



Endodontics

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The Apex

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A publication for ADS's Extended Dental Family

Winna G. Gorham, DMD, MS



Dr. Winna G. Gorham earned her undergraduate degree from UMASS Boston in 2003 Summa Cum Laude before earning her DMD degree from Tufts University School of Dental Medicine in 2008. She completed her postdoctoral training in Endodontics at Tufts University School of Dental Medicine earning her Endodontic Certificate and Master of Science degree in Oral Biology in 2010.

Her research background includes dental meeting presentations including, "Stromal-Epithelial Cross-Talk Modulates Malignant Progression of E-Cadherin-Deficient Carcinoma Cells," "Tumor Stroma Impact on Progression of E-Cadherin-Deficient Squamous Cell Carcinoma," and, "Human ES Cell-Derived

Mesenchymal Cells Express Dental Pulp Cell Markers." Throughout her training, Dr. Gorham received numerous awards and scholarships including, the AADR Student Research Fellowship, the Dr. Harold Berk Endowed Prize Fund for Excellence in Research, the American Association of Women Dentists Colgate Research Award, the Lester P. Goldsmith Endowed Prize Fund in Endodontics, and the American Association of Endodontics/Dentsply Resident Award. She maintains memberships with the American Dental Association, The Pennsylvania Dental Association, The Dental Society of Western Pennsylvania, The American Association of Endodontists, The American Association of Women Dentists, and the Massachusetts Dental Society. Dr. Gorham joined ADS in 2013. She is from Norwood, Massachusetts and resides in the Pittsburgh area. When not working, Dr. Gorham enjoys yoga, running, travel, and spending time with her husband and family.

Regenerative Endodontics Winna G. Gorham, DMD, MS

Regenerative Endodontics has been defined as biologically based procedures designed to replace damaged structures, including dentin and root structures, as well as cells of the pulp-dentin complex¹. Maintaining natural teeth in the human dentition is a goal of dentistry and endodontics for the purpose of oral and overall health of our patients. While traditional root canal therapy has a widely accepted long term prognosis of more than 90%², there are many benefits to maintaining pulp vitality. Vital pulp tissue allows for defense against possible periapical infection and inflammation³ and allows for sensory proprioception which may be important in recognizing caries⁴. Importantly, reparative dentin formation can continue if the pulp tissue of a traumatized immature necrotic tooth maintains vital. Treatment with regenerative procedures can allow a necrotic immature tooth to have continued natural root formation, maintenance of immune and sensory function of the pulp, and prevention of future periapical infection thus preserving long term tooth function⁵. This article will review the biological background for pulpal regeneration, the apexification and regenerative treatment procedures, and a discussion of the outcomes and prognosis based on literature.

Dental pulp is the soft tissue of mesenchymal origin that is characterized by its ability to produce dentin with specialized cells called odontoblasts. Regeneration of the dental pulp involves three main components: stem cells, growth factors, and scaffolds⁶. Stem cells are unspecialized cells which have

two defining properties: the ability to differentiate into other cells, and the ability to self-regenerate³. There are three categories of stem cells related to potency of their abilities to become different tissues⁷. The first is totipotent cells which have the potential to develop into an entire organism. The second category of cells is pluripotent cells which are from embryos (embryonic stem cells) and have the capability to become any type of tissue in the right environment. Finally, multipotent adult stem cells, or post-natal stem cells, can differentiate into adipocytes, chondrocytes, and osteoblasts⁷. These specific types of stem cells have been shown to demonstrate the ability to produce bone like material when exposed to specific environments^{8,9}. An example of multipotent stem cells is dental pulp stem cells.

Different types of dental stem cells include dental pulp stem cells, stem cells from exfoliated deciduous teeth, stem cells from the apical papilla, and periodontal ligament stem cells. The differentiation potential of dental stem cells lies within the formation of the tissues – either related to the dental pulp or the periodontium. The scaffold and growth factors are what allow stem cells to differentiate into the different phenotypes⁹. The environment including the extracellular matrix, stimuli, and growth factors play a key role in the subsequent differentiation^{9,10}. For example, dental pulp stem cells can form odontoblast-like cells using an EDTA soluble matrix extract of dentin by including a cocktail of growth factors that mimic

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Regenerative Endodontics *continued*

dental tissue regeneration after injury (MMPs, TGF-B, and others)¹¹. Also, in a study by Cordonnier, it was shown that human mesenchymal stem cells can differentiate toward an osteoblastic lineage in a 3-D scaffold by looking for the expression of bone markers after exposing human mesenchymal stem cells to calcium phosphate scaffolds¹⁰.

