Pediatrics and Binocular Vision at the Pennsylvania College of Optometry

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Pennsylvania College of Optometry

The Lynch Pediatric and Binocular Vision Service of The Eye Institute

The Eye Institute (TEI) is the main teaching clinic of the Pennsylvania College of Optometry and is located in North Philadelphia. The Lynch Pediatric and Binocular Vision Service at TEI has been serving children and families in Philadelphia and the surrounding areas since it opened in 1978. The services offered in the unit include the Primary Care Pediatric Service, the Vision Therapy Specialty Clinic, the Pediatric/Infant Specialty Clinic, and the SPARC Clinic for special populations.

The Curriculum

Pediatric, Binocular Vision, and Vision Therapy Curriculum at the Pennsylvania College of Optometry

The topical areas of pediatrics, binocular vision, and vision therapy have been important and integral components of the optometric curriculum at the Pennsylvania College of Optometry. In the current curriculum there are two tracts related to these topical areas: a Pediatric Optometry/Binocular Vision Primary Care Tract, and an Advanced Care Tract for binocular vision, vision therapy, and pediatric optometry. All students must successfully complete the requirements of the Primary Care Tract. About one-third of the students in each class select the Advanced Care Tract.

Pediatric Optometry/Binocular Vision Primary Care Tract

Didactic curriculum

The didactic curriculum for the Pediatric Optometry/Binocular Vision Primary Care Tract consists of four courses offered during the 2nd and 3rd years of the program. Two courses cover the diagnosis and treatment of non-strabismic binocular vision, accommodative, and eye movement disorders with a total of 42 lecture hours and 20 laboratory hours. There is an amblyopia and strabismus course with 28 lecture hours and 20 laboratory hours, and a pediatric optometry course with 25 lecture hours and 16 laboratory hours. Thus, all students receive a total of 95 lecture hours and 56 laboratory hours in the areas of binocular vision, vision therapy, and pediatric optometry. In addition, every PCO student is required to complete a clinical rotation in the Primary Care Pediatric Service.

Clinical curriculum

In the Primary Care Tract clinical program the student clinical experience at the Eye Institute now incorporates a primary care pediatric experience much earlier in the student’s clinical education. This experience begins in the winter of the student’s second year at PCO and occurs at the same time that students begin examining adult patients in the Primary Care modules. This clinical experience is designed to achieve the objectives listed in Table 1. The primary care
examination of pediatric patients has been streamlined to make it more comparable to private practice conditions. The goal of this clinical experience is diagnosis and primary care treatment using lenses, prism, patching, and home-based vision therapy. The emphasis is on the identification of patients requiring advanced care. These patients are referred to the Specialty Vision Therapy Department at the Eye Institute. The Primary Care Pediatric experience also includes observation of office-based vision therapy.

Curricula objectives: Pediatric Optometry/Binocular Vision Primary Care Tract

The didactic and clinical program objectives for the Pediatric Optometry/Binocular Vision Primary Care Tract are listed in Table 1. The overall objective is to educate all students to manage the most common binocular vision, accommodative, and eye movement problems in their own offices and refer those patients with more complicated problems requiring advanced care. At the same time about 1/3 of the class will have the opportunity to elect the advanced care tract with a heavy emphasis on office-based vision therapy and treatment of the more complicated binocular, accommodative, eye movement, and learning related vision disorders.

In the curriculum, primary care treatment modalities are the use of lenses, prisms, occlusion and home-based vision therapy. Advanced treatment modalities include all forms of office-based vision therapy. Thus, while all students should be able to competently provide the primary care treatment modalities listed above, only students with an interest in advanced care will receive intensive didactic and clinical education in the area of office-based vision therapy.

Advanced Pediatric/Binocular Vision/Vision Therapy Tract

Didactic curriculum

Advanced workshops are offered when students electing the advanced care tract begin their 4th year clinical rotation. A small group, interactive teaching format comparable to a post-graduate continuing education is used for these workshops.

