Stress and Coping Among Orthopaedic Surgery Residents and Faculty

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Topics in Training

Stress and Coping Among Orthopaedic Surgery Residents and Faculty

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Background: Evaluations of physicians and residents have revealed concerning levels of psychosocial dysfunction. The purposes of this study were to determine the quality of life of orthopaedic residents and faculty and to identify the risk factors for decompensation.

Methods: Twenty-one orthopaedic residents and twenty-five full-time orthopaedic faculty completed a 102-question voluntary, anonymous survey. The survey consisted of three validated instruments, i.e., the Maslach Burnout Inventory, the General Health Questionnaire-12, and the Revised Dyadic Adjustment Scale; and three novel question sets addressing background and demographic information, stress reaction and management, and the balance between work and home life. Descriptive statistics, pairwise correlations, simple t tests, and Pearson and nonparametric Spearman correlations were calculated. The simple correlation coefficient was used to assess bivariate relationships.

Results: The mean overall quality-of-life score, on a scale of 0 to 4 points, was 2.5 points for residents compared with 3.6 points for faculty members. Residents reported considerable burnout, showing a high level of emotional exhaustion and depersonalization and an average level of personal achievement, whereas faculty reported minimal burnout, showing a low level of emotional exhaustion ($p < 0.0003$), an average level of depersonalization ($p < 0.0001$), and a high level of personal achievement ($p < 0.0001$). Only two of twenty-five faculty members (compared with seven of twenty-one residents) scored over 4 points on the General Health Questionnaire-12, indicating significant symptomatology ($p < 0.01$). The majority of subjects reported that a partner or spouse showed nondistressed levels of marital adjustment and satisfaction. All residents and nine of the twenty-five faculty members had mentors but judged the resource to be minimally beneficial. Resident burnout and psychiatric morbidity correlated with weekly work hours; conflict between the commitments of work and home life; discord with faculty, nursing staff, and senior residents; debt load; and work-related stress. Protective factors included being a parent, spending time with a spouse, having a physician father, and deriving satisfaction from discussing concerns with colleagues, friends, and family.

Conclusions: In pursuit of our goal of determining the quality of life of orthopaedic residents and faculty, we identified a large disparity between the two groups. The resident group reported much greater levels of dysfunction particularly with regard to burnout and psychiatric morbidity. Furthermore, with regard to our second goal; our data revealed a number of risk factors for resident decompensation, most notably, increased workload, high debt levels, and discord with superiors. In addition, our research revealed that the current support interventions by the residency program, including mentoring and facilitation of spousal adjustment, are viewed as being of little help.

Residency is known to be a stressful, demanding undertaking, and orthopaedic training can be particularly challenging physically, intellectually, and emotionally. Recent studies have drawn attention to some potentially adverse effects of residency training[1-6]. While a number of researchers have evaluated the quality of life among residents and physicians, none have focused on orthopaedic surgeons or orthopaedic residents. Studies of other medical specialties have described depression, drug abuse, loneliness, marital disruption, cognitive impairment, and suicidal thoughts or actions occurring during training in more than one-third of residents[3]. While research addressing psychological disturbance among American physicians is sparse, studies from the United Kingdom have found that the prevalence of such disturbances in practicing physicians was as high as 27% and the suicide rate for doctors was twice that of the general population[7].

In addition to general assessments of psychiatric morbidity, a number of researchers have focused on the work-related distress syndrome of burnout among physicians and residents[7,8]. Burnout, as defined by Maslach et al., is a syndrome of emo-

tional exhaustion, depersonalization, and a reduced sense of personal accomplishment among individuals who work with people in some capacity[9]. Factors identified as contributing to burnout among workers in a variety of fields include work overload, lack of control, insufficient rewards, lack of community, lack of fairness, and conflicting values[10]. By contrast, high levels of job satisfaction appear to protect an individual's mental health against job stress[7]. Problems associated with burnout scores above the norm include physical and emotional illness, increased turnover, absenteeism, poor performance, drug abuse, and negative attitudes[8].

