The crisis in orthodontic education: Goals and perceptions

Steven J. Lindauer, DMD, MDSc, Sheldon L. Peck, DDS, MS, Eser Tufekci, DDS, MS, PhD, Todd Coffey, MS, and Al M. Best, PhD

Richmond, Va

A crisis in orthodontic education exists today because of a shortage of qualified people seeking to pursue careers in academic orthodontics; 35% of orthodontic graduate programs in the United States report having at least 1 vacant faculty position. Previous studies have identified several factors that contribute to the current shortage. The purpose of this study was to quantify and compare real and perceived differences in income, workload, and other qualitative characteristics between academic and private practice orthodontists. Orthodontic faculty, private practitioners, and residents were surveyed, and their answers were compared statistically. Faculty annual income was less than one half that of private practitioners matched by experience and geography. Faculty reported working an average of 25% more hours per week, and income per hour for full-time faculty was less than one third that of their private-practice colleagues. In addition, faculty perceived that they experienced more stress, encountered more bureaucracy, received less respect, and had a more difficult time achieving board certification than did private practitioners. Despite these findings, both faculty and private practitioners reported high levels of satisfaction in their respective jobs. Orthodontic residents were better attuned to the differences between academics and private practice than were faculty or private practitioners themselves. Residents perceived that it would take an average of 67% longer to pay off their educational debt in a faculty position than in private practice. It is in the best interest of orthodontics to resolve the crisis in education if it is to maintain its well-respected status among dental and medical specialties. (Am J Orthod Dentofacial Orthop 2003;124:480-7)

It is well established that there is a shortage of qualified professionals seeking to pursue academic careers in dentistry and the specialty of orthodontics. A recent report by the American Association of Dental Schools President’s Task Force on the Future of Dental School Faculty concluded that the dental faculty shortage in general is reaching crisis proportions. In orthodontics, the problem is compounded by an existing faculty whose mean age is progressively rising, along with fewer new graduates who are choosing academic careers. Even well-established faculty, with between 5 and 10, and 10 and 20 years of teaching experience, are choosing to enter or return to private practice. In 1990 and 1993, 25% and 17%, respectively, of orthodontic programs reported having vacant faculty positions. By 1997, that number had risen to 42%. In addition, Kula et al reported in 2000 that 38% of full-time orthodontic faculty surveyed were considering leaving academics. Superimposed on the faculty shortage facing the specialty is an increasing need for orthodontists to enter into private practice. Orthodontists are retiring in greater numbers than replacements are graduating from orthodontic programs. Short- and long-term predictions are for more children and adolescents in the United States through 2020. Consequently, a shortage of orthodontists is occurring earlier than first predicted. Waldman reported that the number of orthodontists per capita had decreased in 41 states and the District of Columbia. With an already inadequate number of orthodontic academicians, it is doubtful that the current educational system will be able to produce the additional future practitioners to meet predicted demands.

Previous studies have established that the major deterrent to attracting and retaining qualified orthodontic faculty is the low salary offered by academic institutions. Other negative factors cited by faculty...
included a perceived lack of control over their careers and poor financial support of orthodontic departments. Conversely, orthodontic faculty surveyed stated that the favorable attributes of their experiences were positive student interactions, a desire to contribute to the orthodontic specialty and dental education, and the intellectual stimulation and collegiality of the academic environment.

Faced with the perception of an approaching crisis in dental education, several studies have focused on identifying factors that influence people to choose or reject academic careers in dentistry and dental specialties. Shepherd et al. surveyed 280 new dental faculty and found that the most important factors influencing the decision to maintain their faculty positions included a good working environment, flexibility in work schedule, and a good benefits package. Schenkein and Best concluded that intellectual and scientific stimulation, the lifestyle of academics, and an interest in teaching were the most positive influences, while income and indebtedness were viewed as the most negative factors for dental faculty.

It is clear that salary is by far the most important negative factor influencing the decision to enter or maintain an orthodontic academic career. Previous studies have not quantified the extent to which income, work effort, and other factors differ between full-time orthodontic faculty and private practitioners. These differences must be fully understood so that a plan for resolving the crisis in orthodontic education can be formulated.

