JCO ROUNDTABLE

The Future of Orthodontics
Part 2 Management and Other Issues

DAVID S. VOGELS III, Moderator
R.G. "WICK" ALEXANDER, DDS, MSD
LUIS CARRIERE, DDS, MSD, PHD
GAYLE GLENN, DDS, MSD
ELLIOTT M. MOSKOWITZ, DDS, MS
W. RONALD REDMOND, DDS, MS
JONATHAN SANDLER, BDS, MSC, FDS RCPS, MOrth RCS

Management

MR. VOGELS To what extent is your office "paperless"? What new computer technologies do you think may emerge during the next decade to make practice management even more efficient?

DR. CARRIERE Our office is totally paperless. Regular computers at all offices and administrative areas and laptop computers at every chair are connected with fiberoptic intranet to a central server (Fig. 8). Data and images are displayed. Every area is limited with a password according to the data-protection law in our country.

DR. ALEXANDER Paper has worked well for me over the years, but it is obvious that paperless offices are the future. Our goal is to be paperless by the end of this year. We must always be aware, though, that as we become more "high tech," we cannot forget the "high touch." Orthodontics is all about people. I do not believe that technology can replace personal communication with our patients.

DR. SANDLER We currently have computerized patient photographs, both intraoral and extraoral, and computerized radiographs. These are all linked to color printers, so it is a relatively simple task to print out copies of photographs and radiographs for patients, their parents, and the referring practitioners. We still use paper records of the treatment undertaken. I would like to think that we will move to a paperless system over the next 10 years and that there will be no need for paper records of patient treatments. I can

Mr. Vogels is Managing Editor of the *Journal of Clinical Orthodontics,* 1828 Pearl St., Boulder, CO 80302. Dr. Alexander is a Contributing Editor of the *Journal of Clinical Orthodontics,* a Clinical Professor of Orthodontics at Baylor College of Dentistry, Dallas, and in the private practice of orthodontics at 840 W. Mitchell, Arlington, TX 76013. Dr. Carrière is a Clinical Professor, Department of Orthodontics, University of Ferrara, Italy, and in the private practice of orthodontics at Escuelas Pias, 109, 08017 Barcelona, Spain. Dr. Glenn is the Southwest Society of Orthodontists Trustee to the AAO Board of Trustees and in the private practice of orthodontics at 7005 Pastor Bailey Drive, Suite 101B, Dallas, TX 75237. Dr. Moskowitz is a Contributing Editor of the *Journal of Clinical Orthodontics* and a Clinical Professor, Department of Orthodontics, NYU College of Dentistry; he is in the private practice of orthodontics at 11 Fifth Ave., New York, NY 10003. Dr. Redmond is Technology Editor of the *Journal of Clinical Orthodontics* and in the private practice of orthodontics at 30111 Niguel Road #G, Laguna Niguel, CA 92677. Dr. Sandler is a Contributing Editor of the *Journal of Clinical Orthodontics* and Consultant Orthodontist, Chesterfield Royal Hospital, Calow, Chesterfield, Derbyshire S44 5BL, England.

Fig. 8 Chairside laptop computers in operatory.

see no reason whatsoever why Internet-based software could not be used to manage the patient records we are currently keeping.

DR. REDMOND Indeed, Internet-based software is the wave of the future (if you don't believe me, ask Bill Gates), and orthodontic offices will soon begin to realize the benefits of this mode of practice management. Imagine, all updates and data backup are done at a remote location. No more servers to maintain or replace. Thin Clients will replace chairside computers. The noise and heat from chairside computers will be a thing of the past. Imagine transmitting models of the teeth to Invisalign, or the orthodontic lab, rather than mailing the impressions. It will be a great day for the patients, the doctor, and our staff.

I believe in the future we will combine radio-frequency identification (RFID), "heads-up" display, and wireless technology to produce an advanced pair of eyeglasses. Built into the frames of the glasses will be a miniature projector focused on the inside of the glass lenses. Like the fighter pilot who can view information projected on the inside of the windscreen, and also look past it to view outside, the orthodontist will view patient information projected on the inside of the glasses, and be able to look past it to view the patient. Voice-recognition software will allow chart entries and computer control. RFID will provide perimeter control to prevent overlapping of patient information within the office. This technology will remove most of the desktop computer equipment from the operatory and create a more HIPAA-compliant atmosphere.

Another emerging technology will involve Bluetooth communication and laser projection (Fig. 9). Three penlike devices will use laser-projection technology to project the keyboard, a CPU, and a video screen. The three devices can all communicate with one another utilizing Bluetooth technology. Imagine walking around with these three pens clipped to your inside coat pocket—a real show-stopper!

Fig. 9 Virtual keyboard using Bluetooth and laser-projection technologies (courtesy of i.Tech Dynamic Limited, Hong Kong; www.itechdynamic.com).