Physicians and other health-care professionals are believed to be particularly susceptible to burnout[7]. In 1996, Ramirez et al., in a report on the mental health of 882 hospital-based specialists in the United Kingdom, noted that insufficient communication and management training correlated with increased depersonalization and reduced personal achievement scores[7]. Ramirez et al. noted a corollary finding that the quality of the physician's relationships with patients, family, and support staff was directly proportional to job satisfaction[7]. High levels of burnout in medical professionals may result in poor performance and a decreased quality of medical care[11].

Research in other specialties has revealed a number of features of residency training that contribute to resident stress[1-4,6,12-15]. Factors that increase the risk of dysfunction and those that protect against toxic stress reactions have also been identified[1,3,13] (Table I).

In light of the recognized negative impact of the aforementioned stressors, we hypothesized that orthopaedic residents are at high risk of burnout, psychiatric morbidity, and a diminished quality of life. In addition, we hypothesized that the increased autonomy, financial compensation and security, and sense of clinical competency and responsibility attained by practicing academic orthopaedic surgeons would render them less susceptible to burnout and psychiatric morbidity and would afford them an improved quality of life. Our goals in conducting this study were to determine the quality of life of current orthopaedic residents and faculty and to identify risk factors for decompensation.

Materials and Methods

Participants

Our primary study group was composed of twenty-one orthopaedic surgery residents from a large university training program. The second study group consisted of twenty-five full-time orthopaedic surgery faculty members from two institutions; sixteen were at the same large university training program, and nine were at a second large university training program. Upon review and approval of our project by the institutional review boards of our participating institutions, each study group was surveyed in a voluntary, anonymous fashion. Each participant received a random code number, records of which are confidentially maintained by the study administrator.

Survey Instrument

Participants completed a 102-question survey consisting of six sections:

- Background and demographic information.
- Job satisfaction, assessed with use of the Maslach Burnout Inventory (twenty-two questions), a validated and accepted instrument[9]. It consists of three subscales: nine items measuring emotional exhaustion, i.e., a drained, depleted feeling arising because of excessive psychological and emotional demands; five items assessing depersonalization, i.e., the tendency to view others in an excessively detached, impersonal, even cynical manner; and eight items appraising personal achievement, i.e., a sense of competence and accomplishment. Maslach Burnout Inventory norms for medical workers were developed from the responses of a sample of 1104 American doctors and nurses[9]. Scores are compiled for each subscale and are categorized by thirds in accordance with the normative distribution[9]. Emotional exhaustion and depersonalization correlate with burnout, while personal achievement is inversely proportional to burnout[9].
- Psychiatric morbidity, assessed with use of the General Health Questionnaire-12, a validated, widely used mental disorder screening instrument that has been translated into

TABLE I Residency Stressors and Factors

Residency Stressors	Risk Factors for Distress	Protective Factors
Financial pressures[1,3,12]	Personal psychiatric history[3]	Camaraderie with peers[3,13]
Heavy work and call schedules[4,14]	Family psychiatric history[3]	Sense of clinical competency[1]
Lack of free time[3,13]	Inadequate support systems[1]	Helpful social support systems[1]
Daily microstressors[1]*	Length of residency training[1]	Clinical responsibility[1]
Harassment[15]	Female gender[1,3]†	
Sleep deprivation[2,3,4,12]		

*Frustrating, daily hassles encountered in the health-care workplace[1]. †Studies assessing the impact of gender on stress levels of residents yield conflicting results. Female gender has been associated with higher reported levels of stress; however, studies have disagreed about whether female residents actually experience more emotional distress or dysfunction[1,3].

