Osteopathic principles and practice (OPP) are considered the core, distinguishing elements of the osteopathic medical profession. As such, the American Osteopathic Association introduced Osteopathic Postdoctoral Training Institutions (OPTIs) in 1995 to further incorporate OPP into osteopathic graduate medical education. The current study describes the evolution of the OPP teaching programs at the West Virginia School of Osteopathic Medicine (WVSOM) in Lewisburg in conjunction with its OPTI consortium, the Mountain State OPTI. Developments in distance-learning technology, lecture and workshop curricula for graduate and undergraduate students, and faculty training are described. In addition, elements of “telehealth” technology, including administrative support, and trainee and student evaluations of the programs are examined. It is hoped that the description of WVSOM’s curricular evolution and the emphasis on meeting the needs of OPP program attendees will assist other osteopathic medical schools in developing their own unique OPP programs.

Improving osteopathic graduate medical education (OGME) has been—and continues to be—a much discussed topic within the osteopathic medical profession.1-6 Of the more central topics related to OGME, some educators5,6 report a need to further incorporate and emphasize the teaching of osteopathic principles and practice (OPP) into osteopathic internship and residency programs.

In 1995, the American Osteopathic Association (AOA) established Osteopathic Postdoctoral Training Institutions (OPTIs) as a system to structure and accredit OGME.7 The OPTI and its accreditation standards were created to improve OGME and better prepare osteopathic physicians (DOs) to treat their patients, particularly in relation to OPP. As defined by the AOA,8 OPTIs are to include the following:

- programs of postdoctoral instruction and training in the art and science of the principles and practice of osteopathic medicine and distinctive osteopathic healthcare
- faculty development programs that include OPP
- integration of OPP (taught by OPP faculty) into all teaching services, as appropriate

At the time the OPTI mission statement was published, programs at the West Virginia School of Osteopathic Medicine (WVSOM) in Lewisburg were already on track to increase OPP integration. The then Academic Dean of WVSOM, the late James R. Stookey, DO, had initiated the OPP Integration Project in 1992. At first, this project consisted of monthly 1-hour didactic lectures followed by osteopathic manipulative treatment (OMT) demonstrations given by one OPP faculty member (W.W.L.) at the Greenbrier Valley Medical Center in Fairlea, WV, a local hospital training site. In 1996, in keeping with the AOA’s mission statement for OPTI development, Dr Stookey supported and encouraged the expansion of this lecture series to other hospital training sites in the rest of the state and in neighboring Virginia. Monthly lectures were provided at the local hospital training site during each of the 9 months of the academic year, with frequency varying from 1 to 4 times per year at more distant hospital training sites. These lectures were the beginning of a formal integration of OPP into WVSOM’s OGME program and its OPTI consortium, the Mountain State OPTI (MSOPTI, see http://www.wvsom.edu/OPTI/). Although the MSOPTI Lecture Series was favorably received by attendees, this approach could not be used to provide a standardized, uniform teaching program to all MSOPTI training sites because only one OPP faculty member delivered the lectures. It was physically impossible to provide 9 monthly lectures at all MSOPTI sites.

Dr Stookey also approved plans for the expansion of the school’s OPP teaching programs for the 1997-1998 academic year. This expansion consisted primarily of the development of workshops, which comprised brief didactic presentations of clinically relevant topics followed by hands-on instruction in OMT. The workshops were presented by OPP faculty who traveled to the MSOPTI sites. The objectives of these workshops, which were presented to Dr Stookey, were as follows:
MEDICAL EDUCATION

- To improve integration of OPP and osteopathic manipulative medicine (OMM) in hospitals for postgraduates as well as third- and fourth-year osteopathic medical students
- To encourage physician use of OMT in hospitalized patients, especially those with viscerosomatic disorders
- To unify undergraduate and postgraduate OPP teaching programs into a 7-year OPP curriculum
- To train teachers in OPP and OMM

To accomplish these goals, WV SOM's OPP faculty recognized the need to further develop MSOPTI's teaching programs as well as encourage on-site directors of medical education and hospital staff physicians to participate in these programs. As such, OPP faculty at WV SOM served as academic resources and advisors for MSOPTI site physicians to teach OPP and perform OMT in their hospitals. All MSOPTI site physicians were volunteer DOs, many of whom had expertise in OMT.

