

Canadian Dental Students' Perceptions of Stress

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ABSTRACT

In this paper, we report the results of a survey on dental student stress carried out in April 2005. A questionnaire was used to collect data from 171 students (62% response rate). Identified stressors were academic, clinic-related, social and financial. "Examination and grades" produced the most academic stress, and inconsistent feedback from instructors created the most clinic-related stress. Students found that having a dual role — wife or husband and dental student — was the most burdensome social stressor. Approximately 60% of students reported marital problems and stress associated with "relations with members of the opposite sex." Survey results showed that students who expected a high graduating debt had higher total and academic stress scores.

Total stress was not related to age, gender or marital status. Students living with parents during term time had significantly higher total stress scores than students living in other arrangements. Students residing with parents also had significantly higher debts on entry to dental school. Students with more predental education had (non-significantly) lower stress scores but also had higher student debts. Undergraduate subject major (biological science or non-science) had no bearing on reported stress.

This study highlights the negative effects of student debt, the necessity for staff training and the need for further studies exploring relations among stress, psychological well-being and academic performance.

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Dentistry has long been viewed as a high-stress profession,^{1,2} and dental school is often where stress begins. In numerous studies carried out in United Kingdom, United States and Australian dental schools, students reported elevated perceived stress.³⁻⁷ The last Canadian survey of dental school stress was carried out 16 years ago.⁸

Stress is psychologically debilitating and can have a deleterious effect on academic performance.^{5,6} The main areas causing stress in undergraduate dental students include academic and clinical work, interpersonal relations and living environment.⁹ Dental

educators have an obligation to monitor this stress, take steps to alleviate avoidable stressors and ensure that the dental school curriculum provides students with lifelong stress management tools.

Dental school tuition costs are a hotly debated issue in Canada, particularly since deregulation in 1998, the result of reduced provincial government spending.¹⁰ Deregulation gives universities the discretion to set their own tuition fees to balance the cost of running university dental clinics. Since 2000–2001, dental school tuition fees have increased by 53.6%¹¹; in 2005, annual operating costs stood

at \$9 million.¹² Tuition fee increases undoubtedly affect student debt. In a 1996 study of 6 Canadian dental schools, McDermott and Fuglerud¹³ found a mean dental school entry debt of \$2,013.89 and a mean expected graduating debt of \$25,671.30. Given the increase in tuition, it is likely that the debts of starting and graduating dental students have multiplied over the past decade; **finances are now an additional and important source of student stress.**

Student finances can also influence term-time living arrangements. A University of Toronto commissioned student cost of living survey in 2003¹⁴ found that living expenses incurred by a single student living with parents in Toronto and a single student living in an off-campus Toronto apartment were \$3,396 and \$5,288, respectively. Students with higher current and anticipated debts may opt to reside with parents to allay housing costs. Several studies have shown that students living with their parents have lower stress levels than those residing in student residences or with other students.^{15,16} Therefore, although finances may have a direct effect on dental student stress, with high debt associated with higher stress levels, they may have an indirect moderating effect on stress through the relation between student finances and student living arrangements.

The objectives of this study were to identify stressors reported by undergraduate dental students and to assess the impact of student debt, living arrangements, pre dental education and sociodemographics (age, gender, marital status and living arrangement) on stress.

Materials and Methods

In March and April 2005, all 275 undergraduate dental students enrolled at a Canadian dental school were asked to complete an anonymous questionnaire, which was distributed at the end of whole class lectures for each of the academic years. Separate questionnaires were used for preclinical (first and second year) and clinical (third and fourth year) dental students to take into account the limited exposure of the former to patient care.¹⁴ Both questionnaires included measures of dental school related stress, family commitments, student finances, pre dental education and social support measures. Questions on dental school stress were taken from the Dental Environment Scale (DES)^{3,15} and a United States study of pre dental education⁴ to produce a 36-item list divided into 3 categories: academic stressors, clinic-related stressors and social stressors. The options and response codes for each item were: 1, “not stressful”; 2, “slightly stressful”; 3, “moderately stressful”; and 4, “very stressful.” Total scores and scores for each category were obtained by summing the response codes in those categories. Finance questions were derived from McDermott and Fuglerud’s¹³ Canadian study of dental student debt. Demographic questions were included (age, gender, parity and marital status) to adjust for

potential confounders. The study was approved by the Health Sciences Committee of the University’s Research Ethics Office and granted scientific merit by the faculty’s scientific review committee.

