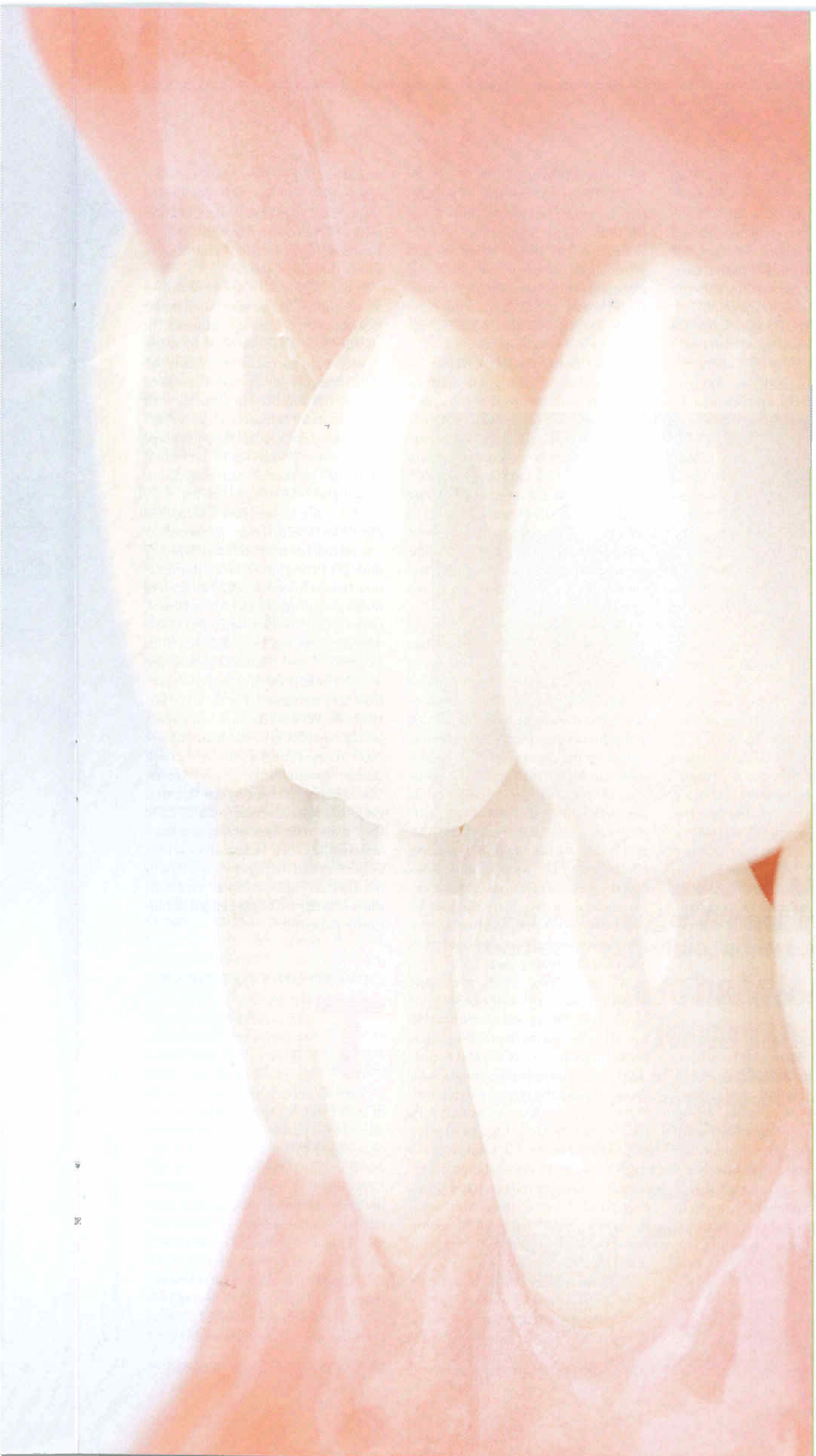
REMOVABLES ON THE REBOUND

Demographic changes and technologic advances make this traditional treatment option relevant again.

By Pam Johnson



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Removable prosthodontics has historically been considered the dark side of dentistry. Patients fear the need for complete and partial dentures because of the social and psychological stigma attached to losing one's teeth.