The original MSOPTI OPP workshop curriculum consisted of four workshops and involved six MSOPTI sites that were paired by geographic location. This program design ensured that a 2-hour workshop could be provided quarterly for each MSOPTI site. After consulting with OPP faculty and MSOPTI site directors of medical education to confirm that the educational needs of each MSOPTI site were met, four primary care topics were chosen: osteopathic diagnosis and treatment of acute low back pain, acute chest pain, acute neck and arm pain, and acute headache. Four additional lecture topics were added in 2001 to create a 2-year cycle for the workshops: osteopathic structural examination, osteopathic diagnosis and treatment of respiratory dysfunctions, gastrointestinal dysfunctions, and genitourinary dysfunctions. Workshops typically discussed somatic dysfunction in the related topic and introduced various OMT techniques and skills.

Workshops were conducted in the evening hours and usually began with a 15- to 20-minute didactic lecture on the designated primary care topic followed by a hands-on OMT laboratory relevant to that topic. Attendance at such presentations is included in interns' and residents' 80-hour work week schedule.

Annual staffing for these workshops involved a total of four OPP faculty members and graduate teaching assistants (GTAs, informally known as "fellows" at some osteopathic medical schools). Workshops were taught by two "table trainers," represented by either one OPP faculty member and one GTA or two OPP faculty members. Faculty and GTA assignments rotated so that MSOPTI sites could become familiar with as many OPP faculty and GTAs as possible. Osteopathic interns and residents were required to attend 80% of all educational programs, which included both OPP and non-OPP lectures and workshops. To encourage faculty development in OPP, MSOPTI site directors of medical education were also required to attend the workshops. Third- and fourth-year osteopathic medical students were encouraged to attend.

Successful delivery of the original workshops necessitated one or two OPP faculty members being off campus once a month so that each MSOPTI site could receive four workshops per year. It also involved faculty driving up to 4 hours from campus and transporting treatment tables to the workshops, as MSOPTI sites at that time did not have enough treatment tables to accommodate all workshop participants.

**Evolution of Teaching Programs**

Although the original lectures and workshops were effective, certain elements of the program were not meeting the needs of the MSOPTI. For example, OPP faculty members at WV SOM experienced stress and inconvenience in driving from the Lewisburg campus to the various MSOPTI workshop sites because some sites required 2 to 5 hours of driving time. This schedule also had to be interfaced with the OPP faculty's on-campus undergraduate teaching assignments. As a result, WV SOM's OPP programs evolved in various aspects, from the implementation of audiovisual technology to increased faculty involvement and training.

**Audiovisual Technology and Preliminary Program**

In 1998, WV SOM's access to new audiovisual technology hastened the further expansion of the OPP teaching programs to MSOPTI sites. West Virginia (Morgantown) University's Mountaineer Doctor Television (MDTV) installed "telehealth" equipment at WV SOM. This technology gave WV SOM the ability to simultaneously connect Lewisburg with multiple OPTI sites in West Virginia, Virginia, and Ohio. The use of this technology for osteopathic medical education programs became known as OPTI Link.

The MSOPTI contracts with MDTV on an annual basis to provide the telehealth network for its distance-learning broadcasts. Each designated MDTV site pays a monthly membership fee of $55. The MSOPTI pays a $50 connection fee for each in-state broadcast and a $60 fee for out-of-state connections. Line charges for MDTV range from $23 to $40 per hour, per event, which the MSOPTI office at WV SOM pays per broadcast.

To connect to multiple sites cost-effectively, MDTV uses Integrated Services Digital Network (ISDN) technology for its videoconferencing equipment. This technology uses dedicated 384 kb/s high bandwidth lines, which can be connected at a videoconferencing bridge in Morgantown, WV, much like a telephone conference call with multiple participants. A complete system for one site can cost anywhere from $10,000 to $20,000. Typically, each site pays a monthly fee for their ISDN lines, much like a cable bill.