Data were analyzed using SPSS version 12 (SPSS Inc., Chicago, Ill.). Individual DES items were analyzed along with academic, clinic-related and social stress scores and a total stress score. Academic stress scores and total stress scores were adjusted to control for the different number of items in the preclinical and clinical student questionnaires yielding item-adjusted academic and total stress scores. This allowed for comparison of stress across academic years. Data analyses included frequency distributions, Student’s *t* tests, Kruskal-Wallis nonparametric tests, 1-way ANOVA and Pearson’s correlations. Statistical significance was set at $p < 0.05$.

Results

Among the students surveyed, 171 completed and returned their questionnaires, representing a 62% response rate. Of the respondents, 58% were female. The mean age of respondents was 24.6 years (standard deviation [SD] = 2.1 years; range 21–32 years).

Academic and Clinic-Related Stressors

Table 1 shows the mean scores for the DES items in decreasing order. “Examination and grades” produced the most academic stress for all students irrespective of academic year. “Lack of time for relaxation” also ranked among the top 5 stressors for students in all academic years. “Ensuring I get good marks,” “Lack of time to do assigned coursework,” “Completing course requirements” and “The amount of assigned class work” were also prominent sources of stress. The highest-ranking clinic-related DES stress item was “Inconsistency of feedback on your work between different instructors.” Approximately 73% of students reported that this item was “moderately” or “very stressful.” “Receiving criticism about work” was also a salient clinic-related stressor.

Social Stressors

Social stress items were among the lowest ranked. The highest scoring social stressor was “Having a dual role of wife/mother or husband/father and dental student.” Twenty-one students (12.3%) expressed marital problems and 80 students (46.8%) reported stress associated with “Relations with members of the opposite sex.”

Financial Stressors

The mean financial debt of students entering dental school was \$10,970.80 (SD = \$19,314.20; range \$0–150,000) and the mean expected debt on graduation was \$97,185.30 (SD = \$58,846.00; range \$0–270,000). Most students felt that their financial situation was “moderately stressful” (32.4%) or “very stressful” (23%).

Table 1 Mean Dental Environment Scale stressors listed in descending order

Stressor		Mean score (SD)
1.	Examination and grades	3.43 (0.69)
2.	Lack of time for relaxation	3.14 (0.92)
3.	Ensuring I get good marks	3.11 (0.87)
4.	Inconsistency of feedback on your work between different instructors	3.00 (0.92)
5.	Lack of time to do assigned coursework	2.89 (0.97)
6.	Fear of being unable to catch up if I get behind	2.87 (0.98)
6.	Completing course requirements	2.87 (1.00)
7.	Amount of assigned classwork	2.84 (0.87)
8.	Receiving criticism about work	2.74 (0.88)
9.	Lack of confidence in self to be successful dental student	2.72 (1.04)
10.	Patients being late or not showing for their appointments	2.61 (1.23)
11.	Financial problems	2.62 (1.01)
12.	Lack of confidence in self to be successful dentist	2.60 (1.06)
13.	Difficulty in learning clinical procedures	2.58 (0.86)
13.	Rules and regulations of the school	2.58 (0.98)
14.	Responsibilities for comprehensive patient care	2.56 (0.94)
14.	Fear of failing course	2.56 (1.13)
15.	Difficulty learning manual skills for laboratory work	2.51 (0.83)
15.	Difficulty of classwork	2.51 (0.86)
16.	Lack of input into decision-making processes	2.49 (0.85)
17.	Difficulty in learning manual skills required for clinical work	2.46 (0.88)
17.	Course more difficult than I imagined	2.46 (0.97)
18.	Personal physical health	2.38 (0.96)
19.	Atmosphere created by being on a clinical course	2.26 (0.92)
20.	Students breaking the rules in dental school	2.07 (0.99)
21.	Insecurity concerning professional future	1.96 (0.87)
22.	Working on patients with dirty mouths	1.90 (0.88)
23.	Having a dual role of wife/mother or husband/father and dental student	1.87 (1.32)
24.	Lack of cooperation by patients in their home care	1.85 (0.91)
25.	Forced postponement of marriage or engagement	1.79 (0.89)
26.	Relations with members of the opposite sex	1.73 (0.90)
27.	Trying to work whilst family in the house	1.65 (0.87)
28.	Lack of atmosphere in living quarters	1.59 (0.77)
29.	Necessity to postpone having children	1.49 (0.82)
30.	Marital problems	1.43 (0.82)
31.	Discrimination due to ethnic group	1.38 (0.67)

SD = standard deviation.

