

Undergraduate Academic Preparation for Employment as a Clinical Exercise Physiologist

POINT: Undergraduate Degree in Exercise Science—A Preferred Path to Working as a Clinical Exercise Physiologist

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INTRODUCTION

Many individuals have a goal of working with a clinical population as a clinical exercise physiologist. Opportunities for practice reside primarily in cardiac rehabilitation, but other areas of practice also exist. These include but are not limited to pulmonary rehabilitation, research, cardiology noninvasive labs, cardiology catheterization labs, and weight management. Many who are employed as a clinical exercise physiologist have only a bachelor's degree. However, more employers are searching for those with a graduate (master's level) degree. Efficient preparation to meet the minimum standard for employment is important and one must consider this when deciding to pursue only a bachelor's degree versus a master's degree. The goal of this article is to build a case that an undergraduate (UG) exercise science degree is a solid and preferred path to working in a clinical exercise setting following graduation, regardless of attaining a master's degree. However, before discussing the major variables that can make a strong UG clinician, we should recognize that there are some areas of concern with respect to UG exercise science programs.

CONCERNS

An initial concern in UG exercise science programs is the great deal of variability in course work and rigor between different university programs. This variability is largely due to the lack of a governing body that requires all UG (and

graduate) programs to follow a similar curriculum for the exercise science/exercise physiology major. Although it should be noted that the Commission on Accreditation of Allied Health Education Programs (1) has been accrediting exercise science/physiology programs for a number of years, currently only 37 UG programs in 21 states are accredited. This low enrollment is likely because accreditation is not a requirement as with other allied health professions, such as physical therapy and nursing. Therefore, most universities are not willing to proceed through the accreditation process because it is an arduous task. This in turn results in universities and colleges making independent decisions on what they believe belongs or does not belong in an exercise science/physiology curriculum and much of this is limited to the available facilities, equipment, and staff expertise. If there is a greater emphasis in colleges and universities to move toward accreditation, this may help coalesce the minimum level of knowledge and skills that all students should attain to practice as a clinical exercise physiologist.

Secondly, UG exercise science programs are a good choice for students considering graduate school for numerous allied health professions, including clinical exercise physiology. Most UG exercise science programs provide core courses that are pre-requisites for graduate school for most allied health professions. In addition, hands-on laboratory activities will develop a better understanding of the didactic material that students will be exposed to at the

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graduate level. Because many students clearly do not know the direction they plan to pursue as freshmen, it is the responsibility of educators to make sure students are exposed to all the different areas in the field of exercise science with a broad base but at the same time provide them with enough knowledge and skills so they have the ability to enter the workforce—in certain areas—with an UG degree. This should be a primary goal for students who expect to be employable with an UG degree. Because there is a wide breadth of courses in most undergraduate exercise science/physiology programs, it is often challenging to decide which areas to emphasize. Each program's emphasis is often determined based on the faculty who comprise the department and their past experiences in the field.

MINIMUM CURRICULUM STANDARDS

All UG exercise science programs should be grounded in the liberal arts so students develop the breadth and depth needed to be a well-rounded individual within society. The majority of UG exercise science programs recognize that coursework must have a focus in science and math (biology, chemistry, physics, anatomy, physiology, pathophysiology, statistics, pre-calculus, etc.). These courses are the stepping-stones to grasping upper-level exercise science courses (exercise physiology, kinesiology, biomechanics, metabolism, ECG interpretation, diagnostic exercise testing, special disease populations, etc.).

