

# Perceived stress among dental students at the University of the Western Cape

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## ABSTRACT

**Introduction:** A high prevalence of stress among dental students has been reported.

**Aim:** To determine perceived stress among dental students at the University of the Western Cape.

**Method:** A self-administered questionnaire to students (n=411) was used to collect data. Variables measured included demographic characteristics of students and their perceived stress in the dental environment using the Dental Environment Stress (DES) survey and the Maslach Burnout Inventory (MBI).

**Results:** The response rate was 78%. Respondents were in the 18 to 21 age category; mostly female (n=207); multi-lingual, with 63% having English as their home language. Huge problems identified from the DES were lack of time for relaxation, inadequate breaks during the day, fear of failing a year or module, work load, inconsistency between clinical supervisors and patients being late for appointments. The MBI found high EE (28.91), low DP (7.13) and high PA (30.06) scores. Fourth year students experienced the highest degree of stress on the DES and MBI.

**Conclusion:** Stressors identified are consistent with international dental literature. Levels of stress increased over the academic years and peaked in the fourth year. Stressors experienced may impact student academic and future professional development, motivating a need for intervention at Faculty level.

## INTRODUCTION

Stress among students has been well documented in the international arena with a high prevalence of stress

## ACRONYMS

<b>DES:</b>	Dental Environment Stress
<b>DP:</b>	depersonalisation
<b>EE:</b>	Emotional Exhaustion
<b>MBI:</b>	Maslach Burnout Inventory
<b>HSS:</b>	Human Services Survey
<b>PA:</b>	Personal Accomplishment

identified among dental students.<sup>1-14</sup> Some of the stressors identified in these studies include the learning environment, fear of failure, heavy workload, difficulties in dealing with patients and with transitions in curricula and challenging relationships with academic staff. Differences in student experiences of stress were related to geographical and educational background, culture and ethnicity. There are sparse published reports on stress among dental students in the South African context.<sup>14-16</sup>

It has been shown that students' perceived stress increases over their successive academic years with detrimental effects on their performance and health.<sup>2,8,13,17</sup> A potential long-term consequence of occupational stress is professional burnout.<sup>8</sup> A significant aspect of the burnout syndrome is "increased feelings of becoming emotionally exhausted", with other characteristics being "the development of a negative cynical attitude towards one's clients" and "a tendency to evaluate oneself and one's accomplishments negatively."<sup>18</sup> A potential for burnout among dental students has been reported.<sup>8,12,19</sup>

In contrast to international studies, Hendricks *et al.*<sup>14</sup> found that dental students at the University of the Western Cape (UWC), South Africa ranked non-academic stressors higher than academic stressors. The investigators suggested that their questionnaire may not have been "sensitive enough to identify the determinants of stress within the Apartheid educational structures". The current post-Apartheid cohort of dental students at UWC constitutes a diverse group. Therefore, it would be useful to explore their perceived stressors within a global context.

## AIM AND OBJECTIVES

The aim of this study was to determine perceived stressors among dental students at the UWC. The objectives were to determine the demographic characteristics, stressors experienced, effects of stressors on students and whether major stressors varied across academic years.

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## METHODS

A cross-sectional, descriptive study of dental students (N=411) was conducted in 2012. Data was collected by means of a self-administered questionnaire using a quantitative approach. The questionnaire was distributed to students in their classrooms and completed questionnaires were collected by the researchers.

The three parameters measured were: 1) demographic characteristics, 2) burnout, using the Maslach Burnout Inventory (MBI) and 3) sources of stress, using a modified Dental Environment Survey (DES). The MBI<sup>20</sup> and DES<sup>4</sup> questionnaires were adapted appropriately for the local and academic environment.

The MBI consisted of 22 statements each scored on a seven point Likert scale ranging from 0 (never) to 6 (every day) which is divided into three scales namely emotional exhaustion (EE), personal accomplishment (PA) and depersonalisation (DP). Mean scores were calculated for the three subscales and these subscales were then categorised as low, average or high. High scores on EE ( $\geq 27$ ) and DP ( $\geq 10$ ) and low scores on PA ( $\geq 40$ ) are indicative

for burnout in the occupational subgroup of medical workers (MBI-Human Services Survey (MBI HSS)).<sup>21</sup>

The DES consisted of 79 statements enquiring about: the study environment (n=27), theoretical (n=14), preclinical (n=13) and clinical aspects (n=25) of the educational environment. Students were required to indicate whether each statement posed "no problem", "a small problem" or "a huge problem" in terms of their studies. Preclinical and clinical components were completed as applicable to the year of study.

