The Benefit of Student-Directed Clinical Correlation Studies and Discussions in the Classroom

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When looking at clinical conditions and the evidence based practices for experiential learning, it is critical for the undergraduate studying Human anatomy and Physiology to understand the ways anatomical information of the human form may be used and applied. Taking into consideration the benefits of studying anatomy and physiology, clinical correlations and their discussions become the framework for fields of medicine, holistic health and alternative wellness that seek to support homeostasis and vitality. These studies are beneficial during the learning process, not to be reserved for post-graduate work and research, in my opinion. When comparing the benefits of integrating form function and dysfunction, to a basic form and function teaching style, it is apparent that the future student looking to use the information in a professional or allied health field will befit greatly from this early exposure and practice to the deductive learning and critical thinking required to be effective in any professional position. These notions are supported by educational best practices in undergraduate and graduate studies as understood by Bloom's Taxonomy; as such, an example of achieving synthesis and evaluation level understanding of anatomy and physiology studies in the undergraduate, graduate and professional healthcare setting via self-directed research and class discussions on *benign prostrate hyperplasia* (BPH) will be discussed as an assignment during a genitourinary unit of study in the classroom (Writing Objectives Using Bloom's Taxonomy, 2016).

As described by The Center for Teaching and Learning at UNC Charlotte, "Bloom's Taxonomy divides the way people learn into three domains. One of these is the cognitive domain, which emphasizes intellectual outcomes (Writing Objectives Using Bloom's Taxonomy, 2016). This domain is further divided into categories or levels. The key words used and the type of questions asked may aid in the establishment and encouragement of critical thinking, especially in the higher levels. Clinical Correlations incorporate Blooms Taxonomy as students

will take the base level information of knowledge, categorized as having a student recall or identify a list of structures, facts or figures, move into the analysis stage of learning where they are to solve problems, classify information and interpret results. Most educational best practices sufficiently bring students to this level of learning; however, the ascension to evaluation is a part of education that teachers miss out on when forgetting to engage students in the levels of judgment, assessment, summarization and placing value on varying sources of information for decision making and critical thinking (Writing Objectives Using Bloom's Taxonomy, 2016).

For this reason, clinical correlations are imperative to successfully educating a student who is to use the anatomy and physiology information in a teacher's course with a lens for a professional or allied health care setting. When looking at the appropriate content for these assignments there are also considerations that should be taken, as not every topic will be appropriate for an undergraduate or graduate setting; the student level, course content and syllabus will direct this. For example, in a course section studying the genitourinary system, discussion of a topic such as benign prostrate hyperplasia (BPH) and resulting benign prostrate obstruction, would be appropriate, as this is a condition afflicting approximately 50–60%of men 60 years or older (DeCao et. al 2015). From the anatomical terminology and description of the condition in the name, all the way to the studying and evaluation of intervention options, the level to which students then could take this study to would be outlined by a rubric as to define what information is to be expected for potentially an out of majors biology class, an anthropology major's anatomy and physiology course, a undergraduate pre-health science degree anatomy and physiology course or a graduate/professional degree baring gross anatomy and physiology lecture etc. This leads students to direct a section of their course and begin to develop personal interests and independent research experience during the time when anatomy and

physiology are fresh in their mind, not 3 years later when reviewing it before speaking of clinical interventions in medical school or when doing rounds for clinic in acupuncture school. The course should be able to fulfill a student's interest and give them the resources and information require to be successful professionals in allied and professional health care settings.

Considering the intimate nature of the bladder and prostrate in the male genitourinary tract, there are many ways that the male may experience complications in both voiding and sexual function when the intimate coordination of anatomical health and physiological function is out of balance. Anatomically, the prostrate in males is located in a posterior-inferior relation to the bladder and surrounds the urethra (Martini, Nath, & Bartholomew, 2015). This poses potential complications in functional anatomy when looking at the risk of stricture, or narrowing of the urethra, during times of growth or enlargement of the prostrate, see figure 1 below. When looking at the homeostatic and physiological functions that occur during these regions, it is apparent that a narrowing of this pathway can result in clinical conditions that will present to a health science professional. An additional example below in figure 2 demonstrates a diagnostic scan that will also help with the coordination the biological health sciences and research fields as well, as biomedical engineers and researchers will also be taking these courses and their interests will differ and to support them, opening the fields of diagnostic medicine and the relationships to identifying and tracking disease or designing medical devices and interventions for assisting in the management or healing of the human form.