MR. VOGELS What developments in orthodontic office design have most affected the way you practice? What future developments promise to make treatment more efficient or offices more patient-friendly? How will computerization continue to affect office design?

DR. CARRIERE The way we practice in our office is imposed by the specific needs of the patient considered as an individual. In our clinic, the whole design and function and ergonomics have been based on the needs of space and form required by the treatment module as the starting point. The rest was designed in an incremental progression toward general services. Furniture is also modular, as well as the space distribution. We are working as a group practice, with a common secretary, administration, laboratory, sterilization area, and x-ray department.

DR. SANDLER Movement to an open-plan office has been a major development that has affected the way in which we practice orthodontics. I can see more and more offices becoming open-plan in the future. Hopefully computerization will be commonplace, and at the touch of a button patient records will be able to appear at each individual work station.

DR. ALEXANDER We are still in the same office that was on the cover of JCO in 1975.[22] All offices reflect the personality of the doctor. What

Mr. Vogels

works for one might be horrible for another. Computerization will change record access, but not necessarily the design of the office—except for a location to place the monitor and other equipment.

DR. GLENN We have more computer equipment in the clinical treatment areas than we did a few years ago. We are moving toward having a computer at each chair in the treatment area, so that we can become paperless at some point in the future.

MR. VOGELS How has the computer affected your collection and billing systems? How much financial management do you outsource?

DR. GLENN My office updated our computer software about three years ago. Collections have increased due to having up-to-date financial information, which can be viewed easily by the staff. Accurate statements are easily produced and mailed at regular intervals. As far as outsourcing, we outsource monthly electronic bank drafts to a third party. I feel that third-party processing of payments will continue to increase, because it is easier for the office staff and is becoming more cost-effective. I also use a payroll service, which provides direct deposit for my employees and files the quarterly payroll reports. Because of my travel schedule, this service works well for my practice. Payroll no longer depends on my being present to sign the checks biweekly.

DR. CARRIERE The computer has transformed our billing system into a simple and controlled procedure at our fingertips. We run our office in a self-contained style without outsourced management.

DR. REDMOND Almost all financially related systems have come back into many offices, including accounts payable and receivable, payroll, and tax preparation. QuickBooks* has been the main contributor to this revolution. It's easy, quick, and reliable—why outsource?

MR. VOGELS Will orthodontic fees continue to increase at a rate of 4-5% per year, or will more innovative fee structures be developed?

DR. REDMOND Orthodontic fees will continue to increase by a couple of percentage points per year, but more impact will come from increases in practice efficiencies, allowing more patients to be treated in a given period.

DR. CARRIERE In our office, in fact, new technology with self-ligating brackets and ultralight force delivery by superelastic wires has reduced treatment time to as little as 40% in many instances. This can have the effect of substantially reducing chairtime and treatment duration. A well-planned and -conducted project might make it possible not only to keep the same fees, but even to reduce them.

DR. ALEXANDER Cost-of-living increases should be built into the fee, but the real question is, "What is the value of orthodontic treatment?" Is the patient paying for how long treatment takes or the quality of the result? Higher standards allow for higher fees. Patients deserve to get what they pay for.

MR. VOGELS How much third-party involvement is there in your practice? Will insurance companies exert more control over treatment decisions in the next few years? What effect will this have on fees?

*Registered trademark of Quicken, 2632 Marine Way, Mountain View, CA 94043; www.quicken.intuit.com.

DR. GLENN Approximately 70% of my patients have insurance benefits, with lifetime maximum benefits ranging from $1,000 to $2,000.

DR. ALEXANDER About 50% of our patients have limited insurance, but "fee for service" has been and will continue to be our philosophy. We have never agreed to be on any insurance program where the orthodontic fee is dictated. Many companies set up "tax-free" accounts enabling the family to use pretax dollars for orthodontic payments.

DR. REDMOND My practice in Seattle is located in a small "city" created by the Municipal Tower, the Columbia Tower, and the Bank of America Building, which all connect by underground passageways. No need to endure the Seattle drizzle to get to the dentist or orthodontist. Almost all the employees in this small "city" have dental/orthodontic insurance benefits, so I would say that 98% of my patients have some form of insurance. Insurance companies do attempt to control fees, but professionals are innovative and continue to overcome these efforts.

DR. SANDLER There is no third-party involvement in my practice. Insurance companies in the U.K. have absolutely no interest in covering orthodontic treatment apart from very occasional cases. I can only see involvement of insurance companies as a bad thing, as they will undoubtedly drive fees down.

MR. VOGELS How will governmental restrictions and regulations such as OSHA and HIPAA continue to affect your practice?

