Christopher M. Adkins

Science Behind Dentistry: Evidence-Based Application of Treatment Techniques in a Clinical Setting

The academic goal of an internship at Southmoor Dental Group in the summer of 2009 was to learn how a practicing dentist incorporates emerging scientific research into his clinical practice. Ethical responsibilities to their patients oblige dentists to replace or augment present treatments if new information indicates that new treatment methods offer significant advantages. As a result dentists are engaged in a continuing process of evaluating new and emerging materials and techniques, and considering their merit and applicability to their own practice. Practitioners typically obtain research outcomes from disciplinary journals, academic and professional symposia, as well as from specific related classes. Renewal of licensure to practice in the state of Ohio requires dentists to keep up with developments in the dental field by completing 40 hours of Continuing Education (CE) each year. This paper examines the application of evidence-based scientific and clinical research findings that a dentist uses in formulating the best practices in management, (diagnosis, treatment, and education) of his own patients. The specific example of dental hypersensitivity reduction through composite resin reconstruction and other therapeutic practices is used to demonstrate the application of current scientific evidence and the considerations that affect its adoption into clinical practice.

Lisa J. Braden

The Effects of Plant and Animal Based Diets on Basking Behavior in the Slider Turtle *Trachemys scripta*

An ontogenetic dietary shift from a carnivorous to herbivorous diet is observed in yellowed-bellied slider turtles, *Trachemys scripta*. To understand this dietary shift, the costs and benefits of plant and animal diets to juveniles and adults must be evaluated. In *T. scripta*, basking is most commonly carried out by exposing their bodies to heat, usually the sun, to raise their body temperature. Diet may influence basking because basking raises body temperature and presumably facilitates biochemical reactions associated with digestion. I examined the basking behavior of sixteen yellow-bellied sliders fed both a gel based plant and animal diet. I hypothesized that turtles fed the animal based diet would bask more than when fed the plant based diet. Turtles were divided evenly into two tanks. Both experiments started with two weeks of fasting, followed by one week of diet, then another week of fasting, and ended with another week of diet. Both
tanks were videotaped for the last 2 days of each treatment. In Trial 1 tank 1, there was no effect of diet on basking times. During Trial 1 tank 2 and Trial 2, turtles basked significantly more when fed the animal based diet. There was a marginal increase in the total number of basking bouts, and no effect on the mean bout length. The increased basking can be explained by higher protein content in the animal based diet. A diet that is higher in protein will have more biochemical reactions which are facilitated by the turtles increased body temperature.

Zachary L. Clouse

The Effects of Fiber and Protein Levels on Basking Behavior in Slider Turtles *Trachemys scripta*

The freshwater turtle, *Trachemys scripta*, is ectothermic and therefore uses its environment to regulate its body temperature. By exposing extremities to the sun for extended periods of time, basking facilitates heat absorption from the environment. Because body temperature can facilitate metabolic processes, there may be connections between basking behavior and diet. The purpose of this study was to determine the effect of fiber and protein levels on basking.

Turtles were fed each of four artificial diets: (1) high fiber, low protein (2) high protein, low fiber, (3) high fiber, high protein, and (4) low fiber, low protein. After eating each diet for one week, turtles were videotaped for two days to quantify total time spent basking, total number of basking bouts, and mean bout length. In general, turtles basked more with higher fiber and high protein levels, although the results were not consistent in both tanks. The energy requirements of fiber and protein vary based on digestive processes, the specific dynamic action causes influxes in energy due to an increase of metabolic rate from ingestion of a food source. Fiber and protein cause increases in SDA, fiber increases fermentation rates, and protein increases enzymatic processes resulting in longer basking periods. These implications suggest that when high protein or high fiber are present within diets, the energy needed for metabolism is causing basking to occur more often to promote digestion. These results suggest that a turtle in a pond may eat diets that are lower in fiber and protein in order to not bask as much, so that they do not expose themselves to predators as often.