Many general dentists avoid them because they are time-consuming, less profitable, and often fraught with patient dissatisfaction. And for laboratory owners caught up in the decades-old esthetic revolution of fixed prosthodontics, complete and partial dentures have been perceived to be almost irrelevant in an era where the majority of the population in the United States was younger than age 65, preventative dental care was on the rise, and discretionary income and vanity drove the market.

Today, the removable market is experiencing a dramatic revitalization. The rebirth is governed by several factors: tremendous advancements in technology, materials, and treatment options for removable prosthetics; a continuing demographic shift as a quarter of the general population in the United States lives beyond the age of 65 and, in fact, is living longer than ever before; and a stubborn economy

challenges patients' ability to afford the high cost of fixed prosthetic solutions to multiple missing teeth. In the meantime, the dental industry finds itself struggling to find the personnel to serve the current and future needs of an aging population with removable prosthetic needs. Dentists are retiring from practice at a faster rate than they are graduating from dental school.[1] And, dental schools continue to diminish the amount of removable prosthetic education in the curriculum, resulting in graduates who have less knowledge on how to serve the edentulous patient.

"Fifty years ago, the over-65 population age group represented only 2% of the total general population ... It is projected that by 2020 it will be around 22% and climbing."

DR. FRANK LAUCIELLO

On the laboratory side, the shrinking numbers of knowledgeable removable technicians due to retirement, consolidation, and attrition challenges dental technology's ability to produce the numbers of complete and partial dentures that will be required by patients for the next 30 years and beyond.

"One third of the US population 65 years and older is missing all their teeth, according to the Surgeon General report issued in May 2000," says Jocelyne Feine, DDS, MS, HDR, a professor in the faculty of dentistry at McGill University in Montreal, Canada. "Certainly with the newer preventative dental procedures people are tending to lose fewer teeth than they used to, but we are also living longer. So even though the frequency of tooth loss may be less, the prevalence is staying the same."

According to a recent report released by the Centers for Disease Control, life expectancy in the United States hit an all-time high of 78.2 years in 2009, and is projected to increase to 82.6 years by 2050.[2] Feine notes that the longer we live, the restorative care provided in the past begins to break down and more expensive treatment is needed to preserve or replace those teeth.

"What this means is that for the next several decades the individual dentist will be seeing more and more edentulous patients coming into the practice," said George Priest, DMD, a prosthodontist with a private practice in Hilton Head, South Carolina.

This begs the question: Does dentistry have the manpower to deliver the impending demand for removable services?

THE DEMOGRAPHICS OF NEED

THERE WERE APPROXIMATELY 76 million children born in the United States between 1946 and 1964.[3] That population group hovers around 79 million today, taking into account those who immigrated to the United States.[4] Collectively referred to as "Baby Boomers," this is the largest single population group in the United States and currently represents 26% of the total population. Beginning January 1, 2011, the first members of this generation turned 65, and the group will continue to hit that mile marker at a rate of approximately 10,000 individuals per day, every day, for the next 19 years.

"Fifty years ago, the over-65 population age group represented only 2% of the total general population," says Dr. Frank Lauciello, director of removable prosthodontics for Ivoclar Vivadent and associate professor in the Restorative Department at SUNY Buffalo, New York. "It is projected that by 2020 it will be around 22% and climbing."

It was Chester Douglass, DDS, who first raised concern about dentistry's ability to meet the need of the growing number of edentulous patients expected by the end of 2020 in his article, "Will there be a need for complete dentures in the United States in 2020?" published by the *Journal of Prosthetic Dentistry* in 2002. Dental educators at the time were projecting that the need for complete dentures would decline markedly in the future and that complete denture education should be removed from the dental curriculum.

"Estimates based on national epidemiologic survey data indicate that edentulism has declined by 10% every decade and that only 90% of edentulous adults obtain and wear complete dentures. However, when the number of adults in each specific age group is multiplied by the percentage who need a complete maxillary or mandibular denture, the results suggest that the adult population in need of one or two complete dentures will increase from 33.6 million adults in 1991 to 37.9 million adults in 2020."[5] Douglass concludes that the 10% decline in edentulism experienced each decade for the past 30 years will be more than offset by the 79% increase in the adult population older than 55 years of age.

Ron Gerughty, PhD, president of Mills Grae University College of Medical Denturitry, was a consultant to the ADA Council on Dental Education in the 1970s and one of the first to propose that removable prosthetics be dropped from the dental curriculum. "The thought back then was that very few of our dental school graduates would have the need to treat patients with dentures, and removable prosthetics was consuming too much time in an overcrowded dental curriculum," confesses Gerughty. "If we could have only foreseen that there might be a growth in the need for dentures."