Past treatments used for necrotic immature teeth included calcium hydroxide apexification and the more current MTA (mineral trioxide aggregate) apexification. Calcium hydroxide apexification involves cleaning and filling the canal with this temporary paste to stimulate calcified tissue to form at the apex (dental pulp)¹². The CaOH is later removed after radiographic apical closure and permanent obturation is then completed. Normal root function usually does not occur after apexification and reports of failures have been histologically related to difficulty to adequately clean the wide-open canal space¹³. Further, failure can arise from relying on patient compliance to complete several visits of treatment¹⁴.

Mineral trioxide aggregate apexification also creates an artificial apical barrier that allows for later placement of permanent canal obturation materials¹⁵. MTA uses a decreased number of visits and higher rate of success in apexification cases¹⁴. MTA has been shown to provide a positive barrier for root end induction as it has high sealing ability, good biocompatibility, and its ability to produce bone, cementum, and periodontal tissue¹⁵. In this technique, MTA is used as an apical plug that is placed at the apical end in the amount of 3-4mm. The MTA is allowed time to harden and set (approx. 4-6 hours with a damp pellet) prior to permanent obturation¹⁴. In a study by Jeerphan et al, MTA apexification was shown to increase root length more than calcium hydroxide apexification groups¹⁴.

Revascularization procedures promote continued growth and strengthening of root structure. Three principles that are important for successful regeneration cases are elimination of bacteria from the root canal system, a scaffold for the ingrowth of new tissue, and prevention of reinfection by creating adequate seal¹³. In a review article by Alan Law published in March of 2013, many specific guidelines for pulp regeneration were discussed¹³. Case selection is very important and includes several guidelines such as necrosis with immature apices, pulp space not needed for post and core restoration, lack of allergies to the antibiotics used in this procedure, and a compliant patient¹³. Also, informed consent should include

the use of all medicaments, the number of visits, possible adverse reaction (discoloration of crown or root, persistent infection, or lack of response to treatment), and alternatives to treatment (such as CaOH or mta apexification).

Dr. Law discussed the actual guidelines for procedures in detail. The first of two appointments includes irrigation with a low concentration sodium hypochlorite solution (1.5%) to decrease cytotoxicity and placement of a triple antibiotic paste placed below the CEJ to minimize staining of the crown. The paste is mixed 1:1:1 of Ciprofloxacin:metronidazole:minocycline. After temporary restoration and dismissal for 3-4 weeks a second appointment is completed. During this second visit, irrigation with EDTA 17% is followed by over instrumentation to create bleeding into the canal space. This bleeding serves the purpose of introducing the stem cells from the apical papilla into the canal system for pulpal regeneration. A Collaplug or Collacote is placed 3 mm below the CEJ followed by MTA placement and permanent restoration¹³.

Pulp regeneration prognosis depends on many factors. The blood clot presence inside the root canal system is important as it provides the scaffold and nutrients necessary for continued root development^{13,17}. Principles such as chemical disinfection without instrumentation, scaffold presence for tissue ingrowth, and a bacterial seal over the access are all important in successful regeneration cases¹⁸. Some published case reports have discussed the success in pulp regeneration using platelet-rich plasma as a scaffold^{19,20}. Jeeruhan and Hargreaves found that this regeneration procedure was successful at tooth retention in the arch at time of recall at 100% compared to 95% for MTA apexification and 77% calcium hydroxide apexification¹⁴. Also, in a recent study by Bose et al, a retrospective analysis of regeneration cases was completed to examine root length and dentin wall thickness following treatment²¹. Continued root development was noted radiographically in the experimental groups demonstrating functional development of the pulp dentin complex in terms of root morphology²¹. Although further research in the form of randomized clinical trials is needed, Pulp regeneration is becoming a valid and accepted treatment for the immature necrotic tooth. The field of endodontics is moving ahead rapidly in the direction of biological treatment to restore natural vitality and functioning of permanent teeth.

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Office News... Meet ADS - Monroeville



Cheryl Cherry, Lindsay Hinterlang,
Dr. Rebecca L. Watkins, Valerie Martino

Meet the “powerhouse women” of ADS that serves the East Suburbs of Pittsburgh with the best endodontic care. All of these women say that patient care is their number one priority!

Cheryl Cherry, Monroeville Office Coordinator, started in Dentistry in 1978 as a receptionist for a dental practice in the Butler area.

During her career Cheryl worked for four other practices. Cheryl then decided that she would like a different experience in the field of dentistry so she accepted a position at Associated Dental Specialists.

“We are all like family at Associated Dental Specialists in Monroeville. I really like all of the girls and doctors. I appreciate how hard they all work. The staff really helps each other out and we all get along so well”, said Cheryl.

