

RESISTING RESISTANCE TO CHANGE: A CRITICAL ANALYSIS OF THE STRUCTURE
OF SURGICAL RESIDENCY TRAINING PROGRAMS

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In 2003, the Accreditation Council for Graduate Medical Education (ACGME) issued regulations affecting the structure of surgical residency training programs. These regulations placed work hour restrictions on residents. There has been significant resistance by the surgical leadership, including program directors and officers in academic organizations, to the adoption of the changes required by these regulations.

The need for these changes to the structure of the resident's work environment, and the resistance to the incorporation of these changes, provide an opportunity to examine the ethos and culture of surgical residency for a potential source of this conflict. This thesis claims that a significant element of this resistance is the recognition that the required changes will not only affect the structure of surgical residency training, but also the culture of residency training and the adoption of a traditional surgical identity by the trainees immersed in that culture.

There is increasing evidence of significant ethical problems resulting from the traditional structure of surgical residency training. The norms perpetuated by the traditional approach to surgical training are antithetical to the current ethical norms expected regarding patient care and the surgeon's personal and professional development. Critical ethical issues addressed in this

thesis include those raised by both the apparent generational break between surgeons trained before and after work hour reform, and the conflict in balancing visions of surgical identity and concerns of patient and personal safety.

The thesis argues that there is no well grounded reason for the resistance to incorporating the changes required by the ACGME. Instead, the development of the structure and culture of the surgical residency may have evolved in response to dysfunctional influences, rather than being built on sound pedagogical theory. The resulting surgical identity molded by this culture may then be appreciated as a potentially flawed, dysfunctional social construct. Changes prompted by the ACGME may result in both a healthier surgical work force and the ability to attract a greater diversity of applicants to the field of surgery. The reframing of what is essential to the surgical identity may allow the creation of new models of surgical training.

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INTRODUCTION

The past decade has been a difficult time for the surgical profession. There has been significant resistance by the surgical leadership, including program directors and officers in academic organizations, to the adoption of the changes in surgical residency structure required by the Accreditation Council for Graduate Medical Education (ACGME) regulations. While the ACGME regulations first issued in 2003 affected all postgraduate training programs, the changes that were required were particularly difficult to incorporate into surgical residency programs. These regulations placed work hour restrictions on residents, limiting the number of hours worked to no greater than 80 hours/week, and mandated supervision of the resident's work, especially at the more junior levels. Although some aspect of this resistance may be related to the greater efforts required of surgical program directors, due to the significant discrepancy between the traditional surgical work load and the new regulations, the extent of criticism documented in the surgical literature suggests a deeper concern. I claim in this thesis that a significant element of this resistance is the recognition that the required changes will not only affect the structure of surgical residency training, but in doing so will also strike at the culture of residency training and by that mechanism affect the adoption of a traditional surgical identity by the trainees immersed within that culture. The need for these changes to the structure of the resident's work environment, and the resistance to the incorporation of these changes, provide an opportunity to examine the ethos and culture of surgical residency for a potential source of this conflict.

Significant features of the culture of surgical residency that bear consideration here include long work hours, with 110+ hour work weeks being common in the past, a rigid hierarchical structure with deference to authority, and the prizing of various “macho” attributes that together help constitute a distinct “surgical identity”. There is increasing evidence documenting the dysfunctional aspects of the traditional surgical training system and the surgeons it produces. While we do not have data demonstrating the need to incorporate these potentially impairing dysfunctional elements into the training program to produce well trained general surgeon, we do have evidence of the negative effects of extreme work hours and sleep deprivation, an area that is a major source of conflict between the surgical leadership and the ACGME regulations. I suggest that this issue is important for at least two reasons. The successful incorporation of the required changes is necessary to support ongoing surgical residency training for the next generation of general surgeons. Additionally, there is increasing evidence of significant ethical problems resulting from the traditional structure of surgical residency training.

The norms perpetuated by the traditional approach to surgical training, and the surgical identity that develops within this culture are antithetical to the current ethical norms expected regarding patient care and the surgeon’s personal and professional development. This results in a dissonance between the traditional construct of the ideal surgeon and the professional who must work in the current work environment with external constraints on professional training.¹ The critical issues to be addressed include the ethical issues raised by both the apparent generational break between surgeons trained before and after work hour reform, and the conflict in balancing visions of surgical identity and concerns of patient and personal safety. Several

¹ Organ Jr. CH The Generation Gap in Modern Surgery. Arch Surg 2002;137:250-252., Brooks JV, Bosk CL Remaking Surgical Socialization: Work Hour Restrictions, Rites of Passage, and Occupational Identity In Press Social Science & Medicine (2012) <http://dx.doi.org/10.1016/j.socscimed.2012.07.007>

ethical issues emerge from this discordance between what has constituted the traditional surgical identity and the current norms. These concerns include the risk of impairment of the developing professional, especially the risk of burnout which has been increasingly discussed, and has the potential for a negative effect on both the patient and the surgeon. There is also the risk of injury to patients due to the more immediate effects of sleep deprivation on cognitive and technical abilities. Additionally, there is the potential for a negative effect on the process of surgical training. If both trainees and the surgical faculty are focused on the differences in training culture due to work hour restrictions, and the loss of the physical “heroic” nature of the traditional training model, there is