Carly M. Dent

Definitive Percutaneous Treatment of Simple and Plunging Ranula

This study was performed in the radiology department at Nationwide Children’s Hospital to evaluate the clinical feasibility and efficacy of percutaneous ultrasound-guided drainage and ablation of simple and plunging ranula, as a less invasive surgical option for treatment of this common condition. Thirty-six patients ages 1-42yr (mean age=13.6Y) with simple (17/36, 47%) or plunging (19/36, 53%) ranulas (sublingual 34/36, 94% and submandibular 2/36, 6%) were
treated with ultrasound guided ranula pseudocyst drainage followed by percutaneous salivary gland ethanol ablation. A medial juxtamandibular approach was used for the sublingual gland, and a submandibular approach for the submandibular gland; pseudocyst drainage was performed with either 5F pigtail catheter, 4-5F straight sheath, or 18-12G needle. Ethanol ablation was subsequently performed through a 23-25G needle. Aspiration of ranula pseudocyst without sclerosis, followed by ethanol salivary gland ablation was successful in providing complete resolution in 35/36 (97%) of patients. The mean ethanol volume injected=2.63 ml, and its injection resulted in focused, regional, and dense echogenicity of the respective treated gland with each injection. Temporary ipsilateral lingual nerve hypoesthesia occurred in 7/36 (19%) of patients and marginal mandibular nerve injury 3/36 (8%): average time to resolution of these neuropathies was 3 months. Percutaneous treatment of simple and plunging ranulas with pseudocyst drainage and salivary gland ethanol ablation is therefore a technically feasible, safe, and effective method of treating simple or plunging ranula, and is the first minimally invasive option to be developed.

Yasser A. Hussein

Reasoning and Rationale Behind Common Treatments in Dentistry

The justification for a particular treatment plan to counter any given ailment in dentistry is ultimately grounded in scientific study and findings; however, other factors such as economic and business considerations, as well as personal preference on the part of the individual practitioner or patient, often also enter into play. Through a combination of observational and hands-on clinical experience, I studied the various circumstances and the rationales that led to the observed treatments. Various aesthetic and functional restorative procedures were encountered over the course of the study. In the end, I concluded that while scientific findings over time embed themselves into established protocol of the dental field, other external factors tend to exert great short-term influence in determining a particular treatment.

Michelle A. Kriegel

The How and Why of Animal Care at The Ohio Wildlife Center

As an intern at the Ohio Wildlife Center, I studied the decision-making processes of the staff members in regards to their care of native species. My background in small animal medicine at a veterinary clinic was at times confirmed as a universal practice and challenged at others. The similarities and differences between the two types of clinics were vast, and in this way I was able to expand my knowledge of animal care into a better-rounded outlook. For example, in wild animal medicine it is imperative to take into account the natural feral behaviors of the species in order to minimize their stress and allow them to keep their healthy
fear of humans. In observing the creation of treatment plans specific to the animals and maladies presented, I was offered a window into the rationale behind the decisions made by the hospital staff. Their legal constraints, as well as past experience, led to many outcomes that I would not have predicted before I began my study. Ethics, in particular, drove many decisions, especially difficult ones in which animals could survive, but never be without suffering or healed to the extent that they would be able to compete in their natural habitat.

Lauren A. Lichtenauer

Specialized Summer Camps as Therapy for Children Living with a Life Threatening Illness

Despite the vast amount of research by Americans on the effect of outdoor or recreational experiences for children facing varying health issues, such as behavioral disturbances, Diabetes, and Autism, little is known about those experiences for children or adolescents facing life-threatening or chronic illnesses. As recreational facilities and programs are becoming more prominent and accessible to these children or adolescents and their families throughout the United States, advancements in how to improve their self-concepts and experiences are also gaining recognition. This study highlights the experiences witnessed at Camp Sunshine in Casco, Maine, which caters to families experiencing these particular circumstances. Underlying the observed and noted experiences are reviews and correlations of current research which aim to question and affirm the effectiveness of program components and procedures.

In addition, this study defines the differences among specialized summer camps and experiences by providing comprehensive insight into program development, institutional support and research and program variation and differentiation. Although this study fails to provide any quantitative research from the experiences above, this article will enable readers to understand the differences between various theories and programs, along with their importance as they continue to develop into a primary therapeutic outlet for adolescents facing these circumstances and their families.

Monisha K. Mallik

Effectiveness of Activator Manipulations in Chiropractic Treatments

Chiropractors manipulate the bones of the spine to treat symptoms that arise from malfunctions in the musculoskeletal system. From manipulations on the cervical spine to lumbar spine, chiropractic treatments can help slowly ease patients of pain ranging from headaches, nerve impinchment causing radiation of pain in the limbs, and adjustment of other joints in the body causing musculoskeletal pain. The field of chiropractics has changed recently with the development of a new form of treatment. Traditional treatment has involved
manual manipulation of joints for realignment, but the new technique called activator treatment focuses on adjustment of the ligaments that support the joints, which indirectly realigns the bone and joints. My objective was to observe if the pain rating decreased in correlation with an increased number of visits by way of the activator technique. A hundred patients were studied to evaluate their pre and post treatment pain on a scale of 1-10 as a measure of the effectiveness of the activator treatment. Results showed that the data parallel the opinions of the patients by showing that adjustments from the activator leave them with a lower pain rating over time. The mean value of the visits was 13.8 with a standard deviation of 9.37, the mean value of pain level resulted in a value of 3.76 and standard deviation of 0.81. The overall regression coefficient was 0.84 with a p value of 0.04, which indicates that the data is 95% significant. I was able to conclude that, as demonstrated by the activator method, there was a decrease in pain over a length of time.