TABLE II Background and Demographic Data

	Resident Group (N = 21)	Faculty Group† (N = 25)
Age* *(yr)*	30 (28-34)	45 (32-66)
No. *(%)* of subjects who were female	3 (14)	1 (4)
No. *(%)* of subjects who were married or in a committed relationship	16 (76)	21 (84)
No. *(%)* of subjects who were single	5 (24)	3 (12)
No. *(%)* of subjects who were divorced	0 (0)	1 (4)
No. *(%)* of subjects with a physician father	7 (33)	9 (36)
No. *(%)* of subjects with a physician mother	1 (5)	1 (4)
Work hours per week*	88 (70-120)	70 (40-105)
Debt anticipated at completion of training*	$76,000-$100,000 (0->$150,000)	NR

*The values are given as the average, with the range in parentheses. †NR = not reported.

eleven languages and used in more than fifteen countries[16]. It has been found to be a highly reliable indicator of depression, social dysfunction, anxiety, and somatic symptoms[12]. The twelve items are symptoms of psychiatric morbidity that receive a score of 0 or 1 on the basis of the frequency with which the subject has experienced the symptom in the recent past, yielding a maximum score of 12[17]. Scores of 4 or higher have been shown to be indicative of substantial psychiatric morbidity[17].

- Stressful aspects of life and work, assessed with use of twenty-three items specifically designed for this instrument. Included were questions identifying specific stressors (e.g., sleep deprivation, financial concerns, and relationships with staff) as well as questions regarding perceptions of harassment, discrimination, and overall life and career satisfaction.
- Responses to stress, with use of eighteen novel questions related to self-care and stress management strategies.
- Relationship issues encountered by married participants and those in ongoing committed relationships, assessed with use of the Revised Dyadic Adjustment Scale (fourteen questions) and self-reported descriptions of the balance between work and home life (fifteen questions). The Revised Dyadic Adjustment Scale is a validated instrument assessing marital adjustment on a 69-point scale[18]. In the Revised Dyadic Adjustment Scale format, "adjustment" is considered a neutral term that refers to the quality of the relationship as determined by the individual[18]. In the normative data for the scale, the mean score (and standard deviation) for couples who scored in the not-distressed range was 52.3 ± 6.6, while the mean score for those in the distressed range was 41.6 ± 8.2; a score of ≤46 is considered to reflect a distressed relationship[18]. In addition, fifteen questions pertaining to the balance between work and home life were adapted from the work of Geurts et al., who evaluated work-home interference as a "critical mediating pathway in the relationship between work and home characteristics and work-related and general psychological health indicators."[6]

Statistical Analysis

Statistical analysis was performed on all completed questionnaires. Descriptive statistics and pairwise correlations were calculated. The simple correlation coefficient was used to estimate the strength and to test the significance of bivariate relationships. The Pearson and nonparametric Spearman correlations were calculated, and similar results were obtained with use of the two methods. Pearson correlation coefficients are presented for consistency. Simple t tests were used to compare mean responses on standardized scales. Differences generating p values of <0.05 were considered significant, while those generating p values between 0.05 and 0.1 were considered to suggest a trend.

Results

The first five sections of forty-six questionnaires (twenty-one from residents and twenty-five from faculty) were completed and analyzed. In addition, thirty-seven subjects (sixteen residents and twenty-one faculty) who reported that they were married or involved in an ongoing committed relationship completed section six of our survey, and these results were also analyzed for data pertaining to relationship issues. The decision to include the relationship data from nonmarried subjects who reported ongoing committed relationships as well as from married persons is supported by the fact that only one-quarter of American households consist of what most people think of as a traditional family: a married couple and their children[19]. Furthermore, cohabitors are at least as likely as individuals in their first marriage to remain together after five years[20,21].

Background and demographic results are reported in Table II.

Job Satisfaction: The Maslach Burnout Inventory

In comparison with the norms for American health-care workers[7], the resi-

TABLE III Burnout Subscales

	Norms*†	Faculty†	Residents†	P Value‡
Emotional exhaustion	22 ± 9.5	16.6 ± 9.5	27.7 ± 9.7	<0.0003
Depersonalization	7.1 ± 5.22	6.6 ± 5.1	15.1 ± 6.3	<0.0001
Personal achievement	36.5 ± 7.3	42.8 ± 4.4	36.3 ± 5.3	<0.0001

*Based on a study of 1104 doctors and nurses[9]. †The values are given as the mean and the standard deviation. ‡The differences between the groups were assessed for significance with use of the t test.

dent group showed high levels of burnout, scoring in the upper third for emotional exhaustion and depersonalization and in the middle third for personal achievement. In contrast, the faculty group showed low levels of burnout, scoring in the lower third for emotional exhaustion, the middle third for depersonalization, and the upper third for personal achievement (Table III).