A pilot study was conducted with 10 students and appropriate minor modifications made to the questionnaire. Data was entered and analysed into IBM SPSS version 21. Descriptive statistics included frequency distributions; means and standard deviations. The Wilcoxon Rank sum test or the Kruskal-Wallis test (when there were more than two groups) was used to compare year groups.

Ethical approval was obtained from the University Research and Ethics committee. Informed consent was obtained from the participants. This project was funded by the University of the Western Cape.

**Table 1:** The overall top five stressors ranked per category of the DES.

Stressors per category (DES)	Percentages of responses to a "huge problem"					
	Overall score	1st Year	2nd Year	3rd Year	4th Year	5th Year
<b>Dental environment</b>						
1. Lack of time for relaxation	45	20	34.6	58.7	74	46.7
2. Inadequate breaks	43.7	27	21.3	42.1	76	77.8
3. Treated as immature and irresponsible	40.3	11	40.5	48.7	60	50
4. Neglect for personal life	37.7	18.5	25.9	41.7	60	40
5. Worrying about physical health	29.2	7.8	24.7	28.9	56	31.1
<b>Mean (dental environment)</b>	<b>39.18</b>	<b>16.86</b>	<b>29.4</b>	<b>44.02</b>	<b>65.2</b>	<b>49.12</b>
<b>Theory</b>						
1. Fear of failing a module/year	57.5	58.7	51.3	53.9	73.5	64.4
2. Overloaded feeling due to large number of modules	50	39.7	36.7	71.1	65.3	42.2
3. Having a lecture/clinic/lab before assessment	48.1	40.3	24.1	65.8	75.5	48.9
4. Amount of study load	47.8	42.9	38	60.5	67.3	35.6
5. Feelings that success is determined by factors not in their control	36.5	33.3	25.3	49	49	51.1
<b>Mean (theory)</b>	<b>47.98</b>	<b>42.98</b>	<b>35.08</b>	<b>60.06</b>	<b>66.12</b>	<b>48.44</b>
<b>Preclinical</b>						
1. Inconsistency between supervisors/teachers	31.4		57	40	49	42
2. Fear of making mistakes	31.1		31.3	40	46.9	46.7
3. Lack of time to practice	25.8		27.5	36.8	37.5	31.1
4. Number of supervisors in relation to students	21.4		17.5	25	38.8	35.6
5. Inability to replace instruments	20.1		20	25	40.8	20
<b>Mean (preclinical)</b>	<b>25.96</b>		<b>30.66</b>	<b>33.36</b>	<b>42.6</b>	<b>35.08</b>
<b>Clinical</b>						
1. Patients being late / missing appointments	38.7		28.8	62.7	61.2	64.4
2. Fear of being criticised in front of patients	35		39	44.7	55.1	64.4
3. Fear of being unable to catch up with clinical requirements	33.3		23.7	48	57.1	63.6
4. Responsibility to get suitable patients	27		10.5	33.8	59.2	57.8
5. Number of assigned quotas	25.8		14.5	32	57.1	46.7
<b>Mean (clinical)</b>	<b>31.96</b>		<b>23.3</b>	<b>44.24</b>	<b>57.94</b>	<b>59.38</b>

## RESULTS

### Demographics of respondents

The response rate was 78% (n= 318). Respondents were primarily in the 18 to 21 age category; mostly female (n=207); multilingual with 63% having English, the medium of education of the University, as their home language.

Respondents were primarily from the Western Cape Province (51%), Kwa-Zulu Natal (18.9%) and the Eastern Cape (13.2%). Most (77%) had attended public schooling. A third (33%) lived with family while the remainder lived in University residence or on their own.

### Student response to the DES questionnaire

The five most frequent stressors in each category of the DES were ranked (Table 1). The theoretical component of the DES scored highest overall (mean = 47.98%) in terms of huge problems compared with the other categories.

There was considerable variation across the year groups in terms of stressors experienced. Fourth year students scored highest in all components except in the clinical component where there was a marginal difference between fourth and fifth year groups.

