



Endodontics

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The Apex

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A publication for ADS's Extended Dental Family

Dr. Richard S. Smith



Dr. Richard S. Smith is a Pennsylvania native growing up in Chester County, Pennsylvania. He attended The Pennsylvania State University for his pre-doctoral studies graduating with a Bachelor of Science degree in Molecular and Cell Biology. In 1994, Dr. Smith received his D.D.S. degree graduating Cum Laude from the University of Colorado, Health Science Center, School of Dentistry. Dr. Smith also served as a Lieutenant Commander in the United States Navy. In 1999, he received his Endodontic Specialty Certification from the Medical College of Georgia, School of Dentistry, Department of Endodontics. Dr. Smith has held faculty teaching positions at the School of Dentistry, Department of Endodontics at the following: The Medical College of Georgia, Marquette University and the University of Colorado, Health Science Center. He has contributed to dental literature with his research being published in the Journal of Endodontics. Dr. Smith has been an endodontist with Associated Dental Specialists since 2002. He maintains membership in the American Dental Association, Pennsylvania Dental Association, Western Pennsylvania Dental Society and the American Association of Endodontists.

The Immature Apex: What To Do?

Root development begins when enamel and dentin formation has reached the future cemento-enamel junction. The completion of root development and closure of the apex occurs approximately three or more years after eruption of the permanent tooth. The treatment of pulpal injury during this period provides a significant challenge for the clinician. Before the introduction of apical closure procedures, the usual approach was surgical. Depending upon the vitality of the affected pulp, three approaches are possible - apexogenesis, apexification and revascularization. Apexogenesis is defined as a vital pulp therapy procedure performed to encourage continued physiological development and formation of the root end. Apexification is defined as a method to induce a calcified barrier in a root with an open apex or the continued apical development of an incomplete root in teeth with a necrotic pulp. Revascularization is defined as a method to induce continued physiological development and formation of the root end in necrotic teeth. The clinical success requires a thorough history of subjective symptoms, clinical and radiographic examination and performance of diagnostic testing. This leads to the proper diagnosis and treatment for these difficult cases.

Apexogenesis should be considered in immature teeth where the pulp remains vital. Two examples are carious exposures and some trauma cases. Diagnosis of a vital pulp using thermal testing is necessary. Anesthesia and rubber dam isolation are required. After access and caries removal, the goal is to remove the unhealthy pulp tissue in the chamber and/or canal orifice. A small spoon or round diamond bur may be used to reach healthier tissue. Rinse the area with sterile water and apply gentle pressure with a moist cotton pellet until bleeding has stopped. A pulp cap is placed over the exposed pulpal tissue. Historically a layer of Dycal or Ca(OH)₂ was placed on the tissue stump and restored. Today, a 1mm thickness of mineral trioxide aggregate (MTA) is used for pulp capping and moist cotton pellet placed followed by a

temporary restoration. About a week later the tooth is re-accessed and the cotton pellet removed. The MTA should be hardened and a permanent restoration can be placed. Follow-up is usually done at 3, 6 and 12 months. At these follow-up visits vitality should be checked and radiographs taken. Non-surgical root canal therapy (NSRCT) may be required after root formation, but routine reentry to remove the pulp and placement of a root canal filling is contraindicated unless dictated by symptoms or restorative considerations.

Apexification should be considered on immature teeth where the pulp is necrotic. Diagnosis of pulpal necrosis in the open apex is sometimes difficult unless swelling or a sinus tract exists. Thermal testing is more reliable for determining pulp vitality than the electrical pulp tester. Comparing root formation of the contralateral tooth should always be considered. Once the diagnosis of a necrotic pulp is reached the treatment protocol is as follows. Anesthesia and rubber dam isolation are required. Endodontic access and complete caries removal are followed by debridement of the necrotic tissue in the canal space and irrigation with 2.5% sodium hypochlorite (NaOCl). Placement of an intracanal medicament and coronal seal completes the first visit.