Erin L. Miller

Evidence of OXPAT Translocation to the Lipid Storage Droplet from the Cytosolic Lipid Pool

The PAT (perilipin, adipophilin, TIP47) family of proteins is highly involved with lipid storage and metabolism. The newest found PAT protein OXPAT, is found on both large lipid storage droplets and a denser cytosolic pool in oxidative tissues. This cytosolic pool is hypothesized to be small high density lipid droplets (HDLDs) analogous to plasma lipoproteins in size and structure. Due to its highly conserved sequence with the fellow PAT family and trafficking protein, TIP47, we propose that OXPAT also plays a role in the trafficking of neutral lipid. Cycloheximide, a protein synthesis inhibitor, was used to inhibit OXPAT synthesis in 3xFLAG-OXPAT transfected Chinese hamster ovary fibroblasts. Loading the cells with an external lipid source caused OXPAT to translocate from small cytosolic punctuate structures in the cytosolic pool (HDLDs) to large central lipid storage droplets (LDs). The results indicate a possible trafficking function of the lipid storage droplet protein, OXPAT, due to the failure of cycloheximide to inhibit translocation. The co-localization of OXPAT with other proteins involved in lipid droplet fusion and directional movement should be further studied in order to understand the proposed trafficking function of the PAT protein.

Lindsay A. Miller

Exploring Surgical Procedures in Eye and Facial Plastic Surgery

Functional cosmetic reconstructive surgeries are procedures, often covered under health insurance, intended for the "enhancement" or maintenance of appearance. The objective of this project was to see if Tylenol III (325 mg of acetyl-para-aminophenol “acetaminophen” and 8 mg codeine) was a sufficient narcotic administered after surgery to effectively manage pain. During my
internship, I looked at the different functional surgeries and daily routines performed at a local eye and facial plastic surgery clinic. I collected data regarding post operative pain in primary brow lift patients and information regarding procedures (sterilization techniques, collecting and organizing patient’s charts, working with medical equipment). I found as age increases so does pain level. Brow lift patients are of potential interest because of the frequency of procedure and the amount of pain experienced during surgery. Collectively, Tylenol III was not a sufficient amount of pain medicine, and that a stronger narcotic should be administered to patients. Further, the experience and knowledge obtained at this internship significantly increased my preparation for post-baccalaureate studies.

Joshua D. Ozbolt

Chitinase Activity in the Gut of *Trachemys scripta*.

Yellow bellied slider turtles, *Trachemys scripta* undergo an ontogenetic dietary shift, in which they primarily consume insects while young, and then shift to a more herbivorous diet as they age. Chitin, a beta-1-4-linked polymer of N-acetylgulcosamine, is a major component of invertebrate exoskeletons. Chitinase is a chitinolytic digestive enzyme found in fish, sea birds, tortoises, and some turtles which is often correlated with high chitin diets. It is suspected that chitinase is present in *T. scripta* because they have remarkably high digestibilities of invertebrate prey items. The purpose of this study is to determine 1) if an endogenous chitinase is synthesized by *T. scripta*, and 2) if its synthesis depends on diet. Four turtles were fed a chitin-based diet of crickets, *Acheta domesticus*, and six were fed a plant diet composed of duckweed, *Lemna minor* and *Wolffia columbiana*. We hypothesized that the turtles fed a chitin-based diet would synthesize chitinase, where as the turtles on a vegetative diet would synthesize it to a much lesser extent, if at all. Turtles were euthanized and the stomachs, pancreases, and small and large intestines were extracted; each were individually homogenized in an extraction buffer. The gut contents were then assayed for the presence of chitinase via fluorescently labeled substrates specific for exo- and endochitinase. It was found that an endogenous chitinase is indeed synthesized by the yellow-bellied slider, and the concentration was highest within the small intestine. Turtles on a cricket diet produce higher concentrations of exochitinase, but chitinase is still produced when the turtles were fed a duckweed diet. It was also found that *T. scripta* is capable of synthesizing endochitinase.