The WV SOM Osteopathic Clinical Skills Lab has proven to be an ideal site for introducing this fully interactive audiovisual technology as a result of the availability of cameras at standard table and ceiling heights, stage lighting, and a television control room. This facility provides excellent displays of various types of OMT demonstrations, Microsoft PowerPoint presentations, images displayed with a document camera, as well as videos from the other sites.
At the time that this new technology was being introduced to WVSOM, the MSOPTI Lecture Series developed into a set of 10 lectures, with a goal of establishing a monthly lecture series, called Osteopathic Grand Rounds. The program format previously described for the MSOPTI Lecture Series was maintained, and the lectures were given from 8:00 AM to 9:00 AM on the last Thursday of each month. No lectures were scheduled in December or June as a result of holiday and vacation schedules for faculty and hospital house staff. As previously stated, osteopathic interns and residents were required to attend a minimum of 80% of the total educational programs offered by the MSOPTI unless excused by the director of medical education or residency program director. These directors were required to attend the Osteopathic Grand Rounds, while third- and fourth-year osteopathic medical students were invited to attend. Lectures were presented via videoconferencing equipment from the WVSOM laboratory with the director of media services (R.M.M.) overseeing the on-screen presentation in the television control room. In that room, the director can pan, tilt, and zoom both cameras, switch between cameras and graphics, make audio adjustments, and maintain the ISDN connection.

After using distance-learning technology for 2 years for Osteopathic Grand Rounds lectures, it became apparent that the technology would also be effective for delivering the MSOPTI OPP workshops. In 2000, the first workshop from the WVSOM laboratory was broadcast to MSOPTI sites.

The 3-Year Curricular Cycle
The WVSOM lecture series were thus presented to MSOPTI sites via distance-learning technology for the next 3 years as two parallel curricula: the Osteopathic Grand Rounds and the MSOPTI OPP Workshops, which were repeated every year and every 2 years, respectively. Student feedback, however, indicated that this format led to some redundancy of topics between the two programs. The WVSOM associate dean of osteopathic medical education (K.M.S.) recommended that the program be expanded into a 3-year cycle to more efficiently integrate OPP into OGME. To complete the new cycle, four additional MSOPTI OPP Workshops were added to the curriculum for a total of 12 workshops and were integrated with the Osteopathic Grand Rounds lecture series (Appendix). The new 3-year curriculum began in the 2003-2004 academic year and has been well received by osteopathic interns and family practice residents.

Although the WVSOM training program was designed to meet the needs of osteopathic interns and family practice residents, more topics were added as the MSOPTI grew to include residents in pediatrics and urology.

The 7-Year Program
Through the office of the associate dean for osteopathic medical education, WVSOM has implemented a continuous, 7-year OPP curriculum. This continuum begins at student orientation and continues throughout all residencies provided through the MSOPTI system. The curriculum is based on the integration of the four principles of the osteopathic philosophy into the care of patients.

To apply these principles to patient care, the five traditional models of osteopathic care—postural-structural or biomechanical, neurologic, respiratory-circulatory, psychobehavioral, and bioenergetic—are used as they apply to all body systems. Every WVSOM faculty member is responsible for conveying these principles to the students as the principles apply to their discipline or field of basic or clinical science.

The OPP curriculum at WVSOM for third- and fourth-year osteopathic medical students consists of a number of OPP-centered requirements. For example, third- and fourth-year students are required to complete the following:

- a 2-week required rotation with an OMM specialist or another specialist whose practice has an OMT emphasis
- reading assignments in OPP and end-of-rotation examinations in the family practice and pediatrics rotations
- course review lectures in OPP conducted during the Comprehensive Osteopathic Medical Licensing Examination-USA Level 2 preparation week
- case presentations using OMT from their junior and senior family practice rotations, which are submitted and graded online

In addition, third- and fourth-year osteopathic medical students completing clerkships at MSOPTI sites are required to attend MSOPTI presentations. They may also take advantage of MDTV broadcasts at over 20 other West Virginia locations.

With the development of a statewide campus system and the requirement that all students participate in this system beginning in 2006, a curriculum for all junior students was modeled after the MSOPTI curriculum. It is anticipated that the same distance-learning technology now used in the MSOPTI program will provide much of the third-year curriculum.

Faculty
Faculty training was promoted initially by having an audiovisual conference between OPP faculty and MSOPTI site faculty 1 week before workshop broadcasts. These sessions afforded MSOPTI site faculty the opportunity to ask questions, review the content of the upcoming workshops, and become familiar with the OMT being presented. Within 2 months, the faculty’s confidence and competency levels had been enhanced to the point that these audiovisual conferences were no longer necessary. Currently, the OPP faculty at WVSOM are available as resources for MSOPTI site faculty.