Additional stressors reported as huge problems were: lack of effective lectures/teaching, by first years (49%); lack of self-motivation to study, by second (39.2%) and fourth years (47.9%); scheduling of continuous assessments, by

third years (46.1%); lack of student input into faculty decision making and lack of response by faculty administration to needs of students, by fourth and fifth years (40-50%). In the fourth and fifth years, additional stressors included clinical supervisor/assistant student ratio and inconsistent clinical feedback (ranging from 41 to 51%) (Table 2).

### Student response to Maslach Burnout Inventory (MBI)

The means for statements in each subscale of the MBI are ranked in descending order (Table 3). The overall mean values (mean, SD) for EE, PA and DP were: 28.91 (10.28), 30.06 (7.51) and 7.13(6.03) respectively. There were significant differences across the year groups for subscales EE and DP. The fourth year group was significantly different compared with the first, second and third years for EE ( $p<0.001$ ) and DP ( $p<0.0001$ ). Students living on their own differed from those living with parents or at university residence in the subscale DP ( $p<0.001$ ). (Table 3).

### MBI Subscales per year group

High scores on EE ( $\geq 27$ ) and DP ( $\geq 10$ ) and low scores on PA ( $\geq 40$ ) are indicative for burn-out (MBI-Human Services Survey (MBI HSS)).<sup>21</sup>

The percentage of students in each sub-scale per year group varied (Table 4). Although EE, the key dimension of burnout, is rated as high for all years except the second year group, none of the year groups met the criteria

**Table 2:** Additional stressors posing a huge problem, per year group.

Stressors according to the DES	Percentage of class				
	1st Year	2nd Year	3rd Year	4th Year	5th Year
<b>Dental environment</b>					
1. Having financial responsibilities	<b>19</b>	19.8	17.6	16.3	17.8
2. Lack of confidence to be a successful dentist	<b>14.3</b>	12.3	13.3	18	20
3. Lack of home atmosphere/ feeling home sick	<b>14.3</b>	8.6	18.4	32	15.6
4. Amount of cheating in dental school	<b>14.3</b>	22.8	20	28	20.5
5. Competition between grades	11.1	<b>35</b>	17.3	26	8.9
6. Conflict between classmates about organization/logistical issues	11.1	23.8	<b>38.2</b>	22	8.9
<b>7. Lack of (faculty ) administrative response to my needs</b>	6.3	19	35.5	<b>40</b>	<b>40</b>
<b>8. Lack of student input in faculty decision making</b>	9.7	22.3	31.6	32.7	<b>50</b>
<b>Theory</b>					
<b>1. Lack of effective lectures/teaching</b>	<b>49.2</b>	<b>26.9</b>	30.7	30.6	22.2
<b>2. Lack of self-motivation to study</b>	<b>36.5</b>	<b>39.2</b>	40.8	<b>47.9</b>	26.7
<b>3. Spacing of continuous assessment throughout the year</b>	20.6	20.3	<b>46.1</b>	46.9	17.8
<b>Preclinical</b>					
1. Inability to afford required instruments		<b>27.5</b>	22.4	35.4	13.3
2. Meeting requirements of preclinical components		<b>19</b>	<b>31.6</b>	32.7	18.2
3. Manner/style of teaching preclinical component		8	<b>27.6</b>	12.2	11.1
4. Receiving criticism about my progress		13.8	22.4	34.7	<b>29.5</b>
5. Limited cooperation from laboratory/technician staff		10	21.1	32.7	<b>22.2</b>
<b>Clinical</b>					
1. Patients attitudes towards dental students		<b>20.3</b>	26.7	38.8	26.7
2. Lack of cleanliness and hygiene in clinics		<b>17.2</b>	9.3	22.9	20
3. Fear of receiving criticism about my work		16.9	<b>34.2</b>	26.5	33.3
4. Conflict between department/ supervisor expectations and available clinical time		15.5	<b>33.3</b>	43.8	40
5. Number of clinical supervisors in relation to number of students		10.8	22.4	51	<b>46.7</b>
6. Inconsistency of feedback between different supervisors		16.9	31.6	40.8	<b>46.7</b>
7. Inadequate number of dental assistants to student numbers		12.1	16.2	49	<b>46.7</b>

(Figures in bold indicate that the data for that year is significantly different from other year groups.)

considered as actually experiencing burnout.<sup>21</sup> However, the fourth year group appeared to be at greater risk for burnout compared with the other groups.