Courses include:
1. Evaluation of Constant Strabismus
2. Treatment of Constant Strabismus
3. Office-based vision therapy for binocular vision, accommodative problems, and eye movement problems
4. Visual Information Processing Evaluation
5. Office-based vision therapy for visual information processing disorders

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**Table 1**

Pediatric Optometry/Binocular Vision Primary Care Tract

Curriculum Objectives

All Students will be able to evaluate and diagnose:
1. Refractive disorders in children
2. Eye disease in children
3. Accommodative disorders in of all pre-presbyopic patients
4. Non-strabismic binocular vision disorders across all age levels
5. Strabismic disorders across all age levels
6. Amblyopia across all age levels
7. Learning related vision disorders

All Students will be able to Manage/Treat
1. Refractive disorders in children (lenses)
2. Eye disease in children (medication, hygiene, referral)
3. Accommodative disorders in of all pre-presbyopic patients (lenses, home-based vision therapy)
4. Non-strabismic binocular vision disorders across all age levels (lenses, prism, home-based vision therapy)
5. Intermittent and accommodative strabismus using lenses, prism, and home-based vision therapy
6. Amblyopia across all age levels (lenses, patching, home-based vision therapy)

All Students will be able to make appropriate referrals for:
1. Patients requiring office-based vision therapy
2. Patients with constant, non-accommodative strabismus.
3. Patients with learning related vision problems.
Clinical curriculum

About one-third of the class is selected each year for this advanced clinical experience in pediatrics, binocular vision, and vision therapy. Selected students participate in the Pediatric/Infant Specialty Clinic, the Vision Therapy Specialty Clinic, and the Primary Care Pediatric Service.

Curricula objectives: Advanced Pediatric/ Binocular Vision/Vision Therapy Tract

The didactic and clinical program objectives for the Advanced Pediatric/Binocular Vision/Vision Therapy Tract are listed in Table 2. In this curriculum the primary objective is to teach students to be able to plan and implement an office-based vision therapy program for binocular vision, accommodative, eye movement, and learning related vision problems. There is also a heavy emphasis on the evaluation and management of infants and children with a wide variety of developmental disabilities.

Table 2

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<thead>
<tr>
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Services

Pediatric Primary Care

The Pediatric Primary Care Service at TEI consists of nine examination rooms, and a pretesting area. Approximately 3,000 children per year are seen in this service, which includes Saturday and evening hours. Students begin in this service in their 2nd year, but care is also provided by 3rd and 4th year students.

Vision Therapy Specialty Clinic

The Vision Therapy Specialty Clinic operates on a referral basis and provides in-depth evaluations of strabismus, non-strabismic binocular and accommodative problems, eye movement disorders, amblyopia, learning related visual disorders and patients with acquired brain injury affecting the visual system. Patients with ocular motor problems can also receive Visagraph and Readalyzer testing. Office based vision therapy is provided for the full range of visual disorders by 4th year students who have elected the Advanced Pediatric/Binocular Vision/Vision Therapy Tract. Patients are also referred into this service by outside optometrists and other professionals involved in caring for children with learning problems.

Infant Vision Service

The Infant Vision Service provides comprehensive diagnostic and treatment programs to children between birth and four years of age in a clinic suite especially designed and equipped for this age group. Staff assigned to this service work directly with the young children to provide both a functional assessment of each child’s vision in addition to ocular health and refractive evaluations. Non-verbal measures of assessment are used including behavioral tests such as Forced Choice Preferential Looking with the Teller Acuity cards or the Stereo Smile II.
Special Populations Assessment and Rehabilitation Center

The Special Populations Assessment and Rehabilitation Clinic (SPARC) was created in response to the shortage of interdisciplinary diagnostic and prescriptive visual services available for children with special needs. SPARC is a joint program of the Pediatric Service and the Feinbloom Vision Rehabilitation Center and is designed to meet the complex and varied needs of these children, who often have difficulty responding in standard clinical vision care settings. Evaluations are performed on children of all ages both at the Eye Institute as well as at neighboring schools. In addition to a psycho-social intake and a basic vision evaluation which includes a refraction, ocular health evaluation, visual acuity testing and visual skills assessment, the evaluation may also include several types of preferential looking, specialized visual field testing, orientation and mobility screening, recommendations for vision stimulation and/or vision therapy, visual processing evaluations and low vision evaluations. Consultation is also available in the area of electro-physiology, psychology, neurology of the visual system, ophthalmology and contact lenses. Information provided through SPARC assessments regarding visual function are critical in helping these children obtain maximum benefit from the early rehabilitative and educational programs they are already receiving.

External clinics and outreach

In an effort to ensure optimal learning and positively impact academic performance in the public school children of Philadelphia, since 2003 the College has partnered with the School District of Philadelphia (SDP) to deliver vision screenings and follow-up vision care to the children in the district who were enrolled in summer school (and therefore at a greater academic risk). Children are either bussed to PCO’s clinical facilities or vision care teams are sent to the schools to examine the younger children. Children needing spectacles receive them free of charge.