In 2006, WVSOM sponsored a series of biannual continuing medical education (CME) presentations called “OMT for Primary Care Physicians,” which is a series of OMT workshops related to all body regions. A $100 scholarship to apply toward the cost of attending CME programs and workshops is avail-
able to MSOPTI faculty to encourage them to participate in CME opportunities as another means of faculty development.

The MSOPTI site faculty involvement also increased in the MSOPTI workshops by having either the director of medical education, table trainer, or the designated intern or resident from each participating MSOPTI site briefly present a real case at the beginning of the workshop related to the topic being discussed (eg, a lower respiratory infection case for the workshop on osteopathic diagnosis and treatment for patients with respiratory conditions). This approach promotes a more case-based relevance to the presented topic as well as positively impacting faculty development. As the MSOPTI programs evolve, faculty development in OPP and OMT will continue to be emphasized so that MSOPTI site trainers feel confident and comfortable in eventually providing MSOPTI lectures and workshops from their respective sites through distance-learning technology.

Administration of Distance Learning
Although technical problems associated with the delivery of the MDTV/OPTI-Link programming occasionally occur, the system remains a reliable platform for program delivery. In addition to the lectures and workshops provided by the OPP faculty at WVSOM, the MDTV/OPTI-Link system is used for a variety of other programs, such as MSOPTI OGME committee meetings, community and health-related CME programs, and interactive discussions with house staff and faculty during accreditation surveys. Although the MDTV system and osteopathic programming interfaced well with one-on-one and small group orientations, the larger the audiences became, the more likely it was that problems associated with the inability to view and hear the broadcasts would occur. Such problems were compounded as programming expanded from dual-location broadcasts to multiple-site participation. The use of educational aids (eg, transparent film-based overhead projections) was also limited because they were difficult to read as a result of insufficient clarity. However, this barrier has been mostly resolved through improvements in distance learning technology and the increased use of Microsoft PowerPoint presentations in place of less technologically advanced materials.

Technical limitations associated with on-site usage are more common. The MSOPTI now requires an on-site audiovisual technician or program support staff member with appropriate equipment training to be present at all required MSOPTI broadcasts. Technicians ensure a stable connection with distance MSOPTI sites, thus increasing audience participation and program quality.

Currently, the MSOPTI consortium has 10 affiliated hospital training sites that have incorporated the MDTV/OPTI-Link distance-learning technology. Two other sites with compatible distance-learning systems are in the process of applying for AOA-accredited postdoctoral training programs. The director of media services for WVSOM (R.M.M.) is available to assist prospective MSOPTI sites, in assessing equipment needs and upgrades, compatibility and configuration issues, costs, and on-going consultation.

New hospital training sites are under development, as well as new programs within the current consortium. All MSOPTI sites are required to support the distance-learning initiatives and programs developed through the MSOPTI curriculum and OGME committees. The MSOPTI postdoctoral programs include a variety of traditional, fast-track, and special emphasis internships, with AOA-accredited residencies in family practice, internal medicine, emergency medicine, combined internal and emergency medicine, pediatrics, and urologic surgery.

In addition to the educational support for distance-learning and technical equipment, each MSOPTI hospital is responsible for providing a sufficient number of treatment tables for each OPP program. Although the number of house staff for each MSOPTI hospital training site is relatively small (ranging from 2 to 20), the number of treatment tables and video monitors required is manageable to set up at each site. Currently, the MSOPTI has 106 house staff in 10 active postdoctoral training sites around West Virginia and in Toledo, Ohio. Student and clerkship opportunities are available in four other MSOPTI-affiliate member hospital locations.

Administrative staff, who support the entire distance-learning process, are crucial to the success of MSOPTI’s teaching programs. Because the OPTI-Link network “piggybacks” onto the MDTV network, all potential timeslots for broadcasts must first be checked for scheduling conflicts with MDTV programming. The MSOPTI office staff provides each training site with program handouts, attendance and evaluation forms, and speaker backgrounds, when warranted. They are also responsible for collecting the attendance and evaluation forms from each training site. The MSOPTI office handles all budgeting and accounting for MSOPTI broadcasts and programming, including paying contracted table trainers $400 for each OPP workshop.