DR. REDMOND The effect for orthodontists has always been easily assimilated and never a burden. Infection control in the orthodontic office has, however, required a major change in our practice systems.

DR. GLENN Both OSHA and HIPAA regulations have resulted in the need for more ongoing staff training and documentation. The HIPAA regulations have resulted in more paperwork for our patients.

Fig. 10 State-of-the-art sterilization equipment in Dr. Alexander's office.

DR. ALEXANDER HIV-AIDS changed everything, from having only cold-sterilization trays in the past to where we now have an entire room for heat sterilization. We use the Hu-Friedy** tray system, where each patient has his or her own instrument cassette. I hope we are now state of the art, so I do not see any more evolution (Fig. 10).

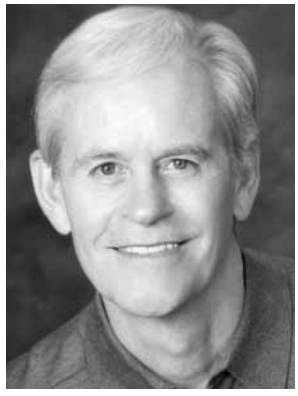
MR. VOGELS How have liability issues affected your practice? What will be the important medicolegal issues in the next decade?

DR. GLENN There is an ever-increasing need for good documentation of policy, procedures, and recommendations in the office. This is true for both patient care and employee relations. I think that periodontal problems in adult orthodontic cases will continue to be a concern in the next decade.

DR. REDMOND Not for orthodontists! Liability is a function of the patient's distrust and dislike of the practitioner, which is typically not the case in orthodontics.

DR. SANDLER Once again, the U.K. has followed the trend of the United States toward litigation. Written informed consent now has to be obtained from every patient prior to commencing orthodontic treatment.

**Hu-Friedy, 3232 N. Rockwell, Chicago, IL 60618; www.hu-friedy. com.



Dr. Alexander

MR. VOGELS What chairside and administrative tasks do you generally delegate to staff members? How do you see this trend developing? Will state regulations be relaxed further?

DR. CARRIERE The tasks that we delegate are the ones that cannot produce any change or modification in the patient's structures. Diagnosis involves a thorough knowledge of a case in terms of individualization, and this is the responsibility of the orthodontist. Intermediate procedures involving record-taking or technical work in preparing the necessary material can be in the hands of the staff members. Case presentation can also be performed by them, but in this case there should be a thorough knowledge of the decisions of the orthodontist, and the information given by a staff member should be objectively the same.

DR. ALEXANDER I am happy with the state regulations in Texas. Our clinical assistants are extremely well qualified and can legally perform most tasks needed to help treat the patient, under the supervision of the orthodontist. I believe the doctor should continue to control the diagnosis and treatment plan. Case presentations can be shared with qualified staff members, but in our office, we want the patient and parents to talk with the doctor and establish confidence in his judgment.

DR. GLENN As a routine, I delegate most tasks allowed by my state dental practice act. All delegated tasks require direct supervision and do not include any irreversible procedures.

DR. REDMOND I also delegate everything that is not irreversible. I practice with very talented "nurses", and in many ways, the patients become more attached to them than to me. As animation becomes more prominent in the patient educational market, staff members will even be delegated to explaining the finer points of the case presentations. I use online animation to explain my informed consent, and to present multidisciplinary treatment plans to my patients. Their response to this visual education has been very rewarding.

In California, the legalization of the Registered Dental Hygienist, with EF (extended functions) and AP (alternative practice), will create an orthodontic "nurse-practitioner" capable of running an orthodontic office without the orthodontist being in residence. There are a few hurdles to overcome, but the framework is there to allow a group of orthodontists to command a 50-to-100-office practice. Communication through sophisticated computer systems will direct the treatment, just as nurse-practitioners are directed by physicians from remote locations. I believe the convergence of the insurance pressures and access to care will provide the catalyst for the development of this practice model.

DR. SANDLER No chairside tasks are legally delegated to staff members in the U.K. at present. Since I qualified in the late '70s, however, we have allegedly been on the verge of introducing Orthodontic Therapists. Now, in 2007, this change is actually going to take place, as the General Dental Council recently passed the legislation necessary to allow non-dentally qualified personnel to practice what would have been classified as "dentistry" in the past. This means that many of the intraoral tasks will be delegated to Orthodontic Therapists, and will include impressions for study models, removal of archwires, replacement of archwires, debonding and debanding of patients, and cleaning them up after orthodontic treatment is complete. In addition, staff members can contribute to instructing patients in the care of their appliances as well as

instructions in the use of headgear and functional appliances.

Staff members may also get involved in patient diagnosis and case presentation, in that they may, after a period of training, be able to adequately analyze cephalometric radiographs and also take intraoral and extraoral photographs. I have recently made a study of clinical photographs taken by professional photographers, orthodontic assistants, and orthodontists. There was no statistically significant difference between the quality of the photographs taken by the three groups; the results will be published in the near future.