Psychiatric Morbidity

Seven residents (33%) and two faculty members (8%) had a score of ≥4 (range, 4 to 7) on the General Health Questionnaire-12, indicating significant psychiatric morbidity ($p < 0.01$)[3].

Life and Work Stress

The average overall quality of life, as rated on a scale that ranged from 0 to 4 points, fell within the "moderately satisfying" range (mean, 2.5 points) for the resident group. By contrast, the faculty group rated their overall quality of life in the "very satisfying" to "extremely satisfying" range (mean, 3.6 points). Both groups rated the overall stress level of their work as "moderately stressful" (mean, 2.6 points for residents and 2.2 points for faculty); however, both groups unanimously reported that they would again choose to pursue a career in orthopaedic surgery.

Responses to Stress

All residents reported having faculty mentors; however, with use of a 0 to 3-point scale, the residents reported that their mentors were of "little help" or "no help" (mean, 0.9 point). Nine (36%) of twenty-five faculty participants reported having mentors and that talking with those mentors helped "a little" (mean, 1.6 points). Residents discussed concerns with their colleagues "quite a bit," whereas faculty did so "a little" (mean, 2.1 and 1.2 points, respectively). Both groups stated that they talked about their concerns with family, friends, and/or partners "quite a bit" (mean, 2.6 points for residents and 2.0 points for faculty).

With regard to self-care, neither group reported difficulty unplugging from work. Neither group reported that they used relaxation techniques or sought formal counseling to help to cope with stress. Both groups claimed that they drew on religion or faith in God "a little" (mean score, 1.2 points for residents and 1.7 points for faculty on a 0 to 3-point scale). Residents reported that they exercised an average of two and one-half times each month, while faculty reported exercising approximately four times each month. Both groups denied cigarette use and reported "a little" alcohol use (mean, 1.2 points for residents and 1.0 point for faculty).

Relationship Issues

Sixteen residents (76%) and twenty-one faculty members (84%) reported being married or in an ongoing committed relationship. Responses to relationship inquiries are scored on a 0 to 5-point scale with a maximum score of 70 points and with a score of <46 points indicating relationship distress. The majority of subjects from each group scored above the distressed range on the Revised Dyadic Adjustment Scale with regard to marital adjustment and satisfaction; the mean score (and standard deviation) was 49.7 ± 7.3 points (range, 38.0 to 62.0 points) for residents and 51.7 ± 6.6 points (range, 39.8 to 66.0 points) for faculty. However, three residents and six faculty members scored within the distressed range.

Residents reported, on the average, being "fairly satisfied" (mean, 5.3 points on a 1 to 6-point scale) with the overall quality of their marriage or relationship, whereas faculty reported being "extremely satisfied" (mean, 5.8 points). Both groups reported that work conflicted with family life "occasionally" (mean, 2.7 points for residents and 2.4 points for faculty on a 0 to 4-point scale).

The residents with a committed relationship reported that their spouses worked an average of 31.8 hours (range, zero to sixty hours) each week outside the home. The faculty members with a committed relationship reported that their spouses worked an average of twenty hours (range, zero to fifty hours) per week outside the home. Both groups reported spending an average of forty-five to ninety minutes alone and awake with their spouse on a typical workday. Neither group viewed the work schedules or commitments of their spouses as a substantial source of family stress. Additionally, both groups perceived that their spouses had more frequently made career sacrifices. Both groups perceived that their families paid attention to their feelings (mean, 1.9 points for each group on a 0 to 3-point scale) and appreciated the way that the subject handled his or her work "quite a bit" (mean, 1.6 points for residents and 1.8 points for faculty members).