Although calcium hydroxide (Ca(OH)₂) has been the medicament of choice for apexification, the use of MTA is gaining popularity. The induction of an apical barrier takes several months or more and requires multiple visits. Controversy exists as to how often to change the Ca(OH)₂ dressing. I usually change the medicament two or three times over the course of treatment at three month follow-ups. After radiographic or clinical evidence of barrier formation and the tooth is symptom free, the canal is thoroughly flushed and cleansed of Ca(OH)₂, dried and obturated with gutta percha (GP).

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The Immature Apex: What To Do? continued

Today, I use a two-step process in these cases where an artificial apical barrier is created with MTA. After the initial placement of Ca(OH)₂ for two weeks, the tooth is re-accessed, flushed and dried. A plug of MTA is placed into the apical 4 to 5 mm. Depending on which tooth is treated, gutta percha (posterior teeth) or composite resin (anterior) is placed in the remaining canal space. The final restoration is placed: avoid post placement in these teeth.

Revascularization is an emerging regenerative treatment option done in immature teeth where the pulp is necrotic. This method has the potential to allow for continued root development as seen in apexogenesis versus a calcific barrier as seen in apexification. Diagnosis of a necrotic pulp is needed and is similar to the diagnostic procedure used for apexification. Anesthesia and rubber dam isolation are required. The tooth is accessed, but NO instrumentation is recommended. Next step is to disinfect canal with 2.5% NaOCl. After irrigation, an intracanal medicament is placed into the coronal portion of the canal followed by a moist cotton pellet and coronal seal. The intracanal medicament can be a thick paste of Ca(OH)₂ or a triple antibiotic paste (combination of ciprofloxacin, metronidazole and minocycline). Recall the patient in three weeks. At the second visit, anesthesia without a vasoconstrictor is used. Isolate and access the tooth as before. Irrigate with 2.5% NaOCl to remove intracanal medicament and a final rinse with sterile water. A small file is used to induce bleeding in the canals. After clot formation, MTA is placed in the chamber or canal

orifice on the clot followed by a moist cotton pellet and coronal seal. One month later remove the cotton pellet and place a permanent restoration. Recall visits at 3, 6, 9 and 12 months are recommended. Clinical exams with vitality testing and radiographs are recommended. Positive response to Endo Ice is usually seen in 9 months. Apexification procedure may be required if root formation is incomplete.

The treatment of immature permanent teeth is challenging. The vitality of the pulp will determine which treatment protocol to follow. Whether it is apexification, apexogenesis or revascularization, the goal is apical closure. If an emergency situation arises in your dental office (trauma or caries), the best option may be immediate referral to an endodontist. If initial treatment is needed for pain control, a shallow pulpotomy with a temporary restoration may be the best short term remedy. These cases take many months of follow-up appointments and patient compliance may be the limiting factor. Ultimately, retention of the immature tooth with apical closure is the goal.

Sources:
Cohen, Stephan, and K. M. Hargreves. Pathways of the Pulp. 9th ed. St Louis: Mosby, 2006.
Cehreti, Z.E., Isbitiren, B.I.. Regenerative Endodontic Treatment (Revascularization) of Immature Necrotic Molars with Calcium Hydroxide: A Case Series. J Endod 2011; 37: 1327-30.

Past and Upcoming Seminars

Implants in the Esthetic Zone - Striving For Predictability Seminar

Arthur M. Rodriguez, DMD, MS presented an ADS continuing education program on **November 17, 2011** at the Four Points By Sheraton Pittsburgh North entitled **Implants in the Esthetic Zone – Striving For Predictability**. Dr. Rodriguez graduated Summa Cum Laude from the University of Pittsburgh in 1982 with a BS in Chemistry and from the University of Pittsburgh School of Dental Medicine in 1986. After completing a General Practice Residency at the VA Medical Center in Pittsburgh he practiced privately as a General Practitioner for 3 years before attending the University of Iowa where he graduated in 1992 with a Specialty Certificate and Masters Degree in Prosthodontics. Dr. Rodriguez achieved Diplomate status from the American Board of Prosthodontics in 1997, is a Fellow of the American College of Prosthodontics and has served on the Board of Directors of the American Academy of Fixed Prosthodontics. His research efforts have focused on implant biomechanics, implant esthetics and stress distribution of cantilever loads on implant prostheses. He is currently Staff Prosthodontist and Assistant Program Director at the VA Medical Center, Pittsburgh and Assistant Professor of Prosthodontics at the Implant Center of the University of Pittsburgh School Of Dental Medicine.