MR. VOGELS What patient motivation and education techniques do you find most effective? How will computerization continue to affect patient education?

DR. GLENN I find that personalized instructions still work the best. We tell the patient what they need to do, we show them how to do the task, and then we ask them to demonstrate what they just learned. We explain to the patient why they need to cooperate and what the benefits of good compliance will be. In this high-tech world, there is still a place for personal communication.

DR. ALEXANDER As my friend Dr. Tucker Haltom says, "Love your patients." Then read our JCO article, "Creating the Compliant Patient".[23] There are three major factors: believe in your system, educate patients properly, and motivate. Taking time to talk with your patients and explain to parents the need for compliance is critical.

DR. CARRIERE Once a patient enters an orthodontic office, he is ready to accept treatment of his condition. In exchange, consciously or not, he is ready to contribute in some aspect to achieve it. It is in the hands of the orthodontist to inform him. The patient can be motivated if he perceives in the orthodontist a deep knowledge of his problem and the certainty that he will accomplish his expectations in due time.

We let parents come into the operatory. In fact, they have a special place to sit, which is strategically positioned to keep them out of sight of the other people in the room. This allows the orthodontist to give explanations while treating at chairside. Computerization is a useful tool for education—we have movies in 3D that visualize in virtual reality the treatment of every malocclusion with the different appliances that we use in the office. This is complemented by clinical cases treated with the procedure we propose.

Dr. Carrière

DR. SANDLER Computerization makes communication with patients easier. A number of websites will undoubtedly be developed where patients can do self-learning about oral hygiene issues, orthodontic issues, and orthognathic surgery issues. Hopefully the better websites will thrive and will lead to good patient motivation and effective patient education.

MR. VOGELS What kinds of advertising and promotion do you use for your practice? Do you find television advertising to be effective, and if not, will it ever become more significant? How will external marketing change in the future?

DR. REDMOND I find niche marketing to be effective in Seattle. I market to my "city" (the three large buildings I mentioned earlier) with postcards to selected lists and spot radio advertising. Invisalign markets on TV and the Internet for me. I find the return on investment to be excellent.

DR. SANDLER I don't use any advertising or promotion of my practice at all. Television adver-

Dr. Glenn

tising will undoubtedly become more effective and will be used widely in the future.

DR. ALEXANDER Our best advertising is our patients and parents. We use no newspaper, TV, or radio ads, but we have used demographically specific direct mail (OREC***) with excellent results. Most of our marketing is internal—we give away T-shirts and have contests, "wooden nickel" awards, etc. There is a concern that orthodontic manufacturing companies might promote their own products by going directly to the public through TV and newspaper advertising, similar to Invisalign. The ramifications of this approach could have a number of effects on the traditional referral format, some positive and some negative.

DR. GLENN I use mostly internal marketing in my practice. Additionally, I stay active in my local dental society and belong to a local dental study club.

DR. CARRIERE Internal marketing is also the most frequently used in our office. Externally, we communicate notes of interest in reference to innovations in orthodontics, research and development we have carried out, and information of interest to parents or patients, in terms of prevention or treatment possibilities, that we have published in the scientific media. In the future, the Internet will be the tool for any type of information, whether it be a search from the patient side or information from the practice's side.

MR. VOGELS Do you have a practice website? If so, how effective is it in terms of internal marketing? Will Internet communication become more prevalent, or will it be replaced by other forms?

DR. SANDLER I do not have a practice website, although Internet communication is definitely becoming much more prevalent. I suspect that eventually I will have to have some sort of Internet site advertising my services and wares.

DR. GLENN I don't have a practice website yet either, but that is on my "to do" list for 2007.

DR. CARRIERE We have www.carriere.es as our website. It has proven to be most effective in terms of total and instant information about our office. I find Internet communication to be the fastest and most expeditious way of information transaction between patients and our office. It is a fact that a vast majority of our patients consult our web page before contacting the office.

DR. ALEXANDER Our website, www.drsalexander.com, has been a practice builder. Although most of our new patients are doctor and patient referrals, one or two new patients per week will come from our website. We were assisted in developing the website by Ortho Sesame.† Internet communication is helpful with patient finances and appointment issues. But always remember: "high tech—high touch".

DR. REDMOND I receive 10-15 new patients per month through my website. The Internet will continue to be the communication medium of choice for quite some time, and the Web 2.0 will be even more productive.

MR. VOGELS If you have satellite offices, how do you use them? What will be the influence of technology in the future?

***OREC Professional Marketing Systems, Inc., 7747 S.W. Cirrus Drive, Beaverton, OR 97008; www.orec.com.

†Trademark of Sesame Communications, 15 S. Grady Way, Suite 420, Seattle, WA 98057; www.sesamecommunications.com.