The purpose of this study was to compile information that can be used to set long-term goals to improve recruitment and retention of full-time orthodontic faculty. There were 3 specific aims: (1) to quantify and compare the real and perceived differences in income between academic and private practice orthodontists, (2) to quantify and compare the perceived and real work-effort differences between academic and private practice orthodontists, and (3) to compare perceptions about other job satisfaction characteristics between academic and private-practice orthodontists.

**MATERIAL AND METHODS**

The experimental design included 3 separate, analogous questionnaires sent to all full-time orthodontic faculty in the United States (n = 170), a sample of private-practice orthodontists (n = 220) matched to the full-time faculty respondents, and all second-year orthodontic residents in the United States (n = 270). Full-time faculty were asked to answer questions about income, work schedules, job satisfaction, and their perceptions of these same factors for private practitioners. Private practitioners were asked to answer questions about income, work schedules, job satisfaction, and their perceptions of these same factors for full-time faculty. Residents were asked to answer questions about their perceptions of income, work schedules, and job satisfaction for full-time faculty and private practitioners.

Institutional Review Board approval was obtained before beginning the study. A current list of all full-time orthodontic faculty members (0.8 full-time equivalent or greater) in the United States was developed from the American Association of Orthodontists (AAO) faculty database. Programs were contacted directly to verify the accuracy of the database and to compile a list of all current second-year orthodontic residents. Departments were also asked about vacant, budgeted, full-time orthodontic faculty positions.

Questionnaires were sent to all full-time orthodontic faculty with a cover letter and a self-addressed, stamped envelope. The return envelopes were coded to identify nonrespondents. When the envelopes were received, they were matched to the code list, and the surveys were geographically coded and separated to maintain confidentiality of the answers. A second mailing was sent a month later to nonrespondents. It was estimated that the response rate would be approximately 70%.

After receiving responses from full-time faculty, 2 private practitioners were matched as closely as possible to each faculty respondent by orthodontic graduation year, geographic location, and sex. Surveys were mailed to private practitioners and second-year orthodontic residents along with self-addressed, stamped return envelopes. The return envelopes were coded to identify nonrespondents and were separated from the surveys upon receipt to maintain confidentiality of the answers. A second mailing was sent a month later to nonrespondents. It was estimated that the response rate would be approximately 60% for private practitioners and residents.

Data were entered into the SAS statistical software package (SAS Institute, Cary, NC). Descriptive statistics were calculated for each group of respondents. Mean real or perceived income and workload data were compared among faculty, private practitioners, and residents with multivariate analysis of variance (ANOVA). Post-hoc, specific differences between faculty, private practitioner, and resident responses were further explored with 2-sample t tests. Data within each group were compared with paired t tests. Ordinal data were compared among groups with the Wilcoxon rank sum test. Because of the many tests being performed, the significance level was set at $P < .01$. 
Table I. Demographic information (mean ± standard deviation)

<table>
<thead>
<tr>
<th>Faculty (n = 119)</th>
<th>Resident (n = 160)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Sex</td>
</tr>
<tr>
<td>50.9 (± 12.3)</td>
<td>Male = 94, Female = 20</td>
</tr>
<tr>
<td>48.2 (± 11.3)</td>
<td>Male = 64, Female = 13</td>
</tr>
<tr>
<td>31.0 (± 3.6)</td>
<td>Male = 113, Female = 45</td>
</tr>
</tbody>
</table>

Table II. Mean income and workload comparisons (mean ± standard deviation)

<table>
<thead>
<tr>
<th>Faculty</th>
<th>Practice</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total net income</td>
<td>$127k ± $53k</td>
<td>$301k ± $185k</td>
</tr>
<tr>
<td>Benefits</td>
<td>$19k ± $49k</td>
<td>$41k ± $42k</td>
</tr>
<tr>
<td>Income hours/week</td>
<td>46 ± 11</td>
<td>35 ± 9</td>
</tr>
<tr>
<td>Additional, nonincome hours/week</td>
<td>9 ± 7</td>
<td>6 ± 7</td>
</tr>
<tr>
<td>Total hours/week</td>
<td>55 ± 16</td>
<td>41 ± 13</td>
</tr>
<tr>
<td>Vacation days used/year</td>
<td>19 ± 17</td>
<td>29 ± 36</td>
</tr>
<tr>
<td>Income/hour</td>
<td>$49 ± $20</td>
<td>$168 ± $119</td>
</tr>
</tbody>
</table>

RESULTS

Of the 54 orthodontic programs in the United States that were questioned, 19 (35%) reported having at least 1 unfilled full-time faculty position. Of 200 positions nationwide, 30 (15%) were reported to be unfilled.