Regarding support outside their family or relationship, both groups reported that their colleagues and their colleagues' families were "a little" supportive (mean, 1.3 points for each group on a 0 to 3-point scale). However, the department was perceived by both

groups as being "not at all" helpful in facilitating their spouses' adjustment (mean, 0.5 point for residents and 0.6 point for faculty). In fact, potential efforts by the department to assist the spouse in understanding the work stress of the subjects were predicted by the residents to be only "a little" helpful (mean, 0.8 point, on a scale of 0 to 1 point), while the faculty predicted that these efforts would help "not at all" (mean, 0.4 point).

Finally, the resident group rated the overall balance between work and home life as "somewhat satisfying" (mean, 4.1 on a scale of 1 to 6 points), while the faculty rated the balance as "fairly satisfying" (mean, 4.6 points).

Positive Correlations

The Pearson and nonparametric Spearman correlations were calculated, and similar results were obtained with use of the two methods. The Pearson correlation coefficients are presented for consistency.

Burnout

Emotional Exhaustion

Among residents, high levels of emotional exhaustion were correlated with anxiety about clinical competence ($p < 0.02$; correlation coefficient, 0.50), increased conflict between work and home life ($p < 0.001$; correlation coefficient, 0.66), stress in relationships with faculty ($p < 0.01$; correlation coefficient, 0.51) and senior residents ($p < 0.07$; correlation coefficient, 0.41), and increased perceptions of work as stressful ($p < 0.002$; correlation coefficient, 0.62).

Among the faculty members, increased emotional exhaustion correlated with anxiety regarding clinical competence ($p < 0.002$; correlation coefficient, 0.57), worry about the future because of the number of orthopaedic surgeons in the field ($p < 0.02$; correlation coefficient, 0.23), stress in relationships with other faculty ($p < 0.003$; correlation coefficient, 0.63), financial concerns ($p < 0.02$; correlation coefficient, 0.45), increased perception of work as stressful ($p < 0.006$; correlation coefficient, 0.53), and increased conflict between work and home life ($p < 0.08$; correlation coefficient, 0.35).

Emotional exhaustion tended to be reduced by increased time alone with their spouse ($p < 0.09$; correlation coefficient, –0.41) in the resident group and by increased perception of support from colleagues and colleagues' families ($p < 0.06$; correlation coefficient, –0.39) in the faculty group.

Depersonalization

For residents, as their reported number of work hours increased, so did their score on the burnout subscale for depersonalization ($p < 0.01$; correlation coefficient, 0.55). The opposite pattern was observed with faculty. As their work hours increased, faculty members had decreased levels of depersonalization ($p < 0.02$; correlation coefficient, –0.44). Stress in relationships with nursing staff correlated with increased depersonalization in residents ($p < 0.039$; correlation coefficient, 0.46) and faculty ($p < 0.03$; correlation coefficient, 0.43). For residents, increases in anticipated debt load at the completion of training ($p < 0.001$; correlation coefficient, 0.66) increased the level of depersonalization. For faculty, higher scores were correlated with increased alcohol use ($p < 0.02$; correlation coefficient, 0.47) and greater levels of concern regarding alcohol and drug abuse ($p < 0.007$; correlation coefficient, 0.53).

For residents, having a father who is a physician correlated with lower ratings on emotional exhaustion ($p < 0.05$; correlation coefficient, –0.42) and depersonalization ($p < 0.04$; correlation coefficient, –0.46). Among faculty, the levels of depersonalization decreased as the number of children they had increased ($p < 0.07$; correlation coefficient –0.38). Depersonalization scores also were lower among faculty members who reported a better quality relationship with their mother ($p < 0.07$; correlation coefficient, –0.37).

Personal Achievement

For residents, being a parent was found to correlate with increased scores on personal achievement ($p < 0.05$; correlation coefficient, 0.47). The scores on personal achievement also increased as satisfaction from talking with colleagues informally increased ($p < 0.05$; correlation coefficient, 0.43) or as satisfaction from talking with friends and family about concerns increased ($p < 0.007$; correlation coefficient, 0.58).