Cheryl and Tom have been married for 30 years. They have 3 adult children: Brian (29 years old), Gregory (26 years old) and Melanie (24 years old). Brian works for the State in Unemployment Compensation in Harrisburg with IBM. Gregory and Jennifer were married last summer. Gregory was a Communications Major in College. He works for New Shows Studios. Melanie earned her degree in Communication and Journalism. She is presently employed as a Technical Writer for Hebcoco in Forest Hills. Cheryl’s husband, Tom, is employed at Bechtel Bettis as an Electrical Engineer.

Lindsay Hinterlang, Dental Assistant, has worked at Associated Dental Specialists for 6 years. Lindsay attended nursing school for 2 ½ years and then decided that her real desire was to work in the dental field. Lindsay initially started in a training program with a general dentist who was a wonderful mentor and teacher to her. After experiencing training in the field of general dentistry for a few years, Lindsay wanted to take her skill set to a higher level. That is when Lindsay interviewed for a position at Associated Dental Specialists. Lindsay also works for an oral surgeon on weekends because of her love of learning about dentistry at all levels. Her passion for dentistry transfers directly to the patient when assisting our doctors.

Lindsay said, “I love helping patients feel more comfortable and want to constantly learn more about the field of dentistry. My training was excellent at Associated Dental Specialists. We were trained to learn all aspects of the practice from ordering to purchasing and then as a dental assistant. More responsibility was given to me as my desire to learn more was noticed by the administrators and staff who trained me. I plan to make ADS my career and life. I feel like we are all family because of the camaraderie and support amongst the staff and doctors.”

Lindsay lives in Brentwood with her two children Damian (8 years old) and Briauna (3 years old). Damian is in the second grade; made straight A’s, received a certificate for perfect attendance and plays football and soccer! Briauna will be starting pre-school in September. Also, Briauna loves going to dance school.

Rebecca L. Watkins, DMD has worked at ADS for the past 7 years. Dr. Watkins travels to all of our offices but her main location is Monroeville. Dr. Watkins said she enjoys caring for the patients by providing a high level of endodontic treatment. She greatly values her relationship with the referring dentists. “Our well-trained, highly competent and compassionate staff at the Monroeville Office is what really makes my treatment for patients much easier. The staff is excellent at assisting me and we all work well together,” said Dr. Watkins. Dr. Watkins stated that our well trained staff makes the whole treatment process much easier for the patients.

Dr. Rebecca Watkins Pettit is originally from Toledo, Ohio. She completed her pre-doctoral studies at Ohio University receiving a Bachelor of Science degree in Biological Studies and Psychology. In 2003, she received a D.M.D. degree from the University of Pittsburgh, School of Dental Medicine. Dr. Watkins graduated near the top of her class and was named to the Dean’s List with honors for four years. She was the recipient of the Toledo Dental Society Scholarship, the William Friedman Scholarship and the Academic Scholarship from the University of Pittsburgh, School of Dental Medicine. Upon graduation, Dr. Watkins received the Robert Zugsmith Memorial Award, a recognition and monetary award for the female graduate demonstrating excellent academic and clinical skills. In addition, she received the American Association of Endodontists Student Achievement Award. In 2005, Dr. Watkins completed the Post-Doctoral Endodontic Program at the University of Pittsburgh, Department of Endodontics, receiving her Endodontic Specialty Certification. Dr. Watkins has contributed to Endodontic literature, focusing on the application of lasers in surgical endodontics. She entered the private practice of endodontics in suburban Philadelphia. In 2006, Dr. Watkins joined Associated Dental Specialists. She maintains membership in the American Dental Association, Pennsylvania Dental Association, Western Pennsylvania Dental Society and the American Association of Endodontists.

Dr. Watkins resides in Pittsburgh with her husband Jesse and 2 children London and Cole. London who is 3 ½ years old just completed her first year of pre-school at Temple Emmanuel in Mt. Lebanon. Cole is 1 year old and looks forward to someday doing all of the fun things his big sister can do! Dr. Watkins’ husband Jesse Pettit is a partner at the law firm of Pettit & Spontak, LLC located in downtown Pittsburgh.

Valerie Martino, Dental Assistant, began working for ADS 6 years ago as Front Desk Receptionist. Valerie really wanted more hands on experience working with our dentists and assisting patients. Valerie wanted to work with the patients on more of a personal level. So, Valerie asked to be trained as a dental assistant which is her present position at ADS. Valerie also is one of our dental supplies buyers and continues to help out at the front desk as we need her.