Surveys were returned by 119 of 170 (70%) full-time faculty, 79 of 220 (36%) private practitioners, and 160 of 270 (59%) second-year orthodontic residents. Mean demographic data for each group of respondents are shown in Table I. In addition, 32 faculty members reported their age as 60 or older (27% of those responding). Also of particular note is the average second-year orthodontic resident’s debt, reported to be $132,120 ± $91,884.

Income and workload

Comparisons between faculty and private-practice responses regarding income and workload are shown in Table II. Total income reported includes all orthodontic-related compensation such as practice income, faculty salary, and speaking fees. The reported total number of working hours per week was divided between regular office hours and additional preparation time spent for which no additional compensation was directly received.

Average faculty income ($127,000 ± $53,000) and benefits ($19,000 ± $49,000) were significantly lower than private practitioner income ($301,000 ± $185,000) and benefits ($41,000 ± $42,000) (P < .0001 and P = .002, respectively). Faculty reported working significantly more regular hours per week (P < .0001) and more additional, noncompensated work time (P = .001). Consequently, faculty reported working significantly greater hours overall (55 ± 16) compared with private practitioners (41 ± 13) (P < .0001). Additionally, faculty reported taking significantly fewer vacation days per year than did practitioners (P < .0001). Income per hour for faculty ($49 ± 20) was less than one third that of private practitioners ($168 ± 119) on average (P < .0001) (Fig 1).

Comparisons between actual faculty income and workload and the perceptions of private practitioners and residents about faculty income and workload are shown in Table III. Private practitioners significantly underestimated faculty income (P = .01) and overestimated faculty vacation days per year (P = .0003). Both private practitioners and orthodontic residents underestimated the number of hours faculty work per week (P < .0001).

Comparisons between actual private practice income and workload and the perceptions of faculty and residents are shown in Table IV. None of the faculty or resident perceptions about private practice differed significantly from reality except that faculty overestimated practitioners’ vacation days per year (P = .004).

When asked what each group thought would be a fair annual net income for full-time faculty, faculty, practitioners, and residents answered $184,000 ± $74,000, $179,000 ± 80,000, and $186,000 ± 69,000, respectively. These answers were not significantly different from each other.

Table V summarizes orthodontic residents’ perceptions of faculty and practice income and workload. All of the residents’ average perceptions were different between academics and private practice (P < .0001) except the number of extra, nonincome-producing hours worked per week. When asked how many years they thought it would...
take to pay off their educational debt as either faculty or private practitioners, residents answered 15 ± 9 and 9 ± 7 years, respectively (P < .0001).

Table III. Mean faculty income and workload comparisons (mean ± SD)

<table>
<thead>
<tr>
<th>Faculty actual</th>
<th>Private practice estimate</th>
<th>Resident estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total net income</td>
<td>$127k ± $53k</td>
<td>$107 ± $47k*</td>
</tr>
<tr>
<td>Hours/week</td>
<td>46 ± 11</td>
<td>38 ± 7*</td>
</tr>
<tr>
<td>Vacation used</td>
<td>19 ± 11</td>
<td>25 ± 7*</td>
</tr>
</tbody>
</table>

*Significantly different from actual, P < .01.

Table IV. Mean private practice income and workload comparisons (mean ± SD)

<table>
<thead>
<tr>
<th>Private practice actual</th>
<th>Faculty estimate</th>
<th>Resident estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total net income</td>
<td>$301k ± $185k</td>
<td>$358k ± $162k</td>
</tr>
<tr>
<td>Hours/week</td>
<td>35 ± 9</td>
<td>32 ± 6</td>
</tr>
<tr>
<td>Vacation used/year</td>
<td>29 ± 36</td>
<td>33 ± 22*</td>
</tr>
</tbody>
</table>

*Significantly different from actual, P < .01.