The levels of personal achievement among faculty members correlated with their ratings of the overall quality of their marriage ($p < 0.04$; correlation coefficient, 0.41) and overall work-family balance ($p < 0.05$; correlation coefficient, 0.39). Surprisingly, for faculty, the personal achievement level increased as the number of hours that his or her spouse worked outside the home each week increased ($p < 0.002$; correlation coefficient, 0.58).

Psychiatric Morbidity

Among residents, increased stress in relationships with senior residents correlated with increased scores on the General Health Questionnaire-12 ($p < 0.04$; correlation coefficient, 0.45) indicating psychiatric morbidity, whereas satisfaction from speaking with a mentor was associated with decreased scores ($p < 0.02$; correlation coefficient, –0.48). For faculty, increased General Health Questionnaire-12 scores were found to correlate with increased levels of worry about the number of orthopaedic surgeons in the field ($p < 0.0004$; correlation coefficient, 0.67).

Relationship Issues and Conflict Between Work and Home Life

In the resident group, increased conflict between work and home life was found to correlate with increased levels of emotional exhaustion ($p < 0.001$; correlation coefficient, 0.66), General Health Questionnaire-12 scores ($p < 0.0075$; correlation coefficient, 0.57), and depersonalization ($p < 0.01$; correlation coefficient, 0.54).

As faculty made more time for hobbies, their emotional exhaustion levels diminished ($p < 0.04$; correlation coefficient, –0.41), personal achievement levels increased ($p < 0.03$; correlation coefficient, 0.44), and psychiatric morbidity (General Health Questionnaire-12) levels declined ($p < 0.07$; correlation coefficient, –0.37).

Discussion

This study is the first, as far as we know, to examine job stress and satisfaction and the psychological and social functioning of orthopaedic residents and faculty. Our study group was small and included residents from only one institution, so it is difficult to generalize our results. Our results showed a great disparity in burnout and psychiatric morbidity between the resident group and the faculty group. Whether this variance arises from generational differences or stage of career development cannot be determined from these results alone. Age may influence the vulnerability to burnout. In a study by Campbell et al. that surveyed 582 practicing surgeons, substantially higher levels of burnout were identified in younger surgeons[8]. Longitudinal follow-up of this population is planned to evaluate the changes over time; furthermore, we hope to expand the current study to include other orthopaedic residency programs as well as orthopaedic surgeons in private practice in an effort to fortify our findings.

Our results revealed a substantial level of burnout in this resident population, with scores in the upper third on both emotional exhaustion and depersonalization. These results reflect a tendency toward cynicism and a view of patients as inanimate objects by doctors who feel overwhelmed, drained, and depleted[9]. An average level of personal achievement was maintained in this population; however, a study by Schaufeli and van Dierendonck supported a two-dimensional conception of burnout including only emotional exhaustion and depersonalization[22]. Thus, the preservation of an average level of personal achievement may not temper the resident burnout level to any substantial degree. Indeed, despite maintaining a reasonable sense of personal accomplishment, the respondents who showed greater levels of burnout also reported increased levels of anxiety concerning their own clinical competence.

Other factors associated with burnout among the residents in our study included increases in work hours per week; conflict between work and home life; stress in relationships with faculty, nursing staff, and senior residents; debt load; and perceptions of work as stressful. Protective factors included being a parent, spending more time alone with a spouse, having a father who is or was a physician, and deriving greater satisfaction from speaking about concerns with colleagues, friends, and family.

The faculty group, by contrast, showed low levels of burnout, scoring below average for emotional exhaustion, within the average range for depersonalization, and above average for personal achievement. These findings contradict those of Campbell et al., who noted that orthopaedists are more likely than other surgeons to suffer from high degrees of burnout, particularly on the subscale of depersonalization[8]. It is tempting to attribute the low level of burnout in the faculty group to practicing in an academic setting; however, Campbell et al. also investigated the impact of caseload, practice setting, and percentage of the patient population covered by health maintenance organizations but found no correlation between these practice characteristics and the prevalence or degree of burnout[8].