Julie A. Phelps

What Makes a Good Damselfish Territory: Results of Spatial Heterogeneity Analysis of *Stegastes spp.* Territories of Central Belize
Damselfish are highly territorial, but the qualities that make a good territory are poorly known. Spatial heterogeneity is very important in determining fish diversity and abundance, and here I suggest that some aspects reef heterogeneity are also key attributes of damselfish territories. Territories of three species of damselfish (Stegastes fucus (dusky damselfish), S. planifrons (three spot damselfish), and S. partitus (biclor damselfish)) were surveyed on patch reefs of Central Belize. In S. fucus and S. planifrons territory and lawn size are proportional to body size. Bicolor damselfish are partly planktonic and require less territory space per given size fish. Habitat assessment scores suggest that damselfish choose territories of high heterogeneity and that substratum height, rugosity, and refuge size are most important to the overall quality of their territories. Live reef cover, hard substrate, and diversity of growth forms are less important. This study shows that territory size and heterogeneity are flexible and independent of live coral cover on the reefs. This is significant because damselfish will be able to find suitable territories, even as the percent of live coral cover continually decreases on Caribbean coral reefs.

Elizabeth M. Putnam

Expression of Calcium Transport Genes in the Equine Gastrointestinal Tract

Calcium regulation in horses is not firmly understood and it affects horses that have a number of pathological conditions. Calbindin-D9K is a protein present in mammalian intestinal cells that is responsible for binding calcium and its transport across enterocytes. The concentration of calbindin-D9K is greatly associated with calcium absorption rate. The objective of this internship was to evaluate the expression of Calbindin-D9K gene in the different tissues of the gastrointestinal tract of horses. This was accomplished by harvesting the tissue, extracting RNA, designing primers, and completing Real Time PCR. The concentrations of calcium transport genes were compared to equine GAPDH. Results found included the highest amount of calbindin-D9K in the right dorsal colon, the right ventral colon, transverse colon, and left ventral colon. These results were dismissed since there were a number of problems with RT PCR and the internship came to an end without recovering significant data. The concentrations of calbindin-D9K are of interest because understanding regulation would allow proper treatments for equines that are not able to keep calcium homeostasis under control.

Stacey A. Schall

The Toxicity of Leaf Extract of Acer spp. on Equine Erythrocytes

Ingestion of wilted red maple leaves (Acer rubrum) by horses results in a fatal or debilitating syndrome (red maple toxicosis) caused by hemolysis and methemoglobin production. Few studies have addressed variation in toxicity for
individual red maples or for *Acer* species. The objective of this research was to evaluate the toxicity of extracts of dried *Acer* spp. leaves on equine erythrocytes. Leaves were collected, dried, and ground in water. Suspensions were filtered and extracts (0, 25, 50, 75, 100, and 200 µl) were incubated with washed erythrocytes. Individual samples were added to NaCl solutions (0.0 to 0.9%). Absorbenecies of the supernatant were read at 560, 576, and 630 nm to determine percentage hemolysis (%H). Percentage methemoglobin (%M) was also determined. The %H was plotted against NaCl concentration, and the resulting sigmoidal line was used to calculate area under hemolytic curve (AUHC). Increased extract amounts resulted in increased %H and %M and could be described by the equations AUHC = 0.115(µl extract) + 16.243 ($P=0.001$, $R^2 = 0.90$) and %M = 0.2254(µl extract) + 9.0979 ($P=0.001$, $R^2 = 0.91$). AUHC and %M were highly correlated ($R=0.99$). There was no significant variation between individual red maple trees for AUHC. In contrast, %M for individual trees differed significantly for treatments 50 and 75 µl, but not for 0 and 25 µl. For treatments 25, 50, and 75 µl, there was significant variation between species for AUHC. AUHC for extracts from Norway and black maple for treatments 25, 50, and 75 µl were not statistically different from the control. Extracts for silver, sugar, and boxelder tended to cause more hemolysis than extracts from red maple. Results show that red maple extracts are toxic to erythrocytes and follow a linear increase with concentration. Individual trees do not vary greatly for toxicity but species of *Acer* do.