Some may debate that because many exercise science specific courses are taught at the graduate level that there is little need to teach them at the UG level. However, there are UG programs that teach these courses and produce individuals well prepared for entry-level positions as a clinical exercise physiologist. An example is Central Michigan University, which has continually produced graduates who find employment in the diagnostic setting (graded exercise testing, Holter monitoring, ECG technician, cardiac catheterization lab technician, etc.), cardiac and pulmonary rehabilitation, and clinical weight loss programs. However, it is noted that this level of UG program has a specific focus/track aimed at preparing students to be adequately trained to enter the field with an UG degree. This type of program has led to a philosophical debate on whether UG programs should be narrowly focused. However, even within this type of concentrated program, there is an opportunity to include coursework in the humanities and arts to help promote critical thinking. In addition, with today's expenses associated with higher education, it begs the question: "How much responsibility does academia have in preparing an individual to enter the workforce following an UG degree?"—particularly when there is little interest or ability to enter graduate school.

Following the attainment of an UG degree in exercise science/physiology that has appropriate didactic clinical training, laboratory experiences, and clinical internship, these students are also eligible to take the examination to become a certified Clinical Exercise Specialist (CES) through the American College of Sports Medicine (ACSM), a highly respected professional organization in the sports

medicine field. The CES certification is clinically focused toward health screening, exercise testing and training, and other physical assessments pertaining to chronic diseased populations (e.g., cardiac, pulmonary, and metabolic disorders). Candidates who sit for this certification exam must demonstrate their knowledge and skills in exercise physiology, strength and conditioning, applied kinesiology or biomechanics, anatomy, physiology, exercise testing and prescription, special populations, and health risk appraisal. Schools that desire to properly prepare their UG students to work as a clinical exercise physiologist should strongly consider inserting these requirements in their curriculum so their graduates can be properly prepared to sit for the ACSM CES certification examination.

PERSONAL EXPERIENCE

Based on previous experiences, I believe a strong UG student in exercise science that is properly prepared academically and completes his or her CES certification is a viable candidate for a clinical position in an exercise physiology discipline. However, I would be shortsighted to not say I do recognize that many clinical exercise science/physiology positions advertised prefer to hire a graduate-level-prepared individual. But most of these do not exclude applications from those prepared only with an UG degree. If in the future clinical programs require the Registered Clinical Exercise Physiologist certification (RCEP) for employment, a graduate degree will be required. But as of today, almost all clinical sites allow either the RCEP or the CES certification for employment. If licensure in the field of clinical exercise physiology does become the standard, which is questionable at this time, then a graduate degree would likely be required. Whether licensure does or does not move forward in clinical exercise physiology, I still believe there are many opportunities for a well-prepared UG exercise science major who is ACSM certified. In many ways, the manner in which physical therapists and physical therapy aides work together is the same in which I envision those who are graduate- and UG-prepared in clinical exercise physiology and exercise science, respectively (e.g., the master's-prepared clinical exercise physiologist interprets a graded exercise test [GXT] for exercise prescription and the UG oversees the day-to-day exercise training), working together.

During my years working clinically, I was alongside a number of employees in cardiac rehabilitation and noninvasive cardiology testing who were either UG- or graduate-prepared in clinical exercise physiology. We worked as a team that met each patient's needs. At the time, as a master's-prepared clinical exercise physiologist, I ultimately had more responsibility than the UG-prepared staff. But we worked side by side, completing diagnostic GXTs, supervising Phase II cardiac rehabilitation exercise sessions, and fulfilling all the other aspects of cardiac rehabilitation. In addition, I had the opportunity to hire a number of UG-prepared exercise science/physiology graduates who completed their ACSM CES certification and they have done an outstanding job in the profession. After completing my PhD and

going on to academia, I have taught for 20-plus years in the exercise science/physiology curriculum and I recognize that an UG exercise science/physiology program is a good choice to enter many different fields. But I have also had many students with their UG degree in exercise science/physiology who developed permanent careers in secondary and primary disease prevention after becoming ACSM certified. The field of exercise science/physiology may be moving toward graduate preparation—like most other allied health degrees—but I also believe there is a place—and will

continue to be a place—for an UG clinically prepared exercise science student who is certified.

SUMMARY

In conclusion, I would encourage clinical programs to consider allowing UG students in exercise science who are well prepared clinically to complete their internship experience. During a clinical internship, the staff will understand first-hand the ability of a student to become a competent professional within the field. And with the proper UG preparation, these individuals can become employed as proficient members of a clinical exercise physiology team.