The impact of OPP and distance-learning programming on MSOPTI has been considerable. At its 2001 AOA inspection, the MSOPTI received a commendation for overcoming geographic barriers by utilizing distance-learning technology in delivering OPP and OMT instruction to partner hospitals. The OPP integration process at WVSOM and MSOPTI continues to drive the quality of MSOPTI distance-learning programming. Its influence on OPTI accreditation and curricular impact has exceeded all expectations locally and statewide, and it has resulted in numerous contacts and references on a national basis. As the OPP integration process evolves into additional specialties, the perception among trainees regarding MSOPTI-based training opportunities will continue to be improved.

Program Evaluation
Trainee and student evaluations have been an integral part of the evolution of OPP programs at WVSOM. All participants (eg, trainers, trainees, osteopathic medical students) are encour-
aged to assess, on a scale of 1 to 4, each workshop and lecture on the quality of the presentation, impact on the respondent's knowledge base, convenience of the date and time of the presentation, and quality of the distance-learning format. Of the workshop respondents in the 2004-2005 academic year, the average rating of presentation quality was 3.3, the effectiveness in improving knowledge about the topic was 2.97, the convenience of the date and time of the program was 2.33, and the quality of the distance-learning format was 3.11. Likewise, Osteopathic Grand Rounds respondents rated the presentation quality 3.34; knowledge improvement, 3.2; convenience, 3.07; and distance-learning format quality, 2.67. The program evaluation forms also allow written comments, in which respondents from the same year may include general suggestions for improving the program.

In the 2004-2005 academic year, only 30 (14%) of 217 MSOPTI OPP Workshop participants and 86 (29%) of 300 Osteopathic Grand Rounds lecture attendees completed and returned the corresponding evaluation forms. These poor response rates highlight the need to improve the collection of completed evaluation forms from distant MSOPTI sites.

Recorded copies of MSOPTI broadcasts are made available to each OPTI site for various purposes, such as repeating a broadcast for someone who was absent from the original presentation. To increase the number of completed evaluation forms for some of the broadcasts, each site's medical education coordinator was asked to contact interns and residents who had excused or unexcused absences for previously aired broadcasts from the 2005-2006 academic year and develop a repeat-viewing schedule for both workshops and lectures. Repeat viewings require attendees to submit the appropriate evaluation forms to the MSOPTI office. It is hoped that additional forms will be returned from both absent groups, although more effort has been focused on those with unexcused absences. More efficient means of tracking program evaluations and improving survey response rates, such as using electronic evaluation forms, are being explored.

Comments

The OPP Integration Project at WVSOM began in 1992. The stated goal of this project was “to create a curriculum that will graduate physicians who utilize the osteopathic philosophy in their clinical practices and provide osteopathic manipulation to their patients.” It is interesting to note how closely this goal compares with the first AOA core competency for accreditation of postgraduate training programs, which was published approximately 10 years later:

Residents are expected to demonstrate and apply knowledge of accepted standards in Osteopathic Manipulative Treatment appropriate to their specialty. The educational goal is to train a skilled and competent osteopathic practitioner who remains dedicated to life-long learning and to practice habits in osteopathic philosophy and manipulative medicine.

The 3-year MSOPTI curriculum is well designed to meet this goal. Retrospective surveys of WVSOM graduates from 1995 through 1999 are being conducted to determine if the primary goal of the OPP Integration Project has been met. The data for these classes will be analyzed and reported in the future.

The OGME training programs in OPP at WVSOM have continued to evolve since they were introduced into the MSOPTI in 1996. Along the way, many lessons have been learned that may be helpful to other osteopathic medical schools in designing their own OPP teaching programs. Development of a 3-year cycle of OGME OPP programs is optimal and prevents redundancy of material in internships and 2-year residencies. Monthly presentations are instrumental in keeping OPP and OMM in the consciousness of interns, residents, and OPTI site directors of medical education—thus promoting the integration of these concepts into patient care.

Although these teaching programs are primarily directed toward OGME, inclusion of third- and fourth-year students when possible is recommended. This integration allows for a trickle-down effect of OPP clinical instruction into predoctoral training. Interns and residents are important role models to students. In the experience of WVSOM, students who see interns and residents actively engaged in OPP lectures and workshops and integrating OMM into their patient care are positively impacted during their undergraduate clinical education.