“I really love working for ADS because you are given an opportunity to advance and extend your skills for different job opportunities within our dental firm. I was very pleased that our Business Manager, John Hischar, trusted in my ability to learn the skills necessary to become a dental assistant. I am grateful to have this opportunity to do what I really enjoy. Also, many of our patients comment on the comfortable atmosphere of our office.”

Valerie has a 3 1/2 year old daughter by the name of Madelyn. They live in Oakmont and will enjoy exploring the sites of Pittsburgh for their vacation such as the Children’s Museum and the Pittsburgh Zoo.

Dress for Success – ADS Making a Difference!

“Service is the Rent We Pay to Live on this Earth,” is the motto that Dawn Foltz, our Lead Dental Assistant, lives by. Dawn has been involved in many volunteer campaigns to make the lives of people in our Pittsburgh Community so much better. Dawn participated in the MS Bike tour for her 15th year on June 8th and 9th 2013. The MS (150) Escape to the Lake (Erie) Bike Tour is a 150 mile two-day one-way bike tour that raises funds to fight the devastating effects of Multiple Sclerosis. Also, Dawn would like to volunteer with her church on trips to Appalachia to help out the poor and underprivileged population in the United States.

Her most recent endeavor has been coordinating the involvement of 13 members of the Associated Dental Specialists staff to participate in volunteering for Dress for Success on April 13, 2013. The mission of Dress for Success is to promote the economic independence of disadvantaged women by providing professional attire, a network of support and the career development tools to help women thrive in work and in life.

Dawn stated that, “John Hischar, Business Manager for ADS, has given us an opportunity to take positions of great responsibility at ADS by the desire and motivation we have proven through our job performance. Our team of women at ADS wanted to demonstrate to other women that, they too, can have the same kind of opportunities available to them through Dress for Success.”

Dawn said, “The high point of the whole day was the bonding experience this created for us as staff members. We organized professional outfits and placed them on racks for women to make their selections for interviews and work. It gave us such a positive bonding experience as team members of ADS. We felt so great about helping economically deprived women transform themselves into empowered professional women who can excel in their career and personal lives.” Dawn Foltz looks forward to organizing a volunteer event for our staff on a yearly basis.



Top Row Left to Right:
Dawn Lewis, Franki Chambers, Natalie Halahurich,
Dawn Foltz, Maggie Reffner, Katy Sorenson
Bottom Row Left to Right:
Mary Beth Brannon, Dana Martinez, Kerry Byrd,
Lindsay Hinterlang, Jessica Venturella, Jennifer Kephart,
Natasha Dimichele.



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Past and Upcoming Seminars

Current Scientific Evidence in Endodontic Therapy



William Nudera, DDS, MS

William Nudera, DDS, MS presented an ADS continuing education program for 6 CE credits on **Friday, April 26, 2013** at the Hilton Garden Inn Pittsburgh/Southpointe entitled **Current Scientific Evidence in Endodontic Therapy**. Dr. Nudera is a Diplomate of the American Board of Endodontics. He has been published in the Journal of Endodontics for his work with antibacterial agents and their efficacy against endodontic pathogens.

Dr. Nudera currently maintains a full time private limited to Endodontics in Bloomingdale, Illinois as well as two satellite practices with a general dental group on the South East Side of Chicago and Calumet City, Illinois. As an Endodontic Opinion Leader, Dr. Nudera has lectured around the United States on a variety of endodontic issues. Dr. Nudera's lecture was designed for the dental clinician who desires to stay at the forefront of the latest scientific advancements, endodontic techniques and schools of thought. His discussion included NiTi metallurgy and irrigation technologies that are cutting edge and changing endodontic therapy.

Our next scheduled program, a 3 credit continuing education seminar on Thursday, September 19, 2013 entitled Geriatric and Special Needs Dentistry will be presented at the Doubletree Pittsburgh/Monroeville Convention Center from 5:30 pm – 8:30 pm. The featured speaker will be Dr. Elaine H. Berkowitz. This seminar will sort through the many complexities of treating both the geriatric and special needs patient. The participant will leave this program being able to deal with "out of the ordinary delivery of dental care."

Also, on **Thursday, November 21, 2013, a 3 credit continuing education seminar entitled, Sedation In The Office: Is this an Option For Your Practice?, will be offered at the Pittsburgh Airport Embassy Suites in Coraopolis from 5:30 pm – 8:30 pm.** This seminar will look at the various options available to dental practices, ranging from an anesthesia provider coming into the office to the dentist providing various levels of sedation. This seminar will provide the various options along with discussing the training and additional requirements necessary to provide this service.

For more information or to register for our seminars, please contact Dawn at 412-283-1413 or email dlewis@ads-endo.com