Demographic Factors and Stress

Age was not related to academic ($p = 0.10$) or adjusted total stress ($p = 0.67$) scores. However, older students did report higher social stress scores than younger students ($p = 0.008$). Female students were more affected by criticism about their work than their male counterparts ($p = 0.02$). Female students also scored higher on

“lack of confidence” stress items ($p = 0.004$) and were more concerned about keeping up with the course load ($p = 0.01$). Despite differences in individual stress items, there were no significant differences between male and female mean adjusted academic, clinic-related, social stress and adjusted total stress scores.

Table 2 Stress scores according to marital status

Marital status	Mean adjusted academic stress score (SD)	Mean clinic-related stress score (SD)	Mean social stress score (SD) ^a	Mean adjusted total stress score (SD)
Single	67.25 (15.1)	25.46 (4.9)	3.93 (2.4)	124.82 (26.4)
Married	62.20 (15.6)	23.11 (5.1)	6.00 (2.3)	123.32 (28.5)
Student in a “long-term relationship”	66.89 (13.8)	25.00 (4.8)	4.44 (2.9)	126.70 (26.5)
<i>p</i> value ^b	0.33	0.44	0.006	0.87

SD = standard deviation.

^aAccording to Bonferroni post-hoc test, social stress scores for married students were significantly higher than those of single students ($p = 0.005$).

^b1-way ANOVA.

Table 3 Stress scores by academic year

Academic year	Mean adjusted academic stress score (SD) ^a	Mean clinic-related stress score (SD)	Mean social stress score (SD)	Mean adjusted total stress score (SD) ^b
1st	65.26 (16.6)	–	4.11 (2.5)	120.20 (30.2)
2nd	72.64 (14.5)	–	4.02 (2.8)	131.85 (27.3)
3rd	69.94 (11.9)	27.96 (3.8)	4.67 (3.2)	135.24 (20.8)
4th	54.45 (14.8)	22.98 (4.5)	4.7 (2.1)	114.38 (19.0)
<i>p</i> value	< 0.001	< 0.001	0.86	0.001

SD = standard deviation.

^aAccording to Bonferroni post-hoc test, second- and third-year students experienced more academic stress than fourth-year students ($p < 0.001$ and $p = 0.005$, respectively).

^bAccording to Bonferroni post-hoc test, second- and third-year students experienced more total stress than fourth-year students ($p < 0.006$ and $p = 0.006$, respectively).

Approximately 60% of students were single and 11.1% were married; the remaining students (29.8%) indicated that they were in a “long-term relationship.” **Table 2** shows the mean stress scores for each marital-status category. Married students had the lowest total stress scores and students in non-marital long-term relationships had the highest stress scores, although these differences were not statistically significant ($p = 0.87$). As expected, married students reported significantly higher social stress scores than single students ($p = 0.005$).

Only 4 dental students (2.3%) had children.

Stress and Academic Year

Table 3 shows the mean stress scores according to academic year with item adjustments made for academic and total stress scores. Third-year students had the highest mean adjusted total stress score. Third-year students also had higher clinic-related stress scores than fourth-year students ($p < 0.001$). There was no statistical difference between academic years in terms of school-entry debt ($p = 0.29$), expected debt on graduation ($p = 0.09$) or social stress scores ($p = 0.51$).

Stress and Predental Education

Most students (82.3%) majored in biology or a health science. Approximately 13% of students majored in a

non-life-sciences subject, such as music, mathematics or commerce. Approximately 5% of students studied psychology at the undergraduate level. No significant differences in stress were found between students who studied biology/health sciences and non-life-sciences subjects (**Table 4**). Students completed a mean of 3.78 years (SD = 0.80 years) of predental university education. Students who had completed more years of predental education had lower mean adjusted academic, clinic-related stress and adjusted total stress scores than those with less predental education, but the difference was not significant. As expected, students with more years of predental education had higher dental school entry debt ($p = 0.006$) and expected graduating debt ($p = 0.005$) than those with fewer years.

Stress and Student Debt

Students with higher expected graduating debts had higher adjusted academic stress ($p = 0.008$) and adjusted total stress scores ($p = 0.02$). Students with higher student debt on entering dental school also had higher social stress scores ($p = 0.02$).

Stress and Living Arrangement

Among the respondents, 31% resided with their parents during term time, 30.4% shared accommodation

Table 4 Stress scores according to pre dental education university major

Undergraduate major	Mean adjusted academic stress score (SD)	Mean clinic-related stress score (SD)	Mean social stress score (SD)	Mean adjusted total stress score (SD)
Biology/health science	66.41 (14.4)	24.88 (4.8)	4.32 (2.6)	124.80 (25.5)
Non-life science	68.49 (16.7)	25.43 (5.7)	4.22 (2.8)	126.36 (31.5)
<i>p</i> value ^a	0.49	0.82	0.86	0.77

^aStudent's *t* test.