## DISCUSSION

This study, based on the modified DES questionnaire of Al-Saleh *et al.*,<sup>4</sup> reported similar findings. However, the overall “dental environment and theory” components in this study were scored as more stressful than the “clinical” components.

Within the dental environment component, lack of time for relaxation was scored highest, as it is also in studies reported in the international literature.<sup>4,11,22,23</sup> Non-academic stressors (a shortage of extra-curricular time and inadequate time for social activities) were also reported as the highest stressor among a UWC study population in 1994.<sup>14</sup> Of interest is that fourth years scored this item highest whilst it was the third years who reported that opinion in other studies.<sup>11,23</sup> Four of the five top stressors identified as “personal or administrative problems” by Al-Saleh *et al.*<sup>4</sup> were also reported in this study. These results suggest that are stressors within the dental environment may be experienced universally. However, in modifying the DES questionnaire, one has to take cognisance of socio-cultural differences. A top stressor: “responsibility of having children”, identified by Al-Saleh *et al.*<sup>4</sup> was excluded in the current study due to the profile of UWC students.

Tables 1 and 2 show that students across the year groups experience stressors differently. This could be attributed to the respective stages reached in the curriculum, the demands of the curricula and the maturity of students in coping with academic and personal demands.<sup>24</sup>

Overall the stressors in the dental environment, theory and preclinical components, were highest in fourth year. Sanders and Lushington<sup>11</sup> found that among Australian dental students stress increased over time and peaked in the fourth year of study. The five year curriculum at UWC is structured such that first, second and third year students have mostly preclinical and didactic teaching, with a limited experience of the treatment of patients, which commences in the third year. In the fourth and fifth years all modules have clinical components.

Perceived stressors changed from the preclinical to clinical components depending on the year of study.<sup>5,25</sup>

Patients being late for appointments posed a huge problem, leading possibly to an inability to catch up with clinical work and failure to complete clinical requirements on time. It is the responsibility of students to find and book appropriate patients to satisfy their clinical requirements. This appears to be a major concern which can, however, be addressed by appropriate screening of patients and referral between departments in the Faculty.

## The Maslach Burnout Inventory

The MBI showed that overall subscale scores do not place dental students at risk for burnout. However, the high EE scores for all, except second years, are a cause for concern. High EE scores in dental students have also been reported by Gorter *et al.* and Pöhlmann *et al.*<sup>8,19</sup> A longitudinal study of European dental schools found the number of students that scored high in the EE dimension increased from 22% in their first year to 39% in their fifth year.<sup>8</sup> The present study concurs with the literature which indicates that the prevalence of emotional exhaustion among dental students is of concern in view of EE being a key dimension of burnout.

Fourth year students appear to be at greatest risk as they meet two of the three criteria (high EE and high DP) indicative of burnout (Table 4). A high DP is characterised by emotional detachment from the needs of patients and peers. Pöhlmann *et al.*<sup>19</sup> suggest that high DP scores may reflect student insecurity in dealing with patients in an environment where treatment demands are high. In addition, a lack of social competence manifests in relationships on a personal and a professional level. During the clinical period, fourth and fifth years experienced emotional exhaustion (10%), a severe lack of accomplishment (17%) and high depersonalisation (28%).<sup>19</sup> Emotional exhaustion was explained by factors such