Factors associated with burnout among the faculty members in our study included increases in anxiety with regard to clinical competence, worry about the future because of the growing supply of orthopaedic surgeons, stress in relationships with other faculty, financial concerns, perceptions of work as stressful, alcohol use, concerns with regard to drug and/or alcohol abuse, and conflict between work and home life. Protective factors included increases in the number of children, spouse's work hours per week, perceptions of support from colleagues and colleagues' families, overall quality of the marriage or relationship, and time spent on hobbies.

Residents showed high levels of psychiatric morbidity, as assessed by the General Health Questionnaire-12, in comparison with the faculty group. However, the finding of significant psychiatric abnormalities in one-third of our resident group is similar to levels reported among other resident groups[3]. In a 1991 study of anesthesia, pediatric, and psychiatry residents at Jefferson Medical College, Samuel et al. reported that the prevalence of psychiatric morbidity, as assessed by the Beck Depression Inventory, was only 17%[23]. However, they suspected that symptoms were underreported because of participant statements questioning the anonymity of the study or revealing a belief that "it was best to always present themselves in a positive light for fear of a negative performance evaluation."[23]

The finding of similar levels of psychiatric morbidity in other resident populations is not intended to diminish the importance of such dysfunction occurring in one-third of the resident group in the present study. It does, however, lend support to the idea that such a dysfunction is a consequence of residency, as a construct, rather than an isolated outcome for a particular group of trainees in a particular program. Indeed, the low prevalence of psychiatric morbidity found in our faculty group (8%) suggests that, beyond the training period, orthopaedic surgery may even be associated with a decreased prevalence of psychiatric dysfunction in comparison with that among physicians in other specialties[7,8]. The frequency of positive feedback from patients and their families, the relative reliability of good and excellent outcomes of orthopaedic procedures, and the current high income potential for orthopaedic surgeons may help to protect job satisfaction and reduce mood disorders. In fact, the sole factor correlating with psychiatric morbidity in our faculty group was a perception of increasing numbers of practicing orthopaedic surgeons. It is of interest that only the few faculty physicians who reported depression and anxiety also reported anxiety-provoking situations such as a hostile marketplace. This finding suggests that it is the concern about competition that may be associated with psychiatric dysfunction in some individuals.

The disparity in burnout and psychiatric morbidity between orthopaedic residents and the faculty who teach

them may arise from the contrasting levels of control and autonomy experienced by the two groups. The demand-control-support model of the impact of work characteristics on psychological health is predicated on the notion that jobs with high psychological demands, minimal autonomy, and low levels of support from superiors are associated with a higher prevalence of psychological health complaints[6]. This model is supported by extensive research in industry, a few studies of health-care professionals, and one study of 166 medical residents in the Netherlands[6]. It is widely recognized that resident physicians are subject to high demands and afforded little discretion over their work content or schedules[3,6,7,13,14,21]. Although our instrument did not specifically address autonomy and control, our results revealed that difficult relationships with faculty and senior residents correlated with increased levels of emotional exhaustion and psychiatric morbidity among junior residents. Additionally, having a physician father correlated with a decreased level of burnout among residents possibly because of enhanced perceptions of support.

Inflated financial pressures on current residents may also contribute to the observed differences in quality of life and burnout between residents and faculty. Increased anticipated debt at the completion of training correlated strongly with increased depersonalization among our resident group. The faculty population is not immune to financial stressors, but they are afforded some protection by their substantially higher income level. In addition, debt load at the completion of training has dramatically increased in the recent past[1,3,12]. Furthermore, while salaries have increased over the past two decades, purchasing power (in 1967 dollars) has decreased[1-3,24]. It has been estimated that comfortably paying off a debt of $75,000 would require a salary of $140,000 per year[24]. Our resident population reported a mean debt of greater than $75,000, yet their current average salary is under $40,000 per year.

On a positive note, the majority of resident and faculty marriages and relationships appeared to be doing well. This finding suggests that, despite their current levels of stress and emotional dysfunction, these residents had in general maintained the ability to sustain an intimate, rewarding personal relationship. It is of concern, however, that the marriages or relationships of almost one in five residents and more than one in four faculty members scored within the distressed range. It is of note that this was the only negative parameter in which the faculty group scored higher than the resident group.