Table 5 Stress scores according to term-time living arrangement

Living arrangement	Mean adjusted academic stress score (SD)	Mean clinic-related stress score (SD)	Mean social stress score (SD) ^a	Mean adjusted total stress score (SD)
Parents	72.37 (14.6)	26.55 (3.8)	4.02 (2.5)	133.71 (24.6)
Family member	60.63 (10.7)	23.00 (3.0)	5.83 (2.6)	121.02 (18.5)
Partner/spouse	64.68 (15.9)	23.63 (5.5)	5.70 (2.5)	125.43 (29.4)
Roommate	64.92 (13.9)	24.04 (4.7)	4.44 (2.9)	121.90 (26.2)
Alone	64.20 (14.3)	25.92 (6.4)	3.35 (1.9)	118.05 (26.5)
<i>p</i> value ^b	0.02	0.31	0.007	0.06

SD = standard deviation.

^aAccording to Bonferroni post-hoc test for mean social stress, roommates experienced more stress than those living alone ($p = 0.008$).

^b1-way ANOVA.

with roommates, 21.1% lived alone, 14% lived with their partner or spouse and 3.5% resided with other family members. **Table 5** shows the mean stress scores according to term-time abode. The lowest mean adjusted total stress score was found among students living alone and the highest among those residing with their parents. Students living with parents also had the highest mean adjusted academic stress score and the highest dental school entry debt. Students residing with roommates had significantly higher social stress scores than students living alone ($p = 0.008$).

Student Finances and Living Arrangement

Students residing in the parental home had the highest dental school entry debt (mean = \$14,339.62, SD = \$25,614.52) whereas students living alone had the lowest entry debt (mean = \$6,666.67, SD = \$10,370.29). Students residing with roommates reported the highest expected graduating debt (mean = \$105,750.00, SD = \$56 869.95).

Discussion

This most recent study of dental student stress in Canada raises several key issues; however, these results cannot be extrapolated to other Canadian dental schools. A further limitation of this study is the suboptimal response rate of 62% and the fact that the sample was

marginally overrepresented by female students. Previous studies have found that female dental students report higher levels of stress than male dental students.^{7,17}

Nevertheless, the results are consistent with international studies rating examinations and grades as the highest academic stressor. However, the mean stress score for “Examination and grades” in this study (3.43, SD = 0.89) was higher than the mean scores reported in previous studies.^{18,19}

Third-year students had the highest total stress scores. This confirms anecdotal evidence that the third year (with the onset of patient care) may be a critical period in dental school training, and students may require additional academic support at this time. The lack of overall gender differences may be a reflection of the growing number of female students entering the dental program (35 male and 29 female entrants in 2002) and that 53.6% of all Doctor of Dental Surgery students in the faculty are female.

Inconsistent feedback from instructors was cited as the most significant clinic-related stressor. The use of part-time clinicians (with different clinical backgrounds) as demonstrators will invariably result in inconsistencies.²⁰ The school introduced a Faculty Development/ Calibration Educational Series in June 2003 in recognition of this problem. However, the extent of student

reports on conflicting teaching highlights the need for further consensus training for dental instructors.

This is the first study to date to explore the relation between dental student stress and student finances; student debt was associated with high academic, social and total stress scores. Findings also **emphasize the high levels of debt incurred during dental training.** The mean dental school entry debt of \$10,970.80 and expected graduating debt of \$97,185.30 represent an eightfold and fourfold increase, respectively, over reported 1993–1994 levels.¹³ The increase in graduating student debt can be partly explained by the increase in dental school tuition fee since deregulation. Dentistry remains the most costly Canadian professional program,¹¹ and the Canadian Dental Association continues to petition the federal government to increase dental school funding to offset the need to increase student fees further.²¹

The finding that students living with their parents had higher stress scores than those in other living arrangements contrasts with previous studies.¹⁵ However, previous studies did not consider student debt as a potential stressor. In this study, students living with their parents had significantly higher dental school entry debts. This supports the theory that students with higher debts tend to reside with parents to avoid the cost of housing. Dental school entry debt could explain the elevated stress levels reported by students living at home. However, the relation between high stress and living with parents remained significant even after adjusting for dental school entry and expected graduating debts, suggesting that other factors may be involved, such as caring for elderly parents or dealing with family illness or separation or divorce.