DR. SANDLER I do not have satellite offices. Again, the Internet will make it more convenient to have satellite offices and to exchange patient information between offices.

DR. ALEXANDER I have practiced full-time for more than 40 years in the same location. My son, Moody, has no plans to change. My other son, Chuck, is in a small western Colorado town, Montrose, and has a satellite office in Gunnison. It is an economic question related to the size of the home location. Technology will make it simpler to have a satellite, but it is still a major investment of time and money.

DR. REDMOND Satellites are a reality because of the nature of our population spread. In addition, the changes in a neighborhood over a 35-year practice lifetime will push the orthodontist to open a satellite in a growth area, until the original neighborhood develops a new generation of young families with children.

MR. VOGELS Will solo orthodontic practices become less common in the next decade? If not, what management structures will take their place?

DR. MOSKOWITZ I predict that solo orthodontic practices will ultimately be replaced by partnerships and other forms of "group practice". This has been the trend in medicine, and I suspect that orthodontic practices will follow this trend. It offers many advantages to individual orthodontists. One group of orthodontists who might benefit from such a professional relationship might be individuals who choose to practice no more, let's say, than three days per week. Each partner might choose to work only several days per week, but the office remains open to treat patients on a five-day-or-more basis. Orthodontists might choose a lifestyle with more free time for themselves and their families rather than attempting to earn the greatest possible amount of money in their practices. There is something to be said for this philosophy.

DR. ALEXANDER If this becomes a trend, it will go much slower than in other branches of medicine. The beautiful thing about the solo practice is the complete freedom the doctor has to control his or her life. With the advent of more female orthodontists who may want to work part-time, however, new organizational structures may become more common. Also, the young orthodontist may want to work for another doctor before creating a solo practice.

Dr. Moskowitz

DR. REDMOND Partnerships and associateships will be driven by the number of women entering orthodontic practice. My experience is that women love to practice orthodontics, but shy away from management. For biological reasons, two or more women can join in a practice partnership to allow time for families.

DR. MOSKOWITZ I am very impressed with the ability of our young colleagues to successfully network in an effort to find the best professional environment for themselves. Partnerships do offer support to their members that might not be available to the solo practitioner. Naturally, any partnership in orthodontics is like a marriage. And the success of such a professional union will greatly depend upon the temperament and compatibility of the individual partners. Another area that I feel will grow considerably will be consequential and meaningful partnership relationships between orthodontists and pediatric dentists. The advantages to both the pediatric dentist and orthodontist are obvious.

DR. SANDLER It is very difficult to predict in the U.K. whether solo orthodontic practices will

become more or less common over the next decade. The way in which orthodontics is financed within the U.K. may lead to a significant reduction in the number of places available for orthodontists to train in the future. This will, of course, have a significant effect on the final workforce trained locally. With the increased number of countries involved within the European Community, there may be a temporary respite from this problem.

Other Issues

MR. VOGELS Will orthodontists in countries outside the United States take more of the lead in developing new systems and technologies over the next decade? What countries do you see as most involved in particular techniques?

DR. SANDLER Certainly, the European countries have taken a lead in developing orthodontic systems over the last decade. The ones that spring to mind are functional appliances and the use of implants in orthodontics. Italy particularly has some very innovative clinicians who are always willing to try new techniques. The Far East also has many pioneers in new orthodontic techniques, particularly in the field of microscrews and skeletal anchorage.

DR. ALEXANDER All one needs to do is notice the authors in our orthodontic journals to see the enormous contributions made by our international colleagues. In Europe, much improvement has been focused on lingual technology. In Asia, countries like Korea, Japan, and Taiwan have been leading the way in implant and lingual technology.

MR. VOGELS How has the involvement of women and minorities affected orthodontic practice in recent years? How do you see these trends developing?

DR. GLENN The percentage of female members of the AAO has increased from 3% to over 16% in the last 25 years. That percentage is increasing yearly and is projected to reach close to 30% by the year 2020. With the increasing number of female orthodontists, we are seeing more women taking leadership roles in their state and regional orthodontic societies and associations. Statistically, female orthodontists have similar practice patterns to their male counterparts. Some studies suggest that women work slightly fewer hours per week in direct patient care and are slightly more likely to be involved in group practices, as Dr. Redmond mentioned. Number of children appears to impact the number of days worked per week for female orthodontists, but a great deal of variation exists.

DR. ALEXANDER Orthodontics is a great profession for women. Frankly, having more women in practice may make it better for men because there will be more part-time practices. In both general dentistry and orthodontics, the percentage of females will continue to grow. This is also true for minorities. About one-third of dental students today are white males. Our office is located close to a university campus, and we have many international patients. The increase in Hispanic patients is a reflection of their increase in population in Texas.