Our results concerning the current quality of life and psychological well-being of orthopaedic residents raised the question of appropriate intervention. Compared with other specialties, surgical residencies offer the fewest supports[3]. In a study of the anesthesia, pediatric, and psychiatry residents at Jefferson Medical College, Samuel et al. reported that 80% of the residents were interested in support groups for themselves or their spouses and that 30% to 60% of the residents were interested in individual counseling or psychotherapy[23].

The ideal intervention would improve resident quality of life and psychological well-being without detracting from the quality of the education or the level of patient care. A limit on work hours per week has been shown to improve resident quality of life, increase reading time, increase in-training examination scores, and increase the volume of surgical cases per resident in a nonorthopaedic surgical training program[11]. Whether these benefits generalize to orthopaedic programs will become evident given the recent implementation of resident work-hour restrictions.

Alternate strategies for improving quality of life among residents include increased support mechanisms provided by the residency program, the incorporation of stress management and effective emotional management training into medical school and residency curricula, and the creation of national financial assistance for medical training[1,3,5,24,25]. Support mechanisms provided by some residency programs include formal or informal support groups and individual counseling; financial counseling to address loan repayment, tax preparation, and insurance issues; professional and career counseling; legal advisors to address malpractice and contract issues; spousal support to address both emotional adjustment and practical guidance for negotiating a new city; and even child care[3]. Our study did not assess the utilization of psychiatric services or resident assistance programs offered by the medical school, although neither group reported use of counseling in general. The current mentoring program, instituted with the intention of providing professional and emotional support to residents, matches each resident with a faculty mentor and requires biannual meetings. Unfortunately, our results demonstrated little perceived benefit to either residents or faculty. Our findings indicate that current program efforts to provide support are viewed as inadequate by the residents; however, our data also revealed low expectations of benefit from additional support efforts. Furthermore, evaluation of the impact of stress management training on burnout levels has indicated that associated benefits are transitory, expiring at approximately six months unless frequent refresher training is provided[25].

In conclusion, our data revealed high levels of burnout among surveyed orthopaedic residents, yet low levels among surveyed orthopaedic faculty. One-third of our population of residents reported symptoms of psychiatric morbidity. Factors decreasing the quality of life and increasing the emotional dysfunction among residents included workload, debt load, and difficult relationships with superiors. Current support strategies employed by the training program are perceived as insufficient or ineffectual. Faculty data obtained in this study suggested the possibility that low job satisfaction and quality-of-life assessments improve after the completion of training, at least among those engaged in full-time academic practice.

The primary deficit of this study was the small study population. It is hoped that our findings of high levels

of burnout and psychiatric morbidity among orthopaedic residents will stimulate additional research in this area. Expansion of the subject group to include additional residency programs, incoming residents, and graduates is planned. In addition, creation of a Web-based survey instrument and a companion instrument to be completed by the physician's spouse or significant other is under consideration. Some alteration of the survey instrument may assist in eliciting variance within and between programs. Regarding mentorship, inquiry was limited to whether the subject had a mentor and whether speaking about concerns with that mentor helped the subject to cope with stress. An expanded inquiry might provide insight into the deficiencies of the current mentorship program. Inclusion of more items specifically related to residency and orthopaedics, as well as pre-training experiences and functioning, would assist in identifying protective resident characteristics as well as risk factors for decompensation. Such an instrument might enable a program to identify residents at risk and intervene preemptively.

Readministration of the questionnaire to the original population is planned in an effort to provide for longitudinal evaluation of variations in stressors and quality of life with progression through and beyond residency. Longitudinal information may also highlight indicators of the hardiness of residents and elucidate the characteristics that allow some residents to pass through residency unscathed while others founder. One of the primary strengths of this study is its provision of a benchmark against which to evaluate the impact of residency changes such as the recently implemnted resident work-hour initiative.

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