REFERENCE

1. Commission on Accreditation of Allied Health Education Programs. Standards and Guidelines for the accreditation of educational programs in exercise physiology; [cited 2013 Dec 20]. Available from: <http://www.caahep.org/documents/file/For-Program-Directors/Exercise%20Phys%20Final%20Standards.pdf>

COUNTERPOINT: In Preparation for a Career in Clinical Exercise Physiology—Diversity in Undergraduate Preparation Best Leads to Success

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INTRODUCTION

Historically, preparation to work in the clinical exercise physiology (CEXP) industry has had many possible paths. Academic preparation varies at the undergraduate (UG) and graduate level, with only some recent efforts in the United States to put shape to the field with respect to consistent coursework and experience at various universities offering degrees in this field. In most parts of the United States, there is a “requirement” to have earned a graduate degree to be hired as a clinical exercise physiologist. We believe that in general, a graduate degree in exercise science/physiology is important to attaining a professional position in CEXP. Although the path to a graduate degree can vary by the individual and school (e.g., UG in exercise science/physiology or UG degree in an unrelated field with some basic preparatory work for entry into a graduate program), this article will draw from our experience at East Stroudsburg University

(ESU) to build a case for an alternate UG path to a graduate degree in exercise science/physiology and, ultimately, a career in this field.

BACKGROUND

More than 30 years in graduate teaching in the CEXP program at ESU has cemented our convictions that being a well-rounded, well-prepared UG student will lead to success in *any* graduate program and in the diverse CEXP career opportunities after graduate school. The ESU graduate program has produced more than 600 students in its 33-year history. As many of us appreciate, those graduates did not all achieve a single occupation. Therefore, a graduate program can and should prepare the student for an advanced career under the medical/health sciences umbrella. It is not the UG degree title or name that matters most but rather the competencies, skills, and courses of study at the UG level that will successfully prepare the UG student for graduate school in CEXP.

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When thinking about preparation, one should consider the other areas of practice open to a person with a graduate degree in CEXP. We often see our students successfully navigate careers in research, medicine, public health, business/sales, and education under the broad umbrella term of medical/health sciences, with some focus on kinesiology. In order to be a successful candidate for the diverse career opportunities available, students should come from diversity in their educational backgrounds.

HOW TO GET THERE

Exercise science is not the only UG preparation route to a graduate degree in CEXP. Consideration of other pathways of UG preparation includes pre-physical therapy, athletic training, biological sciences, chemistry, and others. It is not the UG degree title that is important but rather the competencies, skills, and courses of study at the UG level. There is no doubt that a master's degree in CEXP is specialized, but it may be beneficial to a future clinical exercise physiologist to adopt a more broad-based UG curriculum. And any specific deficiencies in the UG preparation can be compensated for in the very specific skill-based graduate preparation in CEXP.

Some desired measureable outcomes of any master's-level CEXP program graduates include the following:

- A high percentage of success in obtaining a diverse range of clinical exercise physiology professional careers
- Success in acceptance into advanced educational degree (PhD) programs and upper-level health/medical professional degree (medical doctor or physician assistant) programs
- A high degree of demonstrated success in professional certification examination pass rates (e.g., American College of Sports Medicine's (ACSM) Clinical Exercise Specialist [CES] and Registered Clinical Exercise Physiologist [RCEP])

Note that the Commission on the Accreditation of the Allied Health Programs (CAAHEP) requires this type of data to be tracked and reported as part of the accreditation and reaccreditation processes (www.caahep.org). This is the standard for many allied health professions, including nursing (www.acenursing.org) and physical therapy (www.captionline.org). To help students obtain desirable results in these outcomes, the ESU Graduate Admissions Committee has a longstanding belief that leads it to scrutinize the student applicants for demonstrated UG academic excellence and diversity in coursework. The committee recognizes that a demonstrated aptitude for the biological and physical sciences, mathematics, and a breadth of academic backgrounds in the humanities and social sciences is a good predictor of success in the graduate program as well as a subsequent realization of professional success.