That same philosophy permeated the thinking of dental laboratory owners and dental technology graduates over the past 30+ years. "For many years no one coming out of a dental technology program wanted to be a removable technician," says Tom Wade, CDT, and owner of New Horizons Dental Lab in Broomfield, Colorado. "That wasn't where the money was."

Today, only 15% of the laboratories in the United States specialize in the fabrication of complete dentures, with another 8% of laboratories focusing strictly on the partial denture business.[6] Combining the percentage of complete and partial denture laboratories with those that are full service (26%) still does not balance against the percentage of laboratory businesses in the United States that remain focused solely on the crown-and-bridge (52%) market.

One of the factors that will further impact the need for removable prosthetics and that has not been considered by those projecting future need is immigration. Robert Kreyer Jr., CDT, director of removable prosthetics for MicroDental, projects that the increased influx of immigrants into the United States from underdeveloped countries around the world where good oral hygiene practices are lacking and dental care is unavailable will have a significant impact on the need for removable prosthetic care. "It's an unknown variable that will change current thinking," says Kreyer. "As immigrants come to this country, get jobs, and have access to dental care, they want to fix their oral appearance and condition." He believes the current projection that the population will be in need of removable prosthetic care until the year 2020 will be pushed out significantly as a result.

OPPORTUNITY KNOCKS

THE DENTAL LABORATORY industry is being impacted by the general lack of clinical removable skills in the practice combined with a down economy and an explosion of new treatment modalities for the edentulous patient. General dentists challenged by the current economic condition are taking on removable patients whether they have the skills or not because they are seeing fewer patients. "Economics drives the train," says Lauciello. "When the economic situation is not so great, dentists often look at parts of dentistry that they don't enjoy but realize they are losing revenue by letting these potential patients leave the office to seek care elsewhere."

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Economics is also driving patients to choose more affordable treatment options. Priest says many treatment options are scaled down today. Edentulous patients who, in better economic times, traditionally would have opted for a fixed solution are now accepting an implant overdenture, and those who might have chosen an implant overdenture are selecting a conventional denture.

Dentists wanting to recapture that business but are not well versed in removable or implant procedures are seeking and reinvesting in education as well as leaning on their laboratories to help deliver successful removable prostheses. This, in turn, is strengthening the interrelationship between the dentist and technician and offering the laboratory the opportunity to assist clients feeling uncertain about treating patients with removable needs.

Wade says the benefits of helping clients work through removable restorations step-by-step and delivering a successful prosthesis that the patient immediately accepts and pays for are innumerable. "Most of my 90 clients have been with me for more than 20 years. They see my commitment to quality, to teaching and being there for them. There's not a better sales tool out there."

Anthony Arcari, CDT, operations manager for Arcari Dental Laboratory, a full-service operation located in Wakefield, Massachusetts, says his laboratory works with manufacturer partners to offer lecture seminars for his client base on topics ranging from the use of mini-implants to conventional denture techniques. "We find that partnering with these companies to train and educate our clients to be an effective way to impart new techniques as well as the basics."

By providing the education and training general dentists didn't get in dental school and helping them be successful, laboratories are not only elevating the level of patient care but also building the skill level of a "B" or "C" client to the "A" level, says Bruce Keeling, removable quality trainer for Dental Services Group. "Because they don't understand what goes into fabricating removable prosthetics nor the time requirements, technicians need to educate clients so that we can get the information we need and eliminate many of the problems we see in the laboratory," he says.

Economics is also driving the traditionally fixed crown-and-bridge laboratories hit by the recession to consider moving into the removable segment of the laboratory business. Most appealing is the minimal impact that offshore competition and chairside CAD/CAM have had on the removable sector of the business. Khahn Tran, owner of Tran Dental Laboratory, a three-technician, high-quality crown-and-bridge laboratory located in Philadelphia, Pennsylvania, is one of a growing number of strictly fixed laboratories to open a removable department. "Laboratories can't compete with offshore services offering $40 and $50 crowns," says Tran. "When I began researching how to expand my business, it became clear that with the downward pricing pressure for fixed products and the high salaries demanded by fixed technicians, it would be a wiser business decision to move into an area of the business shielded from these pressures," he explains. By the end of this summer, Tran hopes to move from his current 700-square-foot facility to a new 7,000-square-foot facility, with much of the new space devoted to removable services.