Adam M. Schuh

Click and Tone-Burst Methods of Assessment for Evaluation of Vestibular Function

Vestibular function is essential in maintaining a sense of physiological balance within the brain. Patients whom suffer from vestibular disorders experience moments of sudden dizziness and nausea. The VEMP (Vestibular Evoked Myogenic Potential) test is the latest advancement in the field of audiology used to identify and aid in effectively diagnosing vestibular disorders. The VEMP test capitalizes on the relative adjacent location of the cochlea to the saccule which causes vestibular stimulation through evoked sound waves and vestibular response in the brain. Sound waves are emitted into the ear of the patient to stimulate the saccule and the vestibular response is tracked through electrodes connected to the ipsilateral sternocleidomastoid muscle of the neck. The response is filtered through vestibular measuring equipment and interpreted in the form of a graph. The determination of proper vestibular function is determined by identifying the locations of P1 and N1 response peaks on the graph. There are two currently practiced methods in performing the VEMP; click and tone-burst. The click method operates through a constant stream of clicks directed into the ear and the tone-burst methods uses rapid dispersions of sound to stimulate the saccule. Both methods have been proven to be effective in receiving a vestibular response, however only one method is needed to perform the test. In order to determine which test is ideal, twelve subjects were screened
for normal hearing and both click and tone-burst methods were performed. The average peak readings were collected and the tone-burst method gave normalized latency values of $P1 = 14.28 \pm 1.44$ and $N1 = 21.81 \pm 2.25$ and the click produced values of $P1 = 12.71 \pm 2.29$ and $N1 = 20.04 \pm 3.09$. These two methods were determined to be equivalent in producing acceptable peak values, however the tone-burst method was recommended to the practice due to the reliability and consistency of producing identifiable P1/N1 peaks within the graph.

Amar R. Shah

Development of a Fluorescent Assay for Neutral Lipids

The oxidation of lipids is an essential biochemical process that is pertinent to the human body in that it provides a major energy source. Lipids are transported in the blood as lipoproteins, while excess lipids are stored into adipose tissue for future use. A family of proteins comprised of Perilipin, Adipose Differentiation-Related Protein (ADRP), a tail-interacting protein of 47 kDa (TIP47), and S3-12 collectively termed PAT proteins have been shown to be attached to lipid droplets. OXPAT, a member of the PAT family, lies in the region between the neutral lipid core and an aqueous cytosol positioning the protein to regulate the storage and mobilization of lipids. The core of OXPAT coated particles has been suggested to consist of either a hydrophobic lipid core or an aqueous core, which allows the regulation of lipids storage or mobilization. The purpose of this study is to develop an assay that allows one to deduce the composition of the core. Two assays were developed to observe changes in the core composition. The first assay involved running non-denaturing gel electrophoresis and staining particles with several fluorescent dyes to attempt to locate OXPAT coated particles. This assay did not provided conclusive data in that no bands with the expected size were visible after multiple attempts. The second assay involved using fluorescence spectrometry to observe changes in fluorescence of Ethidium Bromide in the presence of neutral lipid micelles. Using this assay an increase in emission was observed with an increasing lipid concentration substantiating the hypothesis that different neutral lipid content could be measured through this assay.

Audra K. Shick

Using Community Involvement to Improve Ohio’s Air, Land, and Water Quality

During fall 2009, I interned at the Ohio Environmental Council. The Ohio Environmental Council combines legislative initiatives, legal action, scientific principles, and statewide partnerships with local communities to secure a healthy environment for Ohio’s families and communities. My objective while interning with the Ohio Environmental Council was to gain experience and insight into working in the environmental field, in particular, how community involvement and
education influences environmental issues. Specifically, I wanted to explore how environmental issues are dealt with in local communities. Through my experiences, I learned that environmental improvement is best achieved through community awareness, education, and involvement. My particular contributions dealt with: 1) the development and dissemination of two educational videos, 2) planning and promoting a conference and forum on clean water, and 3) recruited community participation in local, environmental events.

Katherine V. Stoughton

Evidence Based Veterinary Medicine and Everyday Applications within an Equine Facility