implant provisionalization and techniques for meeting these goals were discussed. Specific attention to the maintenance of bone and soft tissue were given. Abutment/design features which enhance esthetic outcomes were emphasized. The relationship between biologic requirements and clinical implant procedures were also discussed. The importance of fixture and abutment dimensions as well as treatment planning and sequencing were covered.

Our next scheduled program, a 6 credit continuing education seminar on Friday, April 27, 2012 from 9:00 am to 4:00 pm entitled Endodontic Diagnosis and Assessment, will be presented in downtown Pittsburgh. The featured speaker will be Dr. Joe H. Camp. This seminar will sort through the many complexities involved in arriving at a correct diagnosis while presenting a systematic

approach including all appropriate endodontic diagnostic tests. As clinicians know, diagnosis can often times be the most difficult phase of dental treatment. **This is a must attend seminar for the general practitioner!**

If you have any questions or would like to register for this program please call our Education and Marketing Director, Carol Glock, at 412-680-6496.

Dr. Rodriguez presented a systematic approach for maximizing implant esthetics through lecture and case studies. Advantages gained through

Preparing Yourself and the Office in the Event of a Medical Emergency

Medical emergencies can occur anytime in the office. There are many dentists who believe "it won't happen in my office". These emergencies could involve patients, family members, staff, or even the doctors. There are several cases where medical emergencies, even deaths have occurred in the general dentist office. It is imperative that each office have the necessary equipment and drugs to manage an emergency until EMS arrives.

A common misconception that many offices believe is "all I have to do is call 911". This statement can't be further from the truth. Doctors and staff have to be able to manage an emergency for a minimum of 10 minutes. These times may increase due to EMS systems going out of business or EMS systems holding calls until they have an ambulance available rather than calling a mutual aid service. Depending on what information is relayed to the 911 dispatcher, the call receives lower priority since the emergency is occurring in a medical facility. It is assumed that the office should be able to handle the problem, unless it is a life threatening emergency. The first responders through your door, may or may not be Advanced Life Support (ALS) providers; you will still be the one responsible for the patient.

The most common medical emergencies that an office needs to be prepared for are:

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| I. Respiratory:
a. Foreign body airway obstruction
b. Laryngospasm
c. Bronchospasm
d. Emesis/aspiration | III. Allergic Reactions
a. Mild
b. Moderate
c. Severe |
| II. Cardiac
a. Chest pain
b. Stroke
c. Hypertension
d. Hypotension
e. Cardiac arrest | IV. Other
a. Syncope
b. Hyperventilation
c. Seizure
d. Diabetic emergencies |

If a dental practice feels that they do not need emergency equipment in their office, take the time to read a package insert from local anesthesia: "Resuscitation equipment should be available when administering local anesthesia near the face and neck."

It is recommended that each office should have the following equipment:

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| <ul style="list-style-type: none">• AED• Oxygen• 1 E cylinder w/adjustable regulator (0-25 Liters)• 1 spare oxygen E cylinder• Oxygen delivery devices• Nasal canola• Nebulizer mask | <ul style="list-style-type: none">• Pocket mask• Bag valve mask• Airway adjuncts• Suction• Blood pressure cuff• Stethoscope• Glucometer• CPR board |
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EMERGENCY DRUGS

The majority of dental offices either have too many or not enough drugs. The drugs that the dental offices usually do have are expired. It is imperative that dental offices check their equipment and drugs daily. Most common medical emergencies can be managed with just a few simple drugs.