DR. REDMOND Even a casual observation of the population of orthodontic residencies will lead one to the conclusion that there will be more women orthodontists in the future. This is not an unusual circumstance—Western Europe has experienced a high concentration of female dentists and orthodontists for the past 50 years. We are simply following their model. It will be interesting to watch the practice-management dynamics as this change occurs. Also, the Hispanic population has had an enormous effect on our offices in California. Spanish-speaking staff and associates have become a critical part of internal marketing.

DR. SANDLER There has also been a significant increase in the number of women training to be orthodontists in the U.K. My suspicion is that there is a majority of women entering the profession, and this has been the case for the past few years. It is difficult to know whether this will change in the future, particularly in view of the fact that there may be fewer funded posts as

health authorities try to reduce their spending on orthodontics.

MR. VOGELS How would you describe the current level of involvement of general dentists in orthodontic treatment? Will GPs perform more orthodontic treatment in the future, and if so, in what areas? How will this affect referrals and case starts for specialty orthodontists?

DR. GLENN With the popularity of removable aligners, there has been a resurgence of general dentists doing orthodontic treatment in my area.

DR. ALEXANDER Of course, Invisalign is focusing on the GP. How long will it last? This has been an issue for 40 years in my practice. A certain appliance or philosophy is promoted to the GP, they try it, then with time it cools off. I do not see this affecting our case starts significantly.

DR. REDMOND GPs will get involved with Invisalign, but few will buy the supplies (bands, brackets, wires, elastics, etc.) needed to provide traditional orthodontic treatment. I have found the "Invisalign effect" to be beneficial to my practice, but then it is well known in my area that I am available for advice for the GPs, and they appreciate my time and efforts.

DR. SANDLER Although there are no accurate figures for this, the general feeling is that until April 2006, up to 50% of the orthodontic treatment in the U.K. was carried out by dentists who are not in possession of orthodontic specialist training. The mode of delivery of orthodontic care in the U.K. changed dramatically in April 2006, and it became very difficult for non-specialists to increase the amount of work they are currently doing that is paid for by the National Health Service. It also became impossible for any new dentists to be paid by the government for doing orthodontic treatment. It is felt that referrals to specialist orthodontists will probably increase in the near future, and the number of cases that are going to be treated on a private basis is going to increase dramatically over the next few years. It is difficult to tell whether the current group of general dental practitioners who have for many years provided

Dr. Redmond

orthodontic treatment paid for by the National Health Service will continue to provide this treatment on a private basis.

MR. VOGELS What subjects will become more important in orthodontic education over the next decade? How will orthodontic departments need to change to meet these demands?

DR. CARRIERE At present, "evidence-based orthodontics" is one of the most frequently used terms to describe how it should be practiced and taught. Along the same lines, we can see that orthodontics is a fortunate branch of the health sciences—a morphological science that can be parameterized and measured. This characteristic permits us to teach the clinical aspects of orthodontics with objective methods. Virtual reality technology with mathematical modeling will make it easy to simulate and visualize treatment for teaching and research purposes, without any guesswork or risk to patients.

DR. REDMOND The future of orthodontic education is easier to predict than the timeline for its implementation. I agree that digital techniques will become much more sophisticated, leading to the virtual reality patient (VRP). I believe the VRP will be able to replicate specific skeletal and dental disharmonies, allowing the orthodontic resident to "treat" the patient. Virtual tooth movement is already possible, and soon the virtual mal-

occlusion will be integrated with 3D computed tomography to make it possible to predict soft-tissue and skeletal responses to treatment. Diagnosis and treatment planning will move to a new level of sophistication, enhancing our ability to utilize specific protocols to reduce treatment time. The orthodontist-teacher will be able to override the suggested treatment protocols, but refinement will gradually eliminate the need to do so. Distance learning and the VRP will create a paradigm shift in orthodontic education.

DR. ALEXANDER If my grandchildren want to be orthodontists, what kind of education will they receive? Traditional anchorage mechanics are being altered with the advent of mini-implants. The ability to resolve gingival issues with laser technology will also be taught in schools. But while technology has greatly changed "how" orthodontics is performed, the fundamental truths of "what" we teach are still the same. The challenge we face today is educating the student to sift through the media claims and know the true standards. The chairman of our orthodontic department at the University of Texas, Dr. A.P. Westfall, told us when we graduated to "leave it better than you found it". Isn't that every orthodontist's goal?

DR. GLENN Treatment mechanics using skeletal anchorage vs. traditional orthodontic mechanics will certainly need discussion. And students will be exposed to 3D imaging at teaching institutions before these machines find their way into existing private practices.