In support of the Head Start mission, and recognizing that good vision and healthy eyes are a vital component to school readiness, in 1994 the College partnered with the Philadelphia Head Start schools to provide vision screenings to its children. Beginning in the 1994-95 academic year and continuing through the 2004-05 academic year, the College faculty, led by Dr. Gale Orlansky, and its trainees have screened over 35,000 Head Start children. Over this ten-year period, we determined that approximately 15% of children (over 5,000) receiving vision screening services failed the

| Table 3  
| Ongoing Research at PCO |

Convergence Insufficiency Treatment Trial (CITT)

The Convergence Insufficiency Treatment Trial (CITT) was funded in October 2004 by the National Eye Institute. Dr. Mitchell Scheiman is the national Study Chairman of the CITT and Dr. Michael Gallaway is the principal investigator for the clinical site at PCO. Eight other institutions are involved in the study including 3 pediatric ophthalmology sites. The CITT is a four year, randomized, masked, placebo-controlled, multi-center clinical trial in which 208 subjects between the ages of 9 to < 18 years are assigned to: 1) Home-based Pencil Push-Up Therapy, 2) Home-based Pencil Push-ups with Computer Vision Therapy/Orthoptics, 3) Office-based Vision Therapy/Orthoptics, or 4) Placebo Office-based Vision Therapy/Orthoptics. Patients are re-examined by masked examiners after 4, 8 and 12 weeks of treatment have been completed. Long term follow-up will be assessed at 6 and 12 months after the completion of active treatment.

The primary goal of the CITT is to determine if Home-based Pencil Push-up therapy, Home-based Pencil Push-ups with Computer Vision Therapy/Orthoptics (VT/Orthoptics) or Office-based VT/Orthoptics are more effective than placebo treatment (placebo VT/Orthoptics,) and if there is a difference between the three treatments in improving subject symptoms and signs.

Collaborative Observational Study of Myopia in COMET Children (COSMICC)

The Collaborative Observational Study of Myopia in COMET Children (COSMICC) is a five-year longitudinal study designed to examine the progression and stabilization of myopia as a function of age and to evaluate the duration of the treatment effect observed in the original Correction of Myopia Evaluation Trial (COMET). COSMICC, a five-year extension of the original COMET study, will develop predictive models and identify factors that characterize the change in myopia and axial length over a nine-year period in this cohort of children who were 6 through 11 years old at baseline and will be 15 through 20 years old at the end of the follow-up period. These longitudinal data will provide increased understanding of both environmental and genetic factors underlying the progression and stabilization of myopia in children. PCO is one of the four Clinical Centers participating in COSMICC and Dr. Mitchell Scheiman is the principal investigator.
Table 3 continued

Correction of Myopia Evaluation Trial 2 (COMET2)

The original Correction of Myopia Evaluation Trial (COMET) was designed to evaluate the effect of progressive addition lenses (PALs) compared with single addition lenses (SVLs) on the progression of juvenile-onset myopia in children 6-11 years old. Results from this study showed that the overall three-year difference in progression between children wearing PALs vs SVLs was not clinically meaningful. However, a secondary analysis showed that children with larger accommodative lags wearing single vision lenses (SVLs) had the most progression at 3 years, and that progressive addition lenses (PALs) were effective in slowing progression in these children.

COMET2 is designed to further investigate myopic children with poor accommodative response. The primary objective of this randomized trial is to determine if progressive addition lenses (PALs) versus single vision lenses (SVLs) slow the progression of low myopia in children with poor accommodative responses (i.e., large accommodative lags) and near esophoria.

PCO is one of eight Clinical Centers participating in COMET2 and Dr. Mitchell Scheiman is the principal investigator.

Amblyopia Treatment Studies (6,9)

PCO has also been a clinical site for all of the Amblyopia Treatment Studies (ATS) and is currently involved in two ATS studies, ATS6 and ATS9. Dr. Scheiman is the principal investigator for these studies.

The objective of Amblyopia Treatment Study 6 (ATS6) is to determine whether “near” activities enhance the effect of patching on visual acuity improvement in strabismic and anisometropic amblyopia when compared with “distance” activities in the treatment of moderate amblyopia and severe amblyopia in children 3 to <7 years old.

The primary objective of Amblyopia Treatment Study 9 (ATS9) is to compare the effectiveness of weekend atropine plus near activities and daily patching plus near activities for moderate amblyopia (20/40 to 20/100) and severe amblyopia (20/125 to 20/400) in improving vision in the amblyopic eye of 7 to <13 years olds.