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| <ul style="list-style-type: none">• Baby Aspirin• Nitroglycerine tablets• Benadryl• Epi pen• Epi pen jr. | <ul style="list-style-type: none">• Epi 1:1000 ampules• Albuterol• Oral glucose• Syringes |
|--|--|

These drugs can be purchased as either "kits" or on an individual basis. There are advantages and disadvantages to both. Many companies overcharge for these kits, and include drugs that have to be given intravenously. IV drug administration is beyond the scope of most general dentists. Medical Purchasing Solutions is one company who can provide either a kit, containing only the drugs mentioned above, or sell drugs on an individual basis. In addition, Medical Purchasing Solutions provides reminders when the drugs are due to expire at no charge, through their code blue program.

In conclusion, just as or even more important as having the proper equipment, and drugs that are listed, it is imperative the doctors and staff are properly trained in being able to recognize and manage a medical emergency with the equipment and drugs that are in the dental office.

Dental Education Inc. can assist offices in purchasing the proper equipment, drugs, and can provide in office continuing education for the dentists and staff. This training includes both lecture and simulated office emergencies. You can contact Dental Education Inc at 412-292-2978 or brewerdei@gmail.com

Medical Purchasing Solutions
15021 N. 74th Street #300
Scottsdale AZ 85260

Attention: Dennis McNicholl or Mike Mitchell (888-894-2487)



R. John Brewer NREMT-P is an associate with Dental Education Inc. and has 30 plus years experience working as a career paramedic in an urban/suburban area just south of Pittsburgh, Pennsylvania. Mr. Brewer has worked extensively with the dental community since 1998. In addition to the medical emergency courses, he provides BLS, ACLS, and PALS courses. Mr. Brewer has provided training to individual offices, dental societies, PSOMS, PDA, University of Pittsburgh School of Dental Medicine, UPMC Children's Hospital Dept. of Pediatric Dentistry, Duquesne University IV Sedation Courses, Henry Schein Dental, and West Liberty University. Mr. Brewer also assists with helping offices purchase and organize emergency equipment and prepare for office evaluations.

2011 Three Rivers Dental Meeting



John Hischar
Business Manager

Dawn Lewis
Office Administrator

The Three Rivers Dental Meeting, sponsored by the Dental Society of Western Pennsylvania (DSWP), was held at Seven Springs Mountain Resort on Friday and Saturday, October 28 and 29, 2011. There were approximately 325 participants, including dentists, hygienists, assistants, Expanded Function Dental Auxiliaries (EFDA's), front desk personnel, and 52 vendors.

Associated Dental Specialists was among the many vendors who presented a clinical topic from our exhibit space. The topic was Diagnostic Terminology, co-authored by Drs. Richard Smith & Renee Kalp. Dr. Smith presented the topic

to the many participants who stopped at the ADS exhibit table where information about our doctors and offices was available. Our "give-away" which was very well received by the participants was a brushed aluminum water bottle with carabineer clip.

Also, ADS was asked by the officers of DSWP to take the lead in a front desk administrative program on Dental Office Efficiencies. Our Office Administrator, Dawn Lewis, and Business Manager, John Hischar, shared the podium and presented information on Time Management, Audit Programs, Goals & Incentive Programs, Patient Recall Systems, and Dental Office Financing Arrangements. This was the first "non-clinical" program ever presented at the Annual Meeting and was very well attended and received.

ADS had a great presence at the meeting and is looking forward to the next one on October 12 and 13, 2012 at Seven Springs.



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Office News... About our ADS Family

Jennifer Strzyz

Jennifer Strzyz is the Operations Facilitator for Associated Dental Specialists (ADS). She has been with the practice for a total of 16 years. Jennifer was a dental assistant for ADS from 1989 to 1997. In 1997, Jennifer married her husband, Adrian who was in the Marine Corps and left Pittsburgh for 6 years. Upon her return to Pittsburgh, Jennifer rejoined Associated Dental Specialists in 2004.

Adrian retired from the Marine Corps in 2008 and started a second career as a Technical Manual Engineering Production Coordinator for Bechtel Plant Machinery Incorporated in Monroeville. Jennifer and Adrian have two children. Alex is a senior at Bethel Park High School where he has played lacrosse for the past 4 years. Alex works part-time at Shop N' Save. Alex is in the process of submitting college applications and plans to major in computer science or computer engineering. Delaney is in the 6th grade and is finding middle school to be fun, but a lot of work. Delaney is a cheerleader for the recreational football program, plays soccer and has dance class 3 nights a week.