I would also mention that ADA international accreditation of foreign dental schools needs to be monitored. This could later expand to international accreditation of foreign specialty training programs. Licensure by credentials and reciprocity could have an impact on orthodontic practice in certain states or regions.

We also need to be concerned about the looming shortage of full-time dental educators in our dental schools, and especially in graduate orthodontic departments. We must find ways to make it attractive for orthodontists to pursue careers in academia. Without an adequate supply of qualified educators, orthodontic training programs and students will suffer. This could adversely affect our great specialty and the overall quality of orthodontic care.

DR. MOSKOWITZ Orthodontic education, particularly postgraduate residency programs, will need to continue to strive to bridge the gap between "town and gown". In other words, academic institutions need to focus more on melding fundamental theoretical information with the demands of clinical practice and the realities of public expectations. The future of orthodontic education will entail an increased appreciation for the multidisciplinary role that the orthodontist can and will play in the total dental rehabilitative treatment effort. The explosion of implant dentistry has already impacted upon orthodontic protocols with skeletal anchorage, and academic institutions are going to have to step up to the plate and provide more interdisciplinary exposure.

To that end, we simply must resolve certain problems. One glaring problem is the lack of a standardized and mandated three-year course of orthodontic postgraduate residency. Our European colleagues addressed this matter some time ago with the forward-thinking Erasmus program. The benefits of a three-year course of study are intuitive and do not need any amplification, with the exception of a resident's being able to begin and complete more cases. This advantage should not be undervalued. The American Board of Orthodontics has moved to the "medical model" of board certification, and this means that many of our young recent graduates will be seeking board certification sooner, perhaps immediately after graduating and passing the written portion of the ABO examination. Due to this recent philosophical shift, which is still too early to evaluate on its merits, academic institutions have been drawn into the ABO process in an unprecedented manner. Two-year programs simply cannot provide the same academic and clinical experience as a well-structured three-year program (not just adding a year to an existing program). The AAO Council on Education has repeatedly recommended such a standardized three-year course of study; the AAO Board of Trustees should be proactive in this area and make

a strong statement to the Commission on Dental Accreditation. This single action of organized orthodontics will do more for the future of orthodontics than any other single measure.

Lastly, orthodontic education must include a more robust and sustained course of ethical study. The current responsibilities of orthodontists to the public and individual patients must be framed within modern concepts of bioethics. This should be the foundation of postgraduate learning.

DR. SANDLER The three-year orthodontic training program is well established in the United Kingdom and has proved to be very successful at training, in terms of both depth and breadth of experience. Many other European countries have similarly successful three-year programs, but a number do not. In the future, I anticipate all European countries striving to meet the minimum criteria laid down by the Erasmus program, and only then will European recognition of equivalence-of-training reciprocity of practicing rights make sense. I also anticipate an increase in the numbers of graduate students striving to demonstrate their clinical abilities by taking the European Board Examinations.

MR. VOGELS Do you foresee more commercial or governmental involvement in orthodontic education?

DR. SANDLER It is possible that in the U.K., there may be less government sponsorship of orthodontic education. To date almost all orthodontic training posts are fully funded by the government. Our so-called socialist government has completely devolved spending on (and responsibility for) health care down to a local level. It may be that some local health authorities will decide unilaterally not to invest in training of future orthodontists, who will almost invariably go out and work in the private sector. It is therefore possible that there could be an opening for commercial involvement in orthodontic education. Orthodontic departments throughout the country are certainly going to need to adapt to the ever-changing financial circumstances. Up until 2006 in the U.K., we had world-class postgraduate education programs for our orthodontic trainees; with the recent upheaval in the finance of orthodontics, I can foresee the possibilities of a decline in the quality of orthodontic education in the U.K.

Dr. Sandler

DR. ALEXANDER Orthodontics has been "off the radar screen" regarding government control in the United States. I would hope to keep that and commercial enterprises limited in the schools. The reality is that money is necessary to keep schools running, so a tightrope must be walked. Financial support from alumni will become even more important and necessary.

DR. REDMOND Commercial enterprises, more than governmental agencies, will continue to influence orthodontic departments, through both active participation and research and development. I also hope that more orthodontic alumni support their orthodontic residencies to keep the wolves away from the door and to provide the facilities and full-time professors needed to produce quality orthodontists for the future.

MR. VOGELS How will economic developments affect orthodontists' ability to retire comfortably in the next decade? Do you believe orthodontists will retire earlier or later than they have in the past? Will part-time practice become a more popular option? What are your own plans?

DR. REDMOND I believe orthodontists will re-

tire later than in the past, not necessarily because of finances, but because of their love of the patients. My own retirement plans contained a "safety valve". Prior to my sons entering the practice, I maintained nine offices. In 2003, they purchased seven offices, and I maintained my two offices in the Seattle area (my safety valve). I continue to see patients (and I like it) six days per month, which allows plenty of time for traveling and other interests. I will retire one day, but not tomorrow or the next.