Evidence-based Veterinary medicine (EBVM) is the practice of using clinically relevant research data in treatment protocols in daily practice. The research is done in an organized and well documented fashion as to demonstrate the viability and success of a new treatment option. Commonly the research is done in a clinical setting to allow for proper control to ensure that the most adequate information is collected. Following completion of the research, the findings are generally published in an appropriate journal for other professionals to educate themselves and begin offering these treatments within their practices. In equine medicine, the traditional method of authoritative “experts” using their best judgments based on their experiences and passing the information along to fellow colleagues is the foundation for most treatments. As an intern at Woodland Run Equine Veterinary Facility, my goals were to observe daily practices and analyze whether evidence based veterinary medicine was being applied or if the veterinarians were using the traditional methods of medical practice. Throughout the summer long internship, I had the opportunity to be a part of in facility and ambulatory medicine. My experiences included basic lameness examinations, epiglottic entrapment with ulcer present, preventative practices such as deworming via stomach tubing, and being a part of a training scope examination. Through observations, independent research, and a more complete understanding of the definition of evidence based veterinary medicine, I was able to determine that although traditional style of medical practice is the preferred method currently, evidence based research is increasing. Thus, supplementary treatment options are available to veterinarians that can be passed along to clients. With the research backing and newer methods, some of the biggest hurdles for these treatments are cost, availability, and convenience.

Michael A. Tretter

Pharmacology in Anesthetics and When to Stray from the Standard Regimen

Over the summer of 2009, an internship was performed at Mount Carmel St. Ann’s. During the course of this internship, Dr. Eric Humphreys as well as several
other doctors in the anaesthesia department of St. Ann’s were followed through the surgical process from pre-operative interviews to the operating room to the post-operative follow-up in the recovery room. It was determined that the standard course of action in terms of medication for general anaesthesia is Versed as a benzodiazepine, a mixture of Lidocaine and Propofol for induction of anaesthesia, Rocuronium as a neuromuscular blockade, Dilaudid as a narcotic, and Desflurane/Sevoflurane for maintenance of anaesthesia, with the use of others to control issues such as high or low blood pressure or heart rate and more narcotic as needed. With all the possible medications that are available for general anaesthesia, this regimen is very uniform. Early in the internship one case consisted of implementation of a different method of general anaesthesia using an older medication called Etomidate instead of Propofol for induction. There were also cases in which the Versed was left out of the regimen. In order to look at the science behind the field of anaesthesics it was decided to take a closer look at cases in which the standard regimen was avoided and the rationale. This paper will examine the standard regimen of anaesthetics today as well as the reasons that these medications may be removed or supplemented. Several specific cases will be used to show application of standard as well as altered regimen of anaesthesia in medical practice today.

S. Blake Walton

CPR Guidelines: When to Stop Treating

Cardio Pulmonary Resuscitation, also known as CPR, is used in and out of hospital settings when people enter cardiac arrest. There are many guidelines one must follow in order to effectively give the person in cardiac arrest the greatest chance of survival. New guidelines are published every 5 years by the American Heart Association in collaboration with the International Liaison Committee on Resuscitation. Current CPR guidelines for adults state that CPR should be administered at a ratio of 30 compressions for every two ventilations at a speed of 100 compressions per minute. Recent updated CPR guidelines state that for non-healthcare professionals, compression only (no ventilation) is just as effective in out-of-hospital settings. The faster a person in cardiac arrest is given CPR the greater the chance of survival. When in the hospital setting, CPR is used in conjunction with other medical procedures to increase survival/return of spontaneous circulation. Healthcare practitioners must also decide when to stop treating a patient in cardiac arrest if the patient is not responding to CPR and other procedures. Factors that influence termination of CPR include: how long the patient was unresponsive before receiving CPR, time to defibrillation, pre-arrest state, and the initial arrest rhythm. To improve the chances of a successful resuscitation, someone must witness collapse of the cardiac arrest patient, have bystander CPR available, and a short time period to arrival of healthcare practitioners. With many factors to take into consideration, healthcare providers and practitioners must correctly follow CPR guidelines and, if needed, determine when to stop treating a patient under cardiac arrest.
The Use of Scientific Evidence in the Practice of Optometry

The process of diagnosis and treatment in the practice of optometry is the scientific method in action. An optometric eye examination is a direct application of testing and evaluating evidence. The scientific evidence obtained through testing gives optometrists the ability to diagnose a patient’s eye condition and evaluate the success of management. Optometric examinations must be precise and thorough to ensure that best-practice standards of care are delivered, but current research literature suggests that routine testing in optometry is not always 100 percent correct and improvement is needed. Studies continue to be done to determine the best technique and technology for detecting limitations in patients with various visual impairments, and optometrists generally gather such evidence for use in formulating their clinical methods through skills learned in optometry school, and through scientific journals and continuing studies seminars. This paper gives an account of the application of scientific research in the field of optometry, as illustrated by the specific example of the measurement of corneal thickness as a rectifying factor on the diagnosis of glaucoma from opthalmoscopic appearance and tonometry.