Cheryl Cherry

Cheryl Cherry, the Monroeville Office Coordinator for Associated Dental Specialists, always tells her children never to get her anything for Christmas. The most precious gift of all is just having her children come home for Christmas, since they are grown up and out of the house. This year was different! Cheryl sponsors a child through World Vision by the name of Kevin who lives in Guatemala. Cheryl asked her children to give her \$10 so she could send Kevin 7 ducks. Cheryl's kids surprised her! They gave Cheryl enough money to buy 1 goat, 2 chickens and 7 ducks. Doesn't Cheryl have the best kids!

Shalimar Wiech

Shalimar Wiech is a dental assistant in the North Hills Office for Associated Dental Specialists. Shalimar has some great news to share about her personal family life. Shalimar's husband, Eric, has been a nurse for the past 4 years. Eric has been in school pursuing his Bachelor of Science Nursing degree for the last 2 years in hopes of getting accepted into the Nurse Anesthesia Program at the University of Pittsburgh. After applying twice to get into the Nurse Anesthesia Program, Eric just received news that he has been accepted. The Nurse Anesthesia Program at the University of Pittsburgh is ranked number 3 in the country. We wish the best of luck to Eric as he pursues his dream to become a nurse anesthetist.

Dawn Foltz

Dawn Foltz is the lead dental assistant and trainer for Associated Dental Specialists. Dawn has been married to Greg for 5 years and is a mother of two little boys Ayden who is 4 and

Landen who is 1½ years old. Greg is a school teacher at a private Christian school in the North Hills area. Dawn has been cycling and running for the past 16 years. Dawn cycles to raise money for the research of many different health conditions. On February 11, 2012, Dawn will run a 5K in North Park for Glut1 and glucose deficiency. Dawn plans to cycle from Pittsburgh to Erie for Multiple Sclerosis this June. We wish the best of luck to Dawn in all of her physical challenges for such great causes!

Allison Gibbons

Allison is the South Hills Office Coordinator for Associated Dental Specialists. Allison has been at ADS for 10 years. She started as a dental assistant and moved to the front desk in 2004. Allison graduated from the University of Pittsburgh with a Bachelor of Science Degree in Nursing (BSN) in 1996. Prior to working at ADS, Allison worked for an Alzheimer's nursing home and a Urology practice. She maintains her registered nurse's (RN) license in Pennsylvania by taking continuing education courses each year. Allison is responsible for traveling annually to every ADS office to get the staff inoculated with the flu vaccine. Allison's husband Joe is an Operating Engineer and works for the Oxford Development Company. He is a member of Local 95 (International Union of Operating Engineers) and has several certificates necessary to maintain the building functions such as heating and cooling. Allison has two daughters; Cassie who is 8 years old in the second grade and Kendra who is 5 years old in kindergarten. Both girls attend school in the Bethel Park School District.

Donations by ADS

Carrie Durny formerly the Marketing Coordinator for ADS supplied over 80 toothbrushes and over 200 toothpaste samples for homeless families over the Holidays. Carrie's neighbors, Dale and Ellen Smith who are members of the Christ United Methodist Church in the South Hills provide the homeless at the Shepherd's Heart in the city of Pittsburgh with basic essential needs for the Holidays each year. In knowing the need, Carrie contacted an ADS vendor that supplies tooth brushes and tooth paste to the general dentists and asked for the donations. Thanks to Carrie's perseverance, her neighbors were able to give a great smile to many people in need!

Associated Dental Specialists donated three Autoclaves this past year to Direct Relief International. Founded in 1948, Direct Relief International provides medical assistance to improve the quality of life for people affected by poverty, disaster and civil unrest at home and throughout the world. Direct Relief International works to strengthen the in-country health efforts of their partners by providing essential material resources such as medicines, supplies and equipment. The donation of used equipment helps to provide health care professionals with the resources they need at no cost to them. ADS is proud to be part of this effort!