Vision in Preschoolers

The purpose of the Vision in Preschoolers Study (VIP) funded by the National Eye Institute/National Institute of Health is to identify whether vision screening tests can accurately identify preschool-aged children who would benefit from a comprehensive vision examination. Pre-Kindergarten Head Start children from locations across the country participated in each phase of the study. The first phase of the VIP Study found that four commonly used vision screening tests (2 autorefractors, non-cycloplegic retinoscopy and a visual acuity test) were more effective than seven other commercially available tests in recognizing vision problems in preschool-aged children. For the second phase of the study, nurses and lay screeners administered each of these screening tests. The results demonstrated that trained nurses and lay screeners achieved similar accuracy rates administering the two automated refractors. Planning is now underway for a third phase of the VIP Study. Dr. Ciner is the principal investigator for the Pennsylvania College of Optometry site of the Vision in Preschoolers Study. Other centers participating in the study include: University of California Berkeley, School of Optometry, New England College of Optometry, Ohio State University, College of Optometry, Oklahoma Northeastern State University, College of Optometry; University of Pennsylvania, University of Arizona, Children’s Hospital of Philadelphia.

Myopia Family Study

The Myopia Family Study (MFS) funded by the National Eye Institute/National Institute of Health is a multicenter study focused on collecting refractive data and genetic samples from myopic families from five distinct ethnic and racial populations. Its overall objective is to identify the genes responsible for myopia through the recruitment of families with specific patterns of myopia. Populations being studied include: Amish, African American, Ashkenazi Jewish, Caucasian and Chinese. Myopia is likely to be affected by many genes (as well as the environment) that each contribute a small portion to the over phenotype of the individual. Current evidence suggests that there are at least eight myopia genes and many more to be discovered. Identification of susceptible genetic loci will help us understand the causes of myopia and lead to improved methods to prevent or slow the progression of this disorder. Dr. Ciner is the principal investigator for the Pennsylvania College of Optometry site for the Myopia Family Study. The study is through the Department of Ophthalmology, University of Pennsylvania. The Inherited Disease Research Branch, National Genome Research Institute, National Institute of Health is also a participant in this project.
screening and were identified as requiring a more comprehensive visual and ocular health assessment.

In addition to TEI, PCO maintains clinics in the Mt. Airy and Strawberry Mansion neighborhoods of Philadelphia that provide family eye care. Students see numerous children at these clinics. Home based vision therapy is offered to some patients, with patients requiring more extensive diagnostic or therapy options referred to TEI.

Faculty

PCO has a long history of faculty members who have been leaders in pediatrics and binocular vision. They include Drs. Jack Richman, Lou Hoffman, Ralph Garzia, and Len Press leading up to our current director, Dr. Mitchell Scheiman. Dr. Scheiman is Director of Pediatric and Binocular Vision Services at the Pennsylvania College of Optometry and has served on the faculty at PCO since 1982. He has published numerous articles and co-authored four textbooks. Currently, a majority of his time is spent in clinical research. He is the national Study Chairman of the Convergence Insufficiency Treatment Trial (CITT), and is the principal investigator of several other studies including the Collaborative Observational Study of Comet Children (COSMICC), the Correction of Myopia Evaluation Trial 2 (COMET2) and a number of the Amblyopia Treatment Studies. In addition Dr. Scheiman teaches the non-strabismic binocular vision course sequence at the college. He is also a COVD Fellow, a Diplomate in Binocular Vision and Perception, and the 2002 Skeffington Award winner for excellence in optometric writing. He also serves as a journal review board member for *Optometry and Vision Development*. (For a description of research faculty are currently involved in see Table 3)

Elise Ciner is an associate clinical professor in the Pediatric and Binocular Vision service. She is Director of the Infant Vision Service and Co-director of the Special Populations Assessment and Rehabilitation Center. Dr. Ciner team teaches the Human Development course to 2nd year students and is also the course coordinator for the 3rd year Pediatric Optometry course and accompanying laboratory. A new “living lab” was begun this year that allows students to immediately practice some of their newly learned skills in preschools and day cares near the college. Dr. Ciner is the principal investigator from PCO for the Myopia Family Study as well as for the Vision in Preschoolers Study, both funded by the National Institute of Health-National Eye Institute. Dr. Ciner is also part of the team of doctors providing eletrodiagnostic services for patients at The Eye Institute.

Brandy Scombordi, OD currently serves as the academic co-coordinator of the pediatric department. She completed a residency at PCO in 1999. Dr. Scombordi spends considerable time in clinical teaching and teaches the weekly fourth year Pediatric module conference. She has been involved with research serving as an examiner for CITT, ATS, and Vision in Preschoolers (VIP) and is the clinical director of the Special Olympics Lions Club International Healthy Athletes Opening Eyes Philadelphia.