DR. GLENN I hope to practice until age 65 or beyond. I see many of my colleagues continuing to practice beyond what is considered traditional retirement age. They love what they do and are in good health, so there is no reason to retire. I hope to find myself in that same position when the time comes.

DR. SANDLER Recent economic developments in the U.K. mean that there will no longer be a guaranteed income provided by the National Health Service for orthodontists once they have finished their training. There will also no longer be an endless supply of patients who are able to avail themselves of this free orthodontic treatment. There will almost certainly be a major move toward private practice in the U.K., and with the increasing fee levels it may mean that orthodontists at least have the option of retiring earlier than they otherwise would have done. On the other hand, with an increase in income, but a decrease in the patient throughput, it may be that the working environment will become so attractive that orthodontists opt to continue working for longer, albeit perhaps on a part-time basis. As far as my own plans are concerned, I will continue to teach and practice orthodontics for as long as I derive enjoyment from these pursuits.

DR. ALEXANDER Orthodontics is a great way to make a living! I thank God every day that I became an orthodontist, and most orthodontists I know love practicing our beloved specialty. I think there are two questions to be answered: "How much is enough?" and "What else would I do?" My "retirement" plans are in full force now. My son, Moody, owns the practice, and I am on call when I am in town. Continuing to see patients gives me energy. As long as I can perform, I hope to continue. The majority of my time now, however, is spent in research, lecturing around the world, and writing books. I hope to continue this pattern into the foreseeable future.

MR. VOGELS Do you see anything else in your crystal ball that will have an impact on orthodontic practice?

DR. REDMOND I believe the "crystal ball" for orthodontics can be found in any graduate orthodontic department. Simply have a conversation with the orthodontic residents, assess their enthusiasm, respect their intelligence, and listen to their dreams, and you will come to the same conclusion I have—the future of orthodontics looks bright and is in excellent hands. In 1970, I received a Master of Science degree in orthodontics from the University of Southern California; 30 years later, my two sons graduated from the same university with Masters of Science in craniofacial biology. Their didactic education has far exceeded mine, and the next 30-35 years will prove my point. They are equipped to understand the use of viruses as "trucks" for gene therapy. As gene products and their interactions with the cellular environment have been characterized, so the possibility of treating disease by using DNA as a drug has arisen. Viruses are obligate intracellular parasites, designed through the course of evolution to infect cells, often with great specificity to a particular cell type. They tend to be very efficient at transfecting their own DNA into the host cell, which is expressed to produce new viral particles. By replacing genes that are needed for the replication phase of the virus life cycle (the nonessential genes) with foreign genes of interest, the recombinant viral vectors can transduce the cell type they would normally infect and transport the new DNA. Another area of interest is the use of naturally occurring hormones, such as relaxin, to facilitate orthodontic tooth movement. Relaxin was found to stimulate collagenase production in human gingival fibroblast cultures. The data

support a role for relaxin therapy to speed tooth movement and prevent relapse in orthodontic practice. I mention these two new areas of interest because they are currently being studied, but my mind cannot perceive the future nearly as well as the new generation of orthodontists can. I believe we are on the brink of a wondrous age for orthodontics and craniofacial orthopedics.

DR. CARRIERE I wish I had a crystal ball! The future of orthodontics is simplicity. Treatment simplification is the trend, with biologically friendly, inconspicuous appliances that preserve the quality of life of our patients. Research and development of new materials, as well as new biomimetic, comfortable, and biominimalist designs, will be necessary. If we look for a promising future, the ideal to pursue is to provide our patients with innovative orthodontic care based on facts, but with an open mind to new horizons. We will only be able to progress if we proceed free of opinions or prejudices.

DR. ALEXANDER Frankly, I have some concerns with the direction orthodontics may be going. The lines of distinction between specialists are becoming more blurred. The media has begun advertising techniques for orthodontic treatment that seem to be directed to non-orthodontists, as well as skipping the traditional referral from the patient's general dentist. Also, new procedures that were once referred from the orthodontist's office, such as laser surgery and miniscrew implants, are now being promoted to stay in our office. Although I see the efficiency in certain situations, it could destroy the traditional referral process that has served my generation well throughout our careers.

Regarding the future direction of our specialty, time will tell. Some of the patients being treated today will be used in long-term stability studies in the future. Have we discovered new techniques that will change the outcome, or is history repeating itself? When you back up and look into the past, you can see how orthodontics has "corrected" itself. First it was all nonextraction. Then the pendulum shifted to extractions. It has now gone back to all nonextraction. Are we slow learners, or has modern technology shown that this can be achieved? Look at the evidence-based literature.

Emerson said, "The years teach much which the days never know." May we continue to be good students.

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