Customer demand drove Mike Twitchell to transition his one-person crown-and-bridge laboratory to a full-service business. Legacy Dental Arts

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is located in rural America—it's near the southwest corner of Utah. When Twitchell opened his in-practice laboratory a year ago, his clients were impressed enough in the quality he was delivering for fixed prosthetics that they began asking if he would consider fabricating their removable prostheses. He didn't hesitate to capture market share from clients sending removable cases elsewhere. "This is a new source of revenue that has increased my bottom line by as much as 50%," he says.

Five years ago during the height of the "esthetic revolution," customer demand and the attrition of quality removable laboratories in his area drove Shaun Keating, owner of Keating Dental Arts, to offer removable services to customers wanting the service. Strictly set up as a high-quality crown-and-bridge laboratory, Keating at first outsourced much of the removable work to a few laboratories that could meet his quality demands. But after a couple of years, he decided to open a removable department and keep quality control and the revenue in-house. He hired Jim Cain, CDT, to manage the department and, with Jim's help, assembled what Keating describes as a "Dream Team" of removable technicians, each with a minimum of 20 years' experience. "It's been amazing," says Keating. "Our removable department has experienced double-digit growth each year, even in this economy, and is the fastest-growing department in the company. We are building out to add another 4,000 square feet to the laboratory strictly to expand our 13-technician removable department."

The opportunity to build a new revenue stream to their businesses is also sending many fixed technicians back into the classroom to learn the nuances of removable fabrication processes. Kreyer, who teaches continuing education removable courses, has seen this trend building over that past three or four years. Not only are his classes booking up far in advance, but so too are those of other instructors, he notes. Driven by the economy as well as the opportunity to learn new technologies and restorative options, the increased interest in removable prosthetics is now being perceived by the industry as a profitable side of dentistry to tap into. "In the courses I'm teaching, 30% to 40% of the attendees have a fixed background," says Kreyer. "Over the years the dental industry has expressed real concern over the current and future shortage of experienced removable technicians and wondered who would fill the vacuum. The trend we're seeing is that it will come from the fixed side of dental technology."

Kreyer believes that this trend is having a positive effect on the prices charged for conventional removable products. Whereas a removable arch six or seven years ago priced out at around $275 and a couple of years ago averaged $325 to $350, today that same removable arch is hovering around the $400 to $500 mark and moving upward rapidly. "The fixed side of our business is equating the labor cost involved in fabricating one denture to that of producing six or eight veneers and setting prices accordingly," says Kreyer. "Because fixed laboratories traditionally charge more for labor than does the removable side, they are applying fixed labor costs to their removable products and driving prices upward." Kreyer also believes that because high-end fixed technicians tend to be more meticulous in their work, the esthetic and functional standard for removable products may be raised, adding a competitive component within the industry that will ultimately benefit the patient.

IMPACT IMPLANTS

THE PRIMARY FACTOR elevating the removable market to the limelight of restorative dentistry is the implant. Regarded as one of the fastest-growing segments of dentistry, the US implant market is projected to increase at a compound annual rate of 16.3% between 2004 and 2017.[7] On the removable side of the market, the use and patient acceptance of implants to provide denture retention has expanded the restorative options that removable technicians can provide for their clients. From conventional dentures, partial dentures, and immediate dentures—in addition to relines and repairs—the field has exploded overnight with prescriptions for milled titanium implant bars, radiographic stents and surgical guides, verification indices, occlusal splints, and complex hybrid prostheses that demand knowledge of technology and the technical expertise to fabricate them successfully.

These more technically challenging restorations have significantly impacted the billable dollars laboratories charge. "Five plus years ago, the highest-priced prosthetic removable technicians would ever bill out was around $500 for a single arch, which included the labor and denture teeth," Wade recalls. "Overnight, we began billing screw-retained hybrids at $3,000 to $3,500 per arch."

The improved function and higher level of esthetics afforded by implant-retained prostheses also is bringing the conventional-denture wearer back into the dental office to have two implants placed and the prosthesis retrofitted to accommodate the implants or a new denture fabricated. "When you consider that there are more than 30 million edentulous people in the United States and out of this group only 2% to 4% have implant-retained restorations, that leaves a huge number of people who may revisit their situation," says Lauciello.