Job satisfaction

Faculty, private-practitioner, and resident responses to 5 questions concerning their perceptions of academics relative to private practice are compared in Figures 2-6. When comparing the amount of stress encountered at work, faculty answered that they thought they had somewhat more stress than a person in private practice (Fig 2). When compared with someone in private practice, faculty, private practitioners, and residents agreed that faculty encounter much more bureaucracy (Fig 3). Compared with private practice, faculty felt somewhat more satisfied in their academic positions than private practitioners or residents thought they would be (Fig 4). Compared with private practitioners, both faculty and practitioners thought that faculty are slightly less respected than private practitioners; how-

Fig 1. Faculty vs private practice income per hour (mean ± SD). Income per hour was significantly different between groups (P < .0001).

Fig 2. Stress. Faculty responses were significantly different from practice and residents (P < .01).

Table V. Residents’ perceptions of income and workload (mean ± standard deviation)

<table>
<thead>
<tr>
<th></th>
<th>Faculty</th>
<th>Private practice</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average total net income</td>
<td>$136k ± $61k</td>
<td>$285k ± $236k</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Net income, 2 years experience</td>
<td>$ 94k ± $37k</td>
<td>$168k ± $78k</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Net income, 5 years experience</td>
<td>$117k ± $48k</td>
<td>$259k ± $200k</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Net income, 10 years experience</td>
<td>$147k ± $64k</td>
<td>$349k ± $312k</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Benefits</td>
<td>$ 23k ± $23k</td>
<td>$31k ± $31k</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Years to pay off debt</td>
<td>15 ± 9</td>
<td>9 ± 7</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Work hours/week</td>
<td>41 ± 9</td>
<td>36 ± 6</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Additional nonincome hours/week</td>
<td>9 ± 9</td>
<td>8 ± 7</td>
<td>NS</td>
</tr>
<tr>
<td>Total hours/week</td>
<td>50 ± 13</td>
<td>44 ± 9</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Vacation used</td>
<td>21 ± 13</td>
<td>28 ± 18</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

NS, not significant.

Compared to someone in private practice with the same level of experience, do you think academic orthodontics is:

1. Much less stressful
2. Somewhat less stressful
3. About the same
4. Somewhat more stressful
5. Much more stressful
Compared to someone in private practice with the same level of experience, do you think someone in academic orthodontics encounters:

1. Much less bureaucracy
2. Somewhat less bureaucracy
3. About the same
4. Somewhat more bureaucracy
5. Much more bureaucracy

**Fig 3.** Bureaucracy. There were no significant differences in responses among groups.

Compared to someone in private practice with the same level of experience, do you think academic orthodontics is:

1. Much less satisfying
2. Somewhat less satisfying
3. About the same
4. Somewhat more satisfying
5. Much more satisfying

**Fig 4.** Satisfaction. All groups’ responses were significantly different from each other ($P < .01$).

However, residents believed that faculty are slightly more respected (Fig 5). Compared with someone in private practice, faculty thought that they have substantially more difficulty in obtaining American Board of Orthodontics (ABO) certification than private practitioners (Fig 6).

Compared to someone in private practice with the same level of experience, do you think orthodontists in general regard someone in academic orthodontics with:

1. Much less respect
2. Somewhat less respect
3. About the same
4. Somewhat more respect
5. Much more respect

**Fig 5.** Respect. Residents’ responses were significantly different from faculty and practice ($P < .01$).

Compared to someone in private practice with the same level of experience, do you think obtaining ABO certification for someone in academic orthodontics is:

1. Much less difficult
2. Somewhat less difficult
3. About the same
4. Somewhat more difficult
5. Much more difficult

**Fig 6.** ABO certification. Faculty responses were significantly different from practice and residents ($P < .01$).
DISCUSSION

There is currently a crisis-level shortage of full-time faculty in academic orthodontics; 35% of orthodontic programs in the United States reported having at least 1 unfilled full-time faculty position in 2002, corresponding to a total of 30 vacant, budgeted positions nationwide. More than 25% of the faculty responding to the survey reported their age as 60 or older. Several factors have been identified in this and previous studies to suggest that the full-time faculty shortage is unlikely to be resolved soon.