**Table 3: Maslach Burnout Inventory (MBI)**

	Statement	Mean	SD
<b>Emotional Exhaustion (EE)</b>		<b>3.21</b>	<b>1.65</b>
1	I feel used up/worn out at the end of my day at university	4.61	1.30
2	I feel fatigued/tired when I get up in the morning and have to face another day at university	4.42	1.49
3	I feel emotionally drained/exhausted from my studies	4.31	1.47
4	I feel burnt out from my studies	3.98	1.57
5	I feel frustrated by my studies	3.63	1.69
6	I feel that I am working too hard on my studies	2.83	1.91
7	I feel that I am at the end of my rope	2.12	1.99
8	Interacting with people all day is really a strain for me	1.67	1.79
9	Interacting with people directly puts too much stress on me	1.33	1.63
<b>Personal Achievement (PA)</b>		<b>3.75</b>	<b>1.64</b>
1	I can easily understand how my patients and other students feel about things	4.67	1.36
2	I can easily create a relaxed atmosphere with my patients and other students	4.18	1.67
3	I deal very effectively with the problems of my patients and other students	4.02	1.58
4	I feel I'm positively influencing other people's lives through my studies	3.86	1.74
5	I have accomplished many worthwhile things in my studies	3.74	1.61
6	I feel exhilarated/inspired after working closely with my patients and other students	3.58	1.63
7	In my studies, I deal with emotional problems very calmly	3.32	1.82
8	I feel very energetic	2.59	1.72
<b>Depersonalisation (DP)</b>		<b>1.44</b>	<b>1.74</b>
1	I worry that my studies are hardening me emotionally	2.48	2.14
2	I have become more callous/uncaring towards people since I started my studies	1.45	1.92
3	I feel that I treat some patients and other students as if they were impersonal objects	1.19	1.66
4	I feel that patients and other students blame me for some of their problems	1.14	1.54
5	I don't really care what happens to some patients and other students	0.92	1.46

Table 4: Categorisation of MBI subscales per year group

Student group		1st Year	2nd Year	3rd Year	4th Year	5th Year	Overall
EE	Rating	High	Average	High	High	High	High
	mean (SD)	27 (9.15)	25 (8.50)	29.01 (9.97)	36.18 (9.86)	30.12 (11.56)	28.91 (10.28)
	%	50%	35.4%	61.3%	83.7%	69%	58%
DP	Rating	Low	Average	Low	High	Average	Average
	mean (SD)	5.74 (4.31)	6.04 (5.66)	5.62 (5.90)	11.56 (6.96)	8.33 (6.73)	7.13 (6.03)
	%	55.2%	18.7%	56.2%	58%	25.6%	21.4%
PA	Rating	High	High	High	High	High	High
	mean (SD)	31.4 (7.30)	29.42 (7.53)	28.59 (7.69)	30.13 (6.75)	31.83 (7.91)	30.06 (7.51)
	%	63.3%	67.5%	70.4%	67.4%	57.5%	66%

as lack of leisure time (30%), examination anxiety (10%) and the transition stress of entering the clinical phase of training (4%).<sup>19</sup> Similarly, a lack of leisure time, worrying about physical health, fear of failing, and patients being late were identified as huge problems in the current study. Campos *et al.*,<sup>17</sup> using the MBI student survey (SS), identified burnout syndrome in 17% of dental students. The authors found a significant relationship between the prevalence of burnout syndrome and the student's academic performance, use of medication because of studies and thoughts of dropping their course. A lack of motivation to study was reported by 47.9% of fourth year students in the current study.

The fact that all groups scored high on PA, with scores ranging from 57%-70%, suggest that most UWC dental students evaluate themselves and their accomplishments positively, in spite of feelings of emotional exhaustion. A positive shift in EE, particularly in the first and third years may result in a ripple effect on the subsequent years. High levels of PA combined with low levels of EE and DP is indicative of 'engagement with work' which may be a goal to work towards for interventions.<sup>21</sup>

The nature of dentistry as a profession provides for multiple stressors for the future dentist in terms of the patient, staff, equipment and other factors. Gorter *et al.*<sup>26</sup> found that dentists with a high risk for burnout also report health complaints to a greater extent than dentists with a low risk for burnout; dentists with a high burnout risk also report an unhealthier lifestyle than dentists with a low burnout risk. There is evidence to suggest that the concerns of clinical students echo those of qualified practitioners. Therefore, the results of this study should be seen and acted upon in the context of the education and training of future dentists.

## CONCLUSION

This study found that dental students at UWC experience stress to an extent similar to that reported in studies appearing in the international dental literature. The level of stress increased over the academic years and peaked in the fourth year. These stressors may impact student academic performance and future professional development, motivating a need for intervention at a Faculty level.