Based on the goal of enrolling students with the best chance of academic and professional success, the ESU Graduate Admissions Committee evaluates applications based on the following components:

- **Academic Records:** An overall grade point average greater than a 3.0 on a 4.0-point scale (our cohorts average about 3.5 on the 4.0-point scale) demonstrates an applicant's propensity for success in the breadth of skills needed by a clinical exercise physiologist. A liberal arts general education with particular demonstrated success in mathematics and the sciences has proven to be a good benchmark of academic success in the graduate program.
- **Pre-Requisite UG Coursework:** Achievement in specific courses, such as exercise physiology and anatomy & physiology—both with laboratory experiences—serves as a reliable foundation for the development of clinical skills required for a clinical exercise physiologist. In our experience, students who lack these courses at the UG level need to take them prior to entering the master's CEXP program. Note that these courses can be taken outside the traditional exercise science UG program.
- **Healthcare Experiences:** Practical experiences in the healthcare field, including internships, community work, and/or research, portend to be advantageous for the transition of the student into the clinical milieu.
- **Personal Statement:** The applicant's writing competence and his or her capacity to articulate an understanding of the discipline of CEXP can be gauged from his or her personal written goals statement.
- **Letters of Recommendation:** Strong letters of recommendation from references that possess knowledge of the applicant's capabilities needed to be successful in graduate school and specifically in the field of CEXP are given partiality.
- **Graduate Record Exam (GRE):** Although required at many institutions, this is not required at ESU. The absence of this metric has not appeared to affect the prediction of an applicant's success in the ESU graduate CEXP program.

Table 1 lists competencies in an UG education for the ideal foundation for a candidate entering a graduate CEXP program.

SUMMARY

An UG degree leading to placement in a graduate program in preparation for a career in CEXP could be earned from any one of a diverse set of majors (e.g., pre-medicine, pre-physical therapy, athletic training, biology, physician's assistant, chemistry), including exercise science or physiology. These should have a strong emphasis in the sciences and the exercise sciences, along with a healthy dose of liberal arts options. Stagnation in thought and a limitation of critical-thinking skills may be fostered by a more narrow UG preparation. A diverse UG preparation may also allow for diversity in professional preparation as well as job opportunities.

At ESU, we have found that our graduates perform well in the available nationally recognized certifications in the exercise sciences, such as the ACSM's CES or RCEP. But there is more to the exercise science "umbrella" than these certifications and possible career paths. Our students

TABLE 1. Ideal undergraduate foundation for a career as a clinical exercise physiologist.

- Knowledge of functional anatomy and physiology, including laboratory experiences
- Basic applied exercise physiology, including laboratory experiences
- Entry-level knowledge in chemistry, biology, and physics, including laboratory experiences
- Demonstrated knowledge of college-level algebra and/or statistics
- Basic knowledge of human social structures, actions, and functions
- Basic knowledge of human behavioral psychology
- Demonstrated knowledge of basic methods in exercise testing and programming
- Certifications endorsed by the National Commission for Certifying Agencies (NCCA), such as ACSM's Health Fitness Specialist (HFS) or Certified Personal Trainer (CPT) or the National Strength and Conditioning Association's Certified Strength and Conditioning Specialist (CSCS) or Personal Trainer (PT)
- Basic cardiac life support (CPR) certification
- Internship(s) or other experience in a healthcare setting
- Bottom line: An abundance of well-developed critical thinking skills

have also been successful in higher education, research and development, and medicine/allied health. It is our belief that the diversity of UG preparation leads to the flourishing of diverse advanced career pathways in clinical exercise physiology for our students after obtaining a graduate degree in CEXP. We believe that the adoption of this type of diverse UG curriculum be considered for the proper preparation of a UG student desiring a career in clinical exercise physiology.