student or by the same student in different subdisciplines. Similarly, because a pure patient-centered holistic approach will no doubt result in situations in which the student lacks competence to perform the type of treatment required by the patient, appropriate patient selection or extended teacher contribution may again alleviate the situation. Regardless, there are obvious drawbacks with either alternative that cannot be countered completely.

It should be noted that the present distribution of teaching time on subject-specific and holistic teaching in the Bergen model was based on deduction. A basic premise was that both models should satisfy all national and international quality criteria and requirements. Whether the balance thus struck between the two teaching models is ideal was not documented on any outcome variables prior to its formulation, nor have such effects been documented since with regard to the holistic approach.

Our literature search on the subject revealed that only eight of the 211 entries in PubMed were in some way related to undergraduate teaching, indicating that this aspect has received insufficient attention in the past. Furthermore, the fact that only two of these studies reported outcome measures and that neither compared the effect of a more holistic teaching to a traditional one demonstrates that the superiority of holism and patient-centered treatment over a more traditional approach is not documented. On the basis of these results, it may perhaps be argued that the two approaches exist more in the form of ideas and intentions rather than being translated into practical measures in teaching undergraduates. This is all the more peculiar as the first entry on holism in dentistry dates back to 1951.

The need for research to clarify this question therefore seems evident. This need is supported by the short-term as well as the long-term adjustment of the new curriculum found necessary by the teaching staff and Board of Directors of the dental school. As a consequence, the balance between the holistic ideal and the need for a dental student with more solid basic clinical skill was shifted towards the latter. The total number of teaching hours in prosthodontics in both new and old curricula were basically unaltered and remained so after the above changes. Our study’s quantitative results in no way purport to provide a complete answer to the need for research; they merely serve to elucidate a single albeit important aspect as it applies to prosthodontics: the opinions of the graduates.

When our results are considered, a number of methodological limitations should be kept in mind. The views of the patients were not examined. The self-administered questionnaire may possibly not reveal all relevant aspects associated with the alteration of the prosthodontic curriculum. Assessments
by the clinical teachers were not recorded, nor was the competence of the graduates compared. Because the comparison was cross-sectional, the time passed between 2000 and 2003 might in itself be significant. Comparisons between groups of students graduating at different times may be difficult because each group is able to refer to only its own experiences. Furthermore, this study was limited to prosthodontics. Regarding the individual items, these were the unfiltered opinions of the graduates, with all the individual evaluations and preferences.

Nevertheless, the subjective opinion of former students represents an important outcome variable and must by itself be considered of interest. It may also be argued that prosthodontics is a subject of particular interest in the context of holism because diagnoses, indications, prognoses, and treatment planning for prosthetic restorations depend on a good working knowledge of all other dental subdisciplines in order to evaluate the condition of supporting oral structures and their prognoses. This requires a clinical maturity that students previously have reported they do not sufficiently acquire in the dental curriculum, particularly in prosthodontics and oral surgery.10

Even with the separate results, the unanimous opinion of both groups of graduates was that there were too few and insufficiently calibrated teachers. However, the student/teacher ratio was 6:1, which corresponds to those in other Scandinavian dental schools (information from Scandinavian Society for Prosthetic Dentistry). Nevertheless, the graduates’ strong views on the matter indicate that this ratio represents a minimum figure in relation to the clinical competence our students are expected to achieve in the course of their dental education. With the same number of teachers, the 2003 students were less satisfied than their 2000 counterparts. Perhaps the increased focus on student assessment and feedback and detailed instructions on how to remedy possible shortcomings might have been time-consuming to the detriment of clinical teaching.

Calibration of teachers in clinical prosthodontics is demanding due to the inherently complex evaluations associated with the subject. The ensuing likelihood of legitimate professional differences of opinion among teachers, mainly with regard to treatment strategies, tends to frustrate dental students who wish for simple, unambiguous solutions. These circumstances, and to some extent the use of less calibrated teachers from other disciplines in the holistic teaching, may explain why more than 50 percent of the students rated the teachers as being poorly or very poorly calibrated.

Detailed feedback to the students was given individually for the 2003 group—after clinical sessions if expedient, and mandatory after each semester for each course. If any problems were revealed, an individual program was developed to remedy the matter. Despite this systematic approach, the 2000 group was more satisfied with the feedback than their 2003 counterparts. This unforeseen difference is difficult to explain, but may partly be due to higher student expectations for the quality of feedback, which was a major component of the new curriculum. Moreover, it may take some time before the new procedure functions optimally for both teacher and student. Regarding the question of dichotomous (pass/not pass) and a graded (1-12, >6: passed) scale, the results seem to indicate that the students basically had an ambiguous view of the matter.

Unquestionably, the fact that 54 percent of the 2000 group and 36 percent of the 2003 group thought that the teaching was not updated was not flattering for the department. However, the graduates’ opinions might be influenced by the fact that a number of newly developed prosthodontic procedures and materials, particularly related to cosmetic dentistry and implants, were strongly promoted commercially at the time of graduation. At the time, these (implants excluded) still lacked adequate documentation of clinical properties. Nevertheless, the section might no doubt have been more explicit in explaining the reasons why such procedures and materials were not taught.

In terms of requirements of amount of clinical procedures, teaching of prosthodontics should be tailor-made to the demands of the society, which may differ considerably, even between neighboring countries with comparable social systems and economies.11 The fact that more than 70 percent of both groups of graduates said that the amount of clinical procedures required was suitable indicates that these were in harmony with the requirements of society as well as challenges they were facing as dentists.

Despite these methodological reservations, the results of the comparison between new and old curricula do not support the hypothesis that the new more holistic approach represented a change for the better. As demonstrated, on the contrary, the 2003 holistic group showed significantly more negative responses than the 2000 traditional group in regard to the number of clinical instructors available and,
paradoxically, also in regard to feedback from the teaching staff. The same tendency, although only approaching statistical significance, was seen concerning the required minimum number of clinical procedures and the calibration of the teaching staff. The new curriculum of the School of Dentistry, intended to promote a holistic approach to the patients, therefore did not appear to improve the students’ satisfaction with the teaching received.

The lack of outcome measures when curricula are changed means that there are no points of reference in terms of teaching quality. Thus, it becomes impossible to know whether the new curriculum is improving the teaching quality. The satisfaction of graduates with the teaching should in no way be regarded as furnishing sufficient evidence in this context, but merely as an example of one of many possible outcome measures that might be of relevance. Although only possible to specify in general terms, a more satisfactory method would have to include an analysis of the existing curriculum. Necessary data might include seeking information through the use of anonymous questionnaires for teachers and students on relevant quality aspects. Patients might be asked regarding their satisfaction with care received.\textsuperscript{12,13} In future studies, administrative details such as patient turnover and quality indices such as student grades and specified productivity might also be recorded.

The results of this analysis should help identify the curriculum’s strong aspects that should be retained and weaker ones that should be remedied. Specific goals would then be possible to define, including treatment or teaching philosophies that may appear promising. The data from our study should then be reapplied some time after the new curriculum has been implemented and compared with previous ones to see if the intended goals were achieved. Precise targeted adjustments could then be made as required.

\section*{Conclusion}

Both subject-specific student-centered and holistic patient-centered approaches to teaching of clinical dentistry have theoretical advantages as well as disadvantages. Theoretical visions do not ensure a successful outcome. In order to see the effects of interventions on teaching modalities, carefully planned outcome studies before and after the change of curricula must be carried out, so that the effects of the interventions can be monitored, and possible improvements based on facts identified.

\section*{REFERENCES}