As Feine notes, even though dentistry has tried to improve the conventional denture to remove the stigma as well as improve its function and esthetics, the fit of a conventional denture is rarely ideal for the patient as the bone resorbs and the denture becomes loose. "This produces chronic pain and impedes and impairs normal daily functions," says Feine. "The World Health Organization defines impairment as the lack of one or more body parts and disability as the inability to perform a function used in daily life, such as chewing. By that definition, all edentulous patients are impaired and a majority are disabled."

And those who are so self-conscious about their prosthetic condition that they cannot engage in normal social interactions, she adds, are also handicapped. Feine, in her extensive research, has conducted studies that show if just two implants are placed in the mandible to anchor the denture in place, edentulous patients are afforded enough retention to improve their lives considerably. "The people in those studies have said the implant-retained denture has changed their lives," she says. "They can eat foods such as apples and steak that were impossible to eat with a conventional denture, so their nutritional choices are much greater. And they feel more comfortable out in public."

Before Feine started her research, most dentists were treating patients with four or more implants to retain a mandibular denture, which is typically beyond the financial capability of the vast majority of edentulous patients. The two-implant–retained overdenture is an affordable option that can positively affect a patient's quality of life. "Dentists have an ethical and professional responsibility to at least inform patients about implant treatment even if they don't want to take on implants in their practice," said Feine.

Priest agrees that the mandibular conventional denture should not be considered the first option for restorative care and converts most of his patients to the two-implant option. He believes that dentists—through informed consent—need to tell their patients that the better choice is an implant-retained overdenture and let

Back to School

Education is the foundation of any profession. Whether you are a seasoned professional wanting to advance your skills in a targeted area of dental technology or branch out and learn a new specialty, there are myriad educational opportunities awaiting you.

For those interested in pursuing further knowledge in the removable prosthetics arena, all of the major educational centers, such as the Dawson Academy (www.thedawsonacademy.com), The Pankey Institute (www.pankey.org), LVI Global (www.lviglobal.com), and Kois Center (www.koiscenter.com) offer instruction at the highest level from live patient courses to instruction on occlusion and function. Tom Mays CDT, BSc, also offers his Denture Seminars USA (817-738-7242; tmays@att.net) in the Dallas/Fort Worth area.

Manufacturers also are beefing up their continuing education schedules with course offerings on removable prosthetics from conventional complete and partial dentures to implant-supported dentures. Visit www.dentalaegis.com/go/back-to-school to find information on some of the classes being offered by the manufacturing community through the end of the year.

the patients choose the restorative option that best fits their situation. The Baby Boomer generation, he believes, will be the first generation to wholly embrace the implant overdenture because vanity will drive them to avoid "a restorative solution that you put in a jar at night."

It's an issue that Lauciello says dentistry has already reached on a moral level. "Whether the dentist performs implant procedures or not, he or she has the moral responsibility to at least discuss this option with the patient."

Where removable dentistry becomes more complex, technically difficult, and vastly more expensive is with large combination restorations, in which what you place and where you place it can make the difference between restorative success and failure. Older patients who have retained their teeth until their 70s or 80s are finding their older restorations breaking down and they need solutions that preserve as much natural dentition as possible while replacing the newly edentulous spaces. That's why Lauciello encourages dental technicians to get back into the classroom to learn all the nuances of dealing with these cases. "Studies show that placing dentures on top of implants causes a high degree of restorative failure," he says. "If the dentist doesn't give the laboratory sufficient restorative space, it can lead to the compromised structural integrity of the materials and eventual failure of the restoration." If a traditional denture tooth opposes a natural tooth, the problem will be quick wear of the denture tooth. But if a harder denture tooth is used, the risk is fracture of the natural tooth. The worst-case scenario is when implant-supported restorations oppose implant-supported restorations. Restorative failure is much more likely in these situations.

Lauciello encourages laboratory technicians to seek out education that teaches the dental team the proper protocols for treatment planning and communication. "These are huge issues and an opportunity for the technologist to get involved early in the treatment phase and take a leading role," he says. "There is a lot to learn. If you want to play in this game, and it can be very profitable, then you must seek the education you need to do it properly and responsibly."