Parallel to the shortage of orthodontic faculty is a trend toward an increasing attractiveness of private practice, thus making it less likely that young orthodontists will be drawn to a career in academics. It is predicted that there will soon be a shortage of orthodontic practitioners in the United States, although its onset could be delayed by the recent downturn in the country’s economy. The total number of orthodontic resident positions available has decreased over the past 30 years because of the closing of several programs. In addition, more foreign residents are attending US orthodontic programs, and more women are graduating. Many foreign graduates have obligations to return to their home countries, and, in general, female graduates tend to work fewer patient treatment hours per week than do their male colleagues. With the increasing gap in income between private practice and academic orthodontists, along with fewer orthodontic graduates overall, even fewer candidates are seeking to fill vacant faculty positions each year.

Lower income potential is the primary reason cited in previous studies for orthodontists to enter into private practice rather than to pursue academics; it is also the most commonly stated factor by orthodontic faculty for leaving established academic careers. Total average compensation for academic orthodontists is substantially lower (less than half) than that of their private-practice colleagues. Faculty also report working substantially more hours per week. When these 2 factors are combined, the hourly income for full-time academic orthodontists is less than one third that of private practitioners matched by experience and geography on average. Several comments from survey respondents focused on the marked income differential between academics and private practice.

All 3 groups—faculty, practitioners, and residents—agreed that a fair yearly compensation for full-time faculty should be about $180,000, or $53,000 more than the current average. This is still substantially less than the average income reported by private practitioners. The difference could be related to the perceived difference in value of services provided by faculty compared with private practitioners. Alternatively, it might be due to the perception that entering academics is not as financially risky as entering practice. It is likely that the difference is at least in part an acceptance of the reality that faculty salaries will never equal the level achieved by private practitioners.

Coupled with the income disparity reported is the workload difference between faculty and private practitioners. Faculty respondents reported working 25% more hours per week than did private practitioners. Additionally, faculty said they spent 50% more nonincome-producing time in activities related to work than did private practitioners. Both private practitioners and residents underestimated the amount of time that faculty spent during, and in addition to, regular working hours.

Job satisfaction and perceptions about satisfaction are important for formulating a plan to alleviate the current faculty shortage. Both faculty and private practitioners stated that they believed their respective jobs were the more satisfying overall, while residents perceived both as almost equally satisfying. Private practitioners and residents thought that faculty deal with less stress than private practitioners, but faculty themselves disagreed. All 3 groups agreed that faculty deal with significantly more bureaucracy than private practitioners. Both faculty and private practitioners believed that faculty are slightly less respected than private practitioners, but this opinion was not shared by the residents who perceived that faculty were viewed with more respect. Both residents and faculty stated that ABO certification was more difficult for faculty to obtain than private practitioners; however, private practitioners did not perceive this difference.

Any long-term plan for resolving the full-time faculty shortage in orthodontics should focus on recruiting new graduates to academic careers. Therefore, the perceptions of orthodontic residents about faculty and private-practice incomes, workloads, and lifestyles are vital. When evaluating the differences between academic and private-practice career paths, the residents were well attuned to the income potential and time commitment of both options. Residents’ perceptions regarding both academics and private practice were closer to reality than were the perceptions of either group regarding the other. It is apparent, however, that residents enter dental school and orthodontic programs with the intent to enter private practice; only 8 of the 160 (5%) residents responding indicated an interest in an academic career.

Many of the residents’ comments on the survey focused on the income difference between academics and
private practice and their own substantial debt burdens. A few respondents said they would be more likely to consider an academic career if it weren’t for the lower income potential and consequent inability to pay off their debts. With the average debt of second-year orthodontic residents reported in this study to be over $130,000, the potential salary difference undoubtedly deters new graduates from accepting and maintaining faculty positions. Residents perceive that it would take almost twice as long to pay off their educational debts in a faculty position than in private practice.