The adverse effects of student stress on psychological well-being are well documented,²² and we did not explore this area in our study. **Further research should incorporate standardized measures of psychological disturbance (i.e., the Brief Symptom Inventory or General Health Questionnaire) for a more detailed assessment of psychological well-being and its relation to dental school stress.**

Conclusion

This study identifies debt as a dental student stressor and **emphasizes the need to address this issue.** It also highlights the necessity for faculty instructor training and the need to provide extra academic support to third-year students to alleviate dental school stress. **Further studies should include assessing relations among stress, academic performance and psychological well-being.** ♦

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References

- Atkinson JM, Millar K, Kay EJ, Blinkhorn AS. Stress in dental practice. *Dent Update* 1991; 18(2):60–4.
- Freeman R, Main JR, Burke FJ. Occupational stress and dentistry: theory and practice. Part I. Recognition. *Br Dent J* 1995; 178(6):214–7.
- Garbee WH Jr, Zucker SB, Selby GR. Perceived sources of stress among dental students. *J Am Dent Assoc* 1980; 100(6):853–7.
- Humphrey SP, Mathews RE, Kaplan AL, Beeman CS. Undergraduate basic science preparation for dental school. *J Dent Educ* 2002; 66(11):1252–9.
- Sanders AE, Lushington K. Effect of perceived stress on student performance in dental school. *J Dent Educ* 2002; 66(1):75–81.
- Tedesco LA. A psychosocial perspective on the dental educational experience and student performance. *J Dent Educ* 1986; 50(10):601–5.
- Westerman GH, Grandy TG, Ocanto RA, Erskine CG. Perceived sources of stress in the dental school environment. *J Dent Educ* 1993; 57(3):225–31.
- Bradley IF, Clark DC, Eisner JE, De Gruchy K, Singer DL, Hinkleman K, and others. The student survey of problems in the academic environment in Canadian dental faculties. *J Dent Educ* 1989; 53(2):126–31.
- Heath JR, Macfarlane TV, Umar MS. Perceived sources of stress in dental students. *Dent Update* 1999; 26(3):94–8, 100.
- Report of the Advisory Panel on Future Directions for Postsecondary Education. Toronto: Ministry of Training, Colleges and Education; Dec. 1996. Available from URL: www.edu.gov.on.ca/eng/document/reports/futuree.html (accessed March 30, 2007).
- The Daily: University tuition fees. Ottawa: Statistics Canada. September 1, 2005. Available from URL: www.statcan.ca/Daily/English/050901/d050901a.htm (accessed March 30, 2007).
- Crosariol B. Canada's dentistry schools face funding emergency. *The Globe and Mail*. 2005 Feb 28; Sect. B:12.
- McDermott RE, Fuglerud KP. Indebtedness of dental school graduates in Canada: mortgaged futures. *J Can Dent Assoc* 1996; 62(3):253–60.
- University of Toronto Student-Administration Joint Working Group on Ontario Student Assistance Program (OSAP) Reform. Student Cost of Living Study. Runzheimer Canada; 2003. Available from URL: www.abrightfuture.ca/docs/Cost%20of%20living%20-%20UofT.pdf (accessed March 30, 2007).
- Humphris G, Blinkhorn A, Freeman R, Gorter R, Hoard-Reddick G, Murtomaa H, and others. Psychological stress in undergraduate dental students: baseline results from seven European dental schools. *Eur J Dent Educ* 2002; 6(1):22–9.
- Musser LA, Lloyd C. The relationship of marital status and living arrangement to stress among dental students. *J Dent Educ* 1985; 49(8):573–8.
- Sanders AE, Lushington K. Sources of stress for Australian dental students. *J Dent Educ* 1999; 63(9):688–97.
- Acharya S. Factors affecting stress among Indian dental students. *J Dent Educ* 2003; 67(10):1140–8.
- Grandy TG, Westerman GH, Combs CE, Turner CH. Perceptions of stress among third-year dental students. *J Dent Educ* 1989; 53(12):718–21.
- Chapnick L, Chapnick A. The part-time clinical instructor in the undergraduate dental clinic. *J Can Dent Assoc* 1998; 64(5):374–6.
- Canadian Dental Association Brief to the House of Commons Standing Committee on Finance: 2003 Pre-Budget Consultations. Ottawa: Canadian Dental Association. Available from URL: www.cda-adc.ca/_files/cda/news_events/media/submissions/2003/pdfs/prebudgetreport09_29_03.pdf (accessed March 30, 2007).
- Naidu RS, Adams JS, Simeon D, Persad S. Sources of stress and psychological disturbance among dental students in the West Indies. *J Dent Educ* 2002; 66(9):1021–30.