CAD/CAM MEETS REMOVABLE PROSTHETICS

CAD/CAM TECHNOLOGY HAS brought precision and automated processes to the fixed side of dentistry but largely left the complete and partial denture market untouched until recently. The development of sophisticated CAD software modules, combined with 3D rapid manufacturing and CAM milling technologies, have made significant inroads on the removable market, helping to eliminate tedious, labor-intensive processes that often resulted in an end product that still required significant manual adjustment. Today, it's possible for technicians to scan the model of a partially edentulous patient, design a CAD partial denture framework on screen, and print in 3D the design in wax for traditional casting in metal or export the design file to a CAM laser sintering unit for direct manufacture of the metal framework in chrome-cobalt. Pioneered by SensAble Technologies (www.sensable.com), CAD software modules for the digital design of RPDs also have been incorporated into scan/design technologies such as 3Shape (www.3shape.com) and Dental Wings (www.dental-wings.com) with output in wax from 3D rapid prototype suppliers such as 3D Systems (www.3dsystems.com), EnvisionTEC (www.envisiontec.de), and Solidscape (www.solid-scape.com) or in metal using EOS direct-laser metal sintering technology.

CAD/CAM technology also has revolutionized the manufacture of implant-retained bars. Traditionally cast and often adjusted for fit using laser-welding technology, these bars can now be CAD designed and precision milled from a solid milling blank of medical-grade titanium in a myriad of complex designs. Several digital scan/design manufacturers, such as Nobel Biocare (www.nobelbiocare.com), Straumann (www.straumann.us), 3Shape, Dental Wings, and, soon, Amann Girrbach (www.amanngirrbach.com), offer technicians the ability to scan the model, design the implant bar using CAD, and export files to a number of production centers for final processing, including Nobel Biocare, Straumann, Biomet 3i (www.biomet3i.com), Whip Mix Vericore (www.vericoresystem.com), Preat Corp (www.preat.com), and DENTSPLY Compartis (www.compartisusa.dentsply.com).

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"These new technologies in removables have reinvigorated me personally and my business financially," says Tom Wade, CDT. "Digitally designing titanium bars, screw-retained hybrids, and attached overdentures on bars challenged me to learn the technology. Not to mention that when you master the techniques, you can really make good money with these products."

Bruce Keeling believes technology will further step up into the removable space and envisions the day when technicians will be importing a digital impression from the practice, relate that to the temporomandibular joint for accurate bite registration, and then complete the tooth set-up virtually in relation to the condyle on the computer screen. The denture design—including teeth—would be sent to a 3D rapid manufacturing output device for printing. "When you look at the Nobel All-on-Four concept and printing of surgical guides, then you can see that we're not far away from the ability to print a denture in all the different gum and tooth shades," he says.

Creating CAD/CAM complete dentures based on clinical morphologic data and a virtual denture design that is imported into CAD software to mill complete dentures is being used by Charles Goodacre, DDS, MSD, a prosthodontist and the dean of Loma Linda University School of Dentistry. The morphology of the intaglio and cameo surfaces of the dentures is obtained using clinical impressions and records. The impressions and records are then scanned, the teeth are set virtually based on the clinical information, and the resulting data is exported to a milling machine that fabricates the denture base from blocks of resin with recesses into which the denture teeth are bonded. He showed the first CAD/CAM-milled complete dentures at the American Prosthodontic Society meeting in Chicago this past February and then presented the entire clinical technique for the first time at the Academy of Prosthodontics meeting in Hilton Head in May. Goodacre worked with San Antonio, Texas-based Voxelogix Corporation (www.nexsmile.com) for fabrication of the CAD/CAM dentures based on the clinical information he provided them. Voxelogix Corporation specializes in providing NeXsmile implant treatments for patients using CT scans, sophisticated computer planning, and CAD/CAM milling.

Goodacre has also developed a 3D Tooth Arrangement program that greatly enhances the education of dental and dental laboratory technology students. The program allows faculty to create complete denture tooth set-ups that shows students the different occlusal schemes used with complete dentures (bilateral balanced, lingualized, and monoplane occlusions). It is also used to develop partial set-ups where some of the teeth are set by faculty or experienced technicians and the students complete the rest of the set-up. The program can be used to create a limitless number of sample set-ups for student evaluation of the tooth arrangements, testing, and teaching of esthetic tooth positioning. He admits that a great deal of work still needs to be done to incorporate more advanced features and new millable materials need to be developed. "There are so many possibilities," he says. Future plans for the program include incorporating digital data captured from a cone beam CT scan coupled with information obtained from the patient, thereby allowing users to digitally identify key landmarks for denture tooth set-ups and then set the teeth.