The solution to the current and projected full-time orthodontic faculty shortage is not simple. One obvious, yet difficult, step would be to raise average salaries for academicians. It has been suggested that a way to achieve this would be to give faculty more opportunities to see private patients either inside or outside the academic setting.3 However, the more time faculty spend seeing private patients, the less time they spend educating future orthodontists, performing research, and accomplishing other scholarly activities. It would seem more logical to pay faculty more to perform the functions for which they are uniquely skilled and experienced.

Other suggestions to improve faculty recruitment and retention have included forgiving educational debt in exchange for academic service, reducing bureaucratic workload for faculty, changing perceptions to increase respect of faculty, improving nurturing of new faculty recruits, increasing alumni support and endowments, providing more positive faculty role models, and streamlining or eliminating tenure requirements.3 Solutions discussed at the 1997 Orthodontic Chair Conference included adopting the medical model in which funds generated from resident work helps support faculty salaries, increased use of the half-time faculty model, increased support from the AAO Foundation, AAO dues waivers for faculty, and further educating AAO members about the problem. Recruiting part-time faculty into full-time service also seems to be worth pursuing because 33% of the full-time faculty started their careers as part-timers, according to Kula et al.6

Modifying the ABO certification process to make completion more attainable for faculty would be helpful because board certification is an important consideration for faculty promotion and salary increases at the school and university levels.4 ABO certification is also a requirement for assuming the role of orthodontic program director as stipulated in the American Dental Association accreditation guidelines. Many faculty respondents cited this as a problem and commented that ABO certification was particularly difficult for them to obtain because of the few patients they treat and the limited time available for treating faculty-practice patients. Time allocated among teaching, research, and practice responsibilities becomes even more critical as the number of faculty continues to decrease.

As it becomes more difficult to recruit full-time orthodontic faculty in the future, programs will need to rely more heavily on help from half-time or part-time faculty. There is no doubt that adequate training of orthodontists can occur with fewer, or even no, full-time faculty if necessary. A well-respected specialty, however, needs to maintain high standards in both education and research. Beyond training future practitioners, the reputation of the specialty requires faculty both to educate practitioners and to participate at the highest levels of academic performance in universities. It is unreasonable to expect that part-time faculty, or even full-time faculty recruited to teach after retiring from practice, could easily integrate themselves into rigorous research or other scholarly activities. To maintain the status of the orthodontic specialty, programs must recruit and retain highly qualified full-time orthodontic faculty who will spend their careers in academic orthodontics.

Efforts should be focused on recruiting current and future residents from within orthodontic programs. Instilling in residents the culture of giving back to the specialty will be crucial to its future. Strategies need to be developed to address the concerns of current residents and faculty about overwhelming debt burdens, gross disparities in income potential, difficulties in attaining ABO certification, alleviation of bureaucratic loads, and the uncertainty of tenure requirements.

CONCLUSIONS

The disparity in income between full-time faculty and private practitioners is significant, with private practitioners earning more than double the income of full-time faculty on average. The difference is enhanced when the increased length of the average faculty workweek is considered. Income per hour for full-time faculty is less than one third that of private practitioners. Faculty, private practitioners and residents realize the large disparity in income, however, and all think that orthodontic faculty should be paid significantly more. Residents and faculty appear to have a good understanding of the time commitment in private practice. However, private practitioners and residents underestimate the time commitment of full-time faculty.

Qualified orthodontic faculty members are needed to continue to graduate high-quality orthodontic residents and to promote and advance the specialty through education and research. It is expedient to develop new ways for recruiting residents, part-time faculty, and private practitioners into full-time academic and to retain those already devoted to academic careers. It is apparent from the results
of this study that all 3 groups value the current orthodontic educational system and its importance for maintaining the integrity of the orthodontic specialty.

REFERENCES


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1931 to 1968 H. C. Pollock
1968 to 1978 B. F. Dewel
1978 to 1985 Wayne G. Watson
1985 to 2000 Thomas M. Graber
2000 to present David L. Turpin