## References

- Alzahem AM, van der Molen HT, Alaujjan AH, Schmidt HG, Zamaikhshary MH. Stress amongst dental students: a systematic review. *Eur J Dent Educ* 2011; 15: 8-18.
- Silverstein ST, Kritz-Silverstein DA. A longitudinal study of stress in first-year dental students. *J Dent Educ* 2010; 74(8): 836-48.
- Dahan H, Bedos C. A typology of dental students according to their experience of stress: A qualitative study. *J of Dent Educ* 2010; 74(2):95-103.
- Al-Saleh SA, Ebtissam MA, Nadia SA, Huda AA, Mohammed MS. Survey of perceived stress-inducing problems dental students in Saudi Arabia. *Saudi Dent J* 2010; 22: 83-8.
- Polychronopoulou A, Divaris K. Dental students' perceived sources of stress: a multi-country study. *J Dent Educ* 2009; 73(5):631-9.
- Kumar S, Dagli RJ, Mathur A, Prabu D, Kulkarni S. Perceived sources of stress amongst Indian dental students. *Eur J Dent Educ* 2009; 13: 39-45.
- Birks Y, Mckendree J, Watt I. Emotional Intelligence and perceived stress in health care students: a multi-institutional, multi-professional survey. *BMC Medical Education* 2009; 9:61-7.
- Gorter R, Freeman R, Murtooma H, Blinkhorn A, Humphris G. Psychological stress and health in undergraduate dental students: fifth year outcomes compared with first year baseline results from five European dental schools. *Eur J Dent Educ* 2008; 12: 61-8.
- Polychronopoulou A, Divaris K. Perceived sources of stress among Greek dental students. *J Dent Educ* 2005; 69(6):687-92.
- 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: 1021-30.
- Sanders AE, Lushington K. Effect of perceived stress on student performance in dental school. *J Dent Educ* 2002; 66(1): 75 - 81.
- Humphris G, Blinkhorn A, Freeman R, Gorter R, Hoad-Reddick G, Murtooma H, O'Sullivan R, Splieth C. Psychological stress in undergraduate dental students: baseline results from seven European dental schools. *Eur J Dent Educ* 2002; 6: 22-9.
- Heath JR, Macfarlane TV, Umar MS. Perceived sources of stress in dental students. *Dent Update* 1999; 26:94-100.
- Hendricks SJH, Joshi A, Crombie K, Moola MH. Perceived sources of stress among black dental students in South Africa. *J Dent Educ* 1994; 58(6): 406-10.
- Naidoo S, Pau A. Emotional Intelligence and perceived stress. *SADJ* 2008; 63 (3): 148 -151.
- Pau A, Rowland MA, Naidoo S, Abdulkadir, R, Makrynika, E, Moraru, R, Huang, B, Croucher R. Emotional Intelligence and perceived stress in dental undergraduates: a multinational survey. *J Dent Educ* 2007; 71(2): 197-204.
- Campos JADB, Jordani PC, Zucoloto ML, Bonafe FSS, Maroco J. Burnout syndrome among dental students. *Rev Bras Epidemiol* 2012; 15(1): 155-65.
- Maslach C, Jackson SE. The measurement of experienced burnout. *J Occupational Behavior* 1981; 2:99-113.
- Pöhlmann K, Jonas, Ruf S, Harzer W. Stress, burnout and health in the clinical period of dental education. *Eur J Dent Educ*; 2005; 9: 78-84.
- Cooper CL, Cooper RD, Eaker LH, (1988), *Living with Stress*, Penguin Books, Harmondsworth
- Maslach C, Jackson S, Leiter M. *Maslach Burnout Inventory Manual*, 3rd ed. Mind Garden, 2010.
- Morse Z, Dravo U. Stress levels of dental students at the Fiji School of Medicine. *Eur J Dent Educ* 2007; 11:99-103.
- Sofola OO, Jeboda SO. Perceived sources of stress in Nigerian dental students. *Eur J Dent Educ* 2006; 10: 20-3.
- Elani HW, Allison PJ, Kumar RA, Mancini L, Lambrou A, Bedos C. A systematic review of stress in dental students. *J Dent Educ* 2014; 78(2):226-42
- Fonseca J, Divaris K, Villalba S, Pizarro S, Fernandez M, Codjambassais A, Villa-Torres L, Polychronopoulou A. *Eur J Dent Educ* 2013; 17: 30-8
- Gorter RC, Eijkman, MAJ, Hoogstraten J. Burnout and health among Dutch dentists. *Eur J Oral Sci* 2000; 108: 261-7.