"The design data would then be exported to a CAM milling machine to fabricate the dentures. This process has the potential of providing more cost-effective quality dentures in a short time period while retaining all the data to fabricate a denture quickly if a spare or replacement is needed," Goodacre explains. Information about the 3D Tooth Arrangement Program can be obtained at http://llusdaer.com, and a software license can be purchased by contacting Loma Linda University School of Dentistry, Continuing Dental Education at 909-558-4685 for more information.

A Dental Technology "First"

In addition to the first-ever milled complete denture, Dr. Goodacre has created, in conjunction with eHuman.com, 3D interactive educational programs for dental students, dental hygiene students, and technicians. These programs include a "3D Tooth Atlas" that teaches tooth morphology and a "TMJ Occlusion Atlas" that is used to teach occlusion and the temporomandibular joint. The most recent program he has developed is "Head and Neck Anatomy for Dentistry," a comprehensive program that teaches head-and-neck anatomy by using 3D anatomy, quizzes with reference libraries, and games.

To view any of these 3D educational modules, visit:
www.dentalaegis.com/go/goodacre

INDUSTRY RESPONDS TO ESTHETIC AND ECONOMIC DEMANDS

MANUFACTURERS NOT ONLY are experiencing an upward trend in the sale of removable prosthetic products but also the pressure for materials and solutions that meet the higher esthetic and functional expectations of the patient.

"The expectation of the patient is getting higher and higher," says Bruce Keeling. "Manufacturers have been responsive to those demands by creating products that are highly esthetic." In particular, he notes the advances that have been made in denture teeth to make them more natural looking and wear resistant. He cites material developments such as those found in Ivoclar's SR Phonares (www.ivoclarvivadent.com) nano-hybrid composite denture teeth or Heraeus Kulzer's (www.heraeus-dental-us.com) Mondial and Pala microfilled and nano-particle acrylic teeth. Tooth manufacturing has also been revolutionized from the meticulously handmade boutique Vita line of denture teeth to the use of CAD/CAM technology to create consistently matched pairs of teeth. In addition to creating more esthetic denture teeth, Keeling says manufacturers also have made the denture acrylic stronger on the high-end packed resins and added increased translucency to replicate natural oral tissues and opaqueness to help mask milled titanium bar structures.

Esthetic reproduction gum tissue was behind the development of anaxGUM gum-colored composite resin distributed by Microstar Dental Laboratory Products (www.microstardental.com). Similar to Shofu's Ceramage Gum Color and GC Gradia Gum, anaxGUM composite resin was introduced this year for the reproduction of gingival areas in screw-retained implant substructures, removable restorations, and for characterization of complete dentures.

"Denture characterization has become the norm," says Robert Kreyer Jr., CDT. "With products like these and others such as Telio from Ivoclar, technicians can characterize the denture base as well as each individual denture tooth."

Several companies are also finding solutions for laboratories and patients affected by the current economic climate. Peter Newell, product marketing manager for Vident (www.vident.com) says that balancing the demand for higher esthetics and function is causing his company to react creatively by developing new products that help laboratories conserve cash and lower inventory.

"Instead of inventorying all different shades and moulds of denture teeth, we are encouraging laboratories to inventory just their top selling shades and moulds," he says. "We developed our VITA Multi-Functional tooth line, which is a condensed line based on the most popular selling shades and moulds. And in May we introduced an extension of our Vitapan tooth line with Vitapan Plus, which offers the same condensed concept."

For patients unable to afford implant-retained denture solutions or whose bone is not suitable for implant therapy, another new development was recently introduced to the US market that will afford a cost-effective alternative for these types of patients. The Ultra-Suction Denture System from OnCore Dental Inc (www.oncore-dental.com) is a mounted unidirectional valve and suction chamber system embedded into the denture body by the laboratory. Connected by two 1-mm air passages, the system works by expelling the air gap between the denture body and the gums and creates a complete peripheral seal around the denture, sucking it down onto the ridge or tissue.

"The other advantage of this system is that patients can opt for a palateless upper denture," explains Martin Rigutto, OnCore's president and CEO. "That gives the patient much better phonetics and the ability to taste food." The system can be added to an existing denture during a reline or rebase procedure or built into a new conventional prosthetic.

Whether it's the Baby Boomer generation or those coming of age behind it, the demand for highly esthetic and naturally functioning removable prosthetics will push manufacturers to develop materials and techniques that come ever closer to replicating nature.

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