Dr. Michael Gallaway is an Associate Professor at PCO and has been a faculty member since 1981. He is a Fellow of COVD. Dr. Gallaway is currently PCO’s principal investigator for the CITT study and has a private practice devoted to vision therapy. He is also an ATS investigator, and is involved in clinical research on reading eye movements and VERA school vision screening software. He also serves as a journal review board member for *Optometry and Vision Development*.

Dr. Joann Bailey completed the PCO pediatrics residency in 1995, and has been a faculty member since that time. She currently teaches the strabismus and binocular vision course, is a clinical preceptor in the Pediatric/Binocular Vision Service and is in private practice specializing in children’s vision and vision therapy.

Dr. Janet Swiatocha completed a pediatrics residency at UAB in 1991 and has been a faculty member at PCO since 1998. She currently serves as the director of the Adult Special Populations clinic and spends most of her time in clinical teaching.

Gale Orlansky, OD is a SUNY graduate and has been a faculty member at PCO for 22 years. In addition to directing the Head Start program, she is a clinical instructor in the Pediatric/Binocular Vision Service and a laboratory instructor in the Pediatric Optometry Course. Dr. Orlansky is the principal investigator in a study to determine the reliability of the Developmental Eye Movement Test.
Jaimie Neiman, OD is a graduate of PCO and joined the faculty in 2003 after completing a residency in 2002. She is a clinical instructor in the Pediatric/Binocular Vision Service, serves as a facilitator in the clinical problem solving course, and teaches in the clinical procedures laboratory.

Maria Parisi, OD, completed a residency at PCO in 1986. She currently teaches a portion of the Pediatric Optometry course in addition to her clinical teaching in the Pediatric/Binocular Vision Service, and has lectured extensively on pediatric ocular disease.

Mark B. Boas, OD, MS, is a clinical instructor in the Pediatric/Binocular Vision Service. Dr. Boas is a graduate of PCO and is immediate past president of the Pennsylvania Optometric Association. He has served the college as a member of the Board of Trustees since 1998. Dr. Boas participated in the Vision In Preschoolers Study and is presently involved in the Convergence Insufficiency Treatment Trial as a vision therapist. He maintains a private practice in Exton, PA with his wife, Suzanne O. Boas, OD.

Dr. Lynn Greenspan completed a residency in rehabilitative optometry at the Northport VA, and directs a vision clinic at Bryn Mawr Rehabilitation Hospital. She is involved with clinical education of optometry students at this institution and works closely with occupational, physical, and speech therapists.

**Pediatric residency program**

PCO has trained pediatric residents since 1977, and graduates include numerous pediatric optometrists active in optometric education, research and clinical care. Currently, two residents are selected each year. They are immersed in pediatric clinical care, including both clinical teaching and independent patient care. They carry a diverse vision therapy case load, and receive seminars from many of the PCO faculty members on a wide variety of topics. Residents also rotate through the Eye Institute’s Neuro, Retinal and Emergency Services to round out their experience.

**COVD at PCO**

We have an active COVD presence at PCO. Dr. Michael Gallaway is the COVD Faculty Liaison, and together with student liaisons, have organized three to four talks per year over the past five years. Our presenters are all active in vision therapy and children’s vision and most are COVD fellows. We all relish the opportunity for dialogue with students about COVD and the professional opportunities involving vision therapy. Recent presenters have included Drs. Len Press, Harvey Richman, and Barry Tannen. We welcome any COVD members who would like to visit and share their excitement with the students. Please contact Dr. Gallaway for details. Seventy-five students attended the last talk with Dr. Press. Both student interest and attendance has grown over the past five years.

**Externship sites**

PCO has an extensive network of externship sites for 3rd and 4th year students. COVD Fellows Drs. Len Press, Gary Etting, Penelope Suter, Robert Copeland, Carl Hillier, Neil Draisin, and Paul Harris all participate in this program, along with COVD Associate member Dr. Robert Love. These exposures are extremely beneficial for students in experiencing the delivery of functional care and vision therapy in a private practice setting.

**Summary**

The Lynch Pediatric and Binocular Vision Service provides all PCO students with the opportunity to implement their didactic training in the primary care evaluation of children. Students who are interested in advanced training, including vision therapy, choose the specialty track. Our goal remains to produce optometrists who are comfortable examining children and referring to colleagues for vision therapy and advanced testing when needed, as well as the development of future COVD members who will provide a full range of services to care for people of all ages with functional vision problems.