These programs are proving to be an excellent forum for identifying, nurturing, and training future academicians in OPP and OMM. For example, five of WVSOM’s interns and residents who were trained in the OPP programs and who have established practices within the MSOPTI sites have become some of the most osteopathically minded directors of medical education and table trainers. One of the prominent concepts in the AOA’s original mission statement for developing OPTIs was to utilize OPP faculty as an educational resource for faculty development within the OPTI. In fulfillment of this goal, MSOPTI site table trainers are encouraged to develop their own OPP presentations so that in time they can become the primary presenters of some of the MSOPTI OPP Workshops and Osteopathic Grand Rounds lectures. This will increase MSOPTI site faculty involvement in these programs and continue to enhance the integration of OPP and OMM into education and patient care at MSOPTI training sites.

Educational OPP programs, such as those described in this article, need to be individualized to meet the training needs of the OPTI. Because some residencies evolve within a growing OPTI, OPP training programs need to maintain flexibility in order to meet their needs. As a result, it is unlikely that a national standardized OGME program in OPP could be effectively established.

Evaluation of OPP programs in OGME must be ongoing both from trainee and student participants as well as from critiques by OPP faculty, OPTI site directors of medical education, program trainers, and table trainers. The 3-year cycle
of OPP programs at WVSOM, for example, resulted in large part from faculty and administration’s response to student evaluations, which brought attention to redundancy of material when it was a 2-year program. Ongoing program evaluation promotes positive fine tuning of teaching programs and keeps in step with the changing needs of a growing OPTI.

Presently, interns and residents are evaluated on their OMT skills via OPP faculty and MSOPTI site faculty at the workshops. Residents are also evaluated on their ability to apply OMM in each of their rotations. Because further development of trainee evaluation is needed, objective structured clinical examinations, which will include evaluation of OMM skills for residents, are being created.

Distance-learning technology has permitted more efficient use of faculty resources and enabled teaching programs to reach multiple geographic sites simultaneously. This technology gives the OPTI sites access to state-of-the-art interactive audiovisual presentations while promoting communication between OPTI sites. Although there are a few disadvantages associated with distance-learning (eg, possible poor audiovisual quality, trainees and students exhibiting reluctance to interact when they are “on TV,” technological system failure), most problems can be avoided with the help of an attending audiovisual technician.

Finally, administrative support from both osteopathic medical schools and OPTI sites is important in all aspects of program delivery. This support entails providing budgetary support for distance-learning technology, providing an adequate number of treatment tables at each OPTI site, and financial incentives (eg, paying table trainers hourly for their participation and giving CME credit for their participation). Some MSOPTI sites staffed predominantly by allopathic physicians were initially somewhat naive as to how OPP integrates into patient care, but such a disparity has been reduced through continued faculty development and administrative support, both from WVSOM and the MSOPTI sites.

Conclusion

The AOA, in its original OPTI mission statement of 1996 and more recently in its promotion of the core competencies, is pragmatically supporting the integration of OPP into all levels of undergraduate and postgraduate training. Osteopathic principles and practice cannot be learned in 2 years of undergraduate training; it is a lifelong professional endeavor. If the osteopathic medical profession is to maintain its unique philosophical approach to healthcare, then it must be consistent in teaching OPP through all levels of undergraduate and postgraduate training programs, including CME. The 3-year OPTI curriculum, which is part of WVSOM’s 7-year OPP curriculum, is proving to be an effective tool for achieving these goals. We hope that other COMs may find the educational resources described in the current article helpful in developing their own unique OPP teaching programs.

Acknowledgments

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References

### Appendix

Mountain State Osteopathic Postdoctoral Training Institutions (MSOPTI) 3-year curriculum in osteopathic principles and practice (OPP).

*Topics presented in November, January, February, and April for each academic year were OPP workshops presented by both OPP faculty and MSOPTI faculty. All other programs were part of the Osteopathic Grand Rounds and were presented by OPP faculty only.

†No presentations were made in December or June as a result of holiday and vacation schedules. **Abbreviations:** NA, not applicable; OB/GYN, obstetrics and gynecology; OMT, osteopathic manipulative treatment.

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