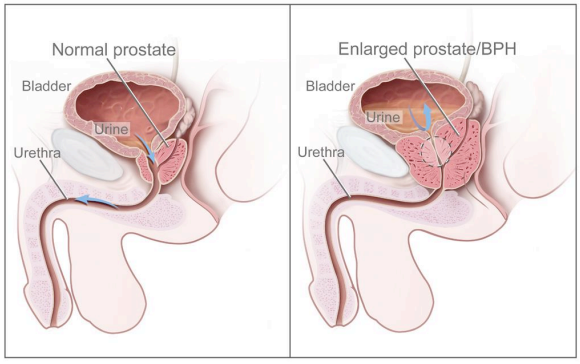

Figure 1. Normal prostate and benign prostatic hyperplasia (BPH) graphics side by side. Image on the right demonstrates how an enlarged prostate generates BPO.

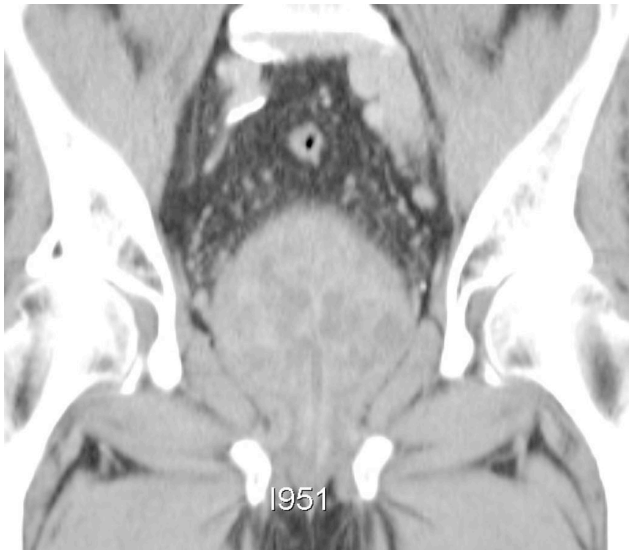

Figure 2. Magnetic Resonance Imagery of Benign *prostatic hyperplasia. A narrowing and structure of the urethra may be seen along the midline of the bladder neck and prostrate. As well the density differences in anatomical tissues may be seen when searching for diagnostic information in the western approach for medical intervention.*

As previously mentioned, with over half of the United States population of men living with a benign, as in non-cancer defined, overgrowth of prostrate tissue, there is now a generation of men living with sexual and urinary dysfunction and a wide variety of health care options available to them, hopefully implemented by the future healthcare professionals and or researchers having taken a course in anatomy and physiology (Prostate Cancer Treatment., 2016) (DeCao et. al 2015). This is where clinical correlations are imperative to successful learning in a course, seeking to generate a student armed with facts, strategic sorting and classifying experience for relative nature to a given topic and then capitalizing on all of that with the evaluation of potential health care interventions or daily wellness routines that will generate change in an anatomical structure or physiological system. As each student in the classroom could up in a different field, it is important to give this opportunity for students to begin exploring the areas of interest where they might specialize for medicine, nursing, areas of therapy such as physical therapy (PT) or occupational therapy(OT), anthropology, oriental and traditional Chinese medicine (TCM), yoga/crossfit/dance movement therapy, nutritional healing/counseling, psychological and behavioral therapy, biomedical research and design, pharmacy studies, herbal therapy design and development to name a few.

With the breadth of study seen in the future of students in even a basic anatomy course, it is important that the experience in the classroom is developed to allow students to best learn the anatomy and physiology facts and figures; however, success in the future is also contingent on keen critical thinking and deductive reasoning skills that display the ability for professionals to work in the synthesis and evaluation levels of Blooms Taxonomy. As seen in Table 1. below, presenting with students evaluating outcomes, estimating success or development of an idea, defending and/or criticizing an idea our outcome/intervention plan (Writing Objectives Using Bloom's Taxonomy, 2016). Tests, discussion questions and course content geared specifically for institutional or degree requirements does nothing for a students interests and future goals as they develop their mindset for purpose with their degree. Allowing students to develop a clinically oriented paper will allow them to explore and show ownership of one of the course content modules, as well as give them an opportunity to discuss and explore interventions and outcomes for when the standard anatomy and physiology studied is out of balance and medical intervention or natural supports are required. With this potential a student will develop knowledge and demonstrate comprehension, analysis and then expand into synthesis and evaluation.

Table 1. Bloom's Ranking of Thinking Skills. Source: The Center for Teaching and Learning. UNC Charlotte.

KNOWLEDGE	COMPREHENSION	APPLICATION	ANALYSIS	SYNTHESIS	EVALUATION
List, Name, identify, Show, Define, Recognize, Recall, State, Visualize	Summarize, Explain, Interpret, Describe, Compare, Paraphrase, Differentiate, Demonstrate, Classify	Solve, Illustrate, Calculate, Use, Interpret, Relate, Manipulate, Apply, Modify	Analyze, Organize, Deduce, Contrast, Compare, Distinguish, Discuss, Plan, Devise	Design, Hypothesize, Support, Schematize, Write, Report, Justify	Evaluate, Choose, Estimate, Judge, Defend, Criticize

The opportunity then stands for student development opportunity as students present their content to peers and a discussion and evaluation based activity is developed for the benefit of all students again to get small topics covered and keep inters and passion alive in the classroom. An example for the benefit expected from the discussion is the chance of two proposals covering the same topic in the. BPH for example, is a non life threatening condition that's symptoms include weak or interrupted flow of urine, frequent urination, trouble starting or stopping flow of urine, pain or burning when urinating or ejaculating, blood in urine or semen, irretraceable pain in lower abdomen; however, at times the clinical interventions may have varying success outcomes and as always, the potential for side effects such as worsening of stricture(Figure 3)., erectile dysfunction and urinary incontinence (Parker & Simhon, 2015) (Prostate Cancer Treatment., 2016) (DeCao et. al 2015).

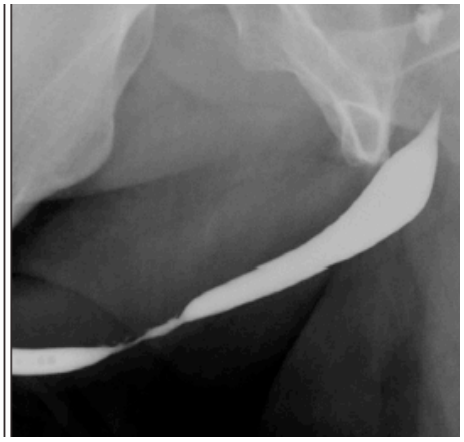

Figure 3. Image of a urethrography following a TURP procedure, resulting in worsening of conditions and increase structure in the urinary tract.

A supportive example of students gaining experience in evaluating these clinical correlations and interventions would be when discussing interventions and side effects when comparing the western medical intervention and supports for BPH, such as the transurethral resection of the prostrate (TURP) procedure, to a more holistic eastern intervention of clearing the "damp heat" condition of the lower pelvis, known to generate inflammation, where clearing herbs such as *Da Huang,* commonly known as rhubarb and *Huang Bai,* commonly known as

philodendron, addition of zinc and selenium supplements and nettle tea (DeCao et. al 2015) Wiseman & Ellis 1995). When looking up benefits and risks the students will be able to present the best options for future patience or assist in developing new and up and coming healing and system management routines and devices for BPH.

When looking at the potential for serious complications it would be a beneficial exercise to have students begin discussions and have open talks about what they feel would be the best practice for treatment in these conditions. Having them begin the deductive reasoning practice will surely benefit their future practice and increase their ability to succeed in their chosen field of anatomy and physiology studies. These conversations will also help students gain confidence in presenting their take on the information the have now studied through all levels of learning as defined by Blooms Taxonomy. These practices are crucial, as students will likely have to do project presentations numerous times during their professional studies and work. In closing, it is important to note the benefit of the process in which student- directed studies integrating clinical correlations to anatomy and physiology concepts are presented in the classroom at the level of synthesis and evaluation. The duplicity in benefit for both students and professors persists as these discussions and clinical correlation papers give professors and teachers clear opportunities for measurable learning outcomes.

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Image Sources:

Figure 1: http://www.cancer.gov/types/prostate/patient/prostate-treatment-pdq

Figure 2: Case courtesy of A.Prof Frank Gaillard, Radiopaedia.org, rID: 35992

Figure 3: Parker, D. C., MD, & Simhan, J., MD. (2015). Management of complications aster surgical outlet reduction for benign prostatic obstruction. *The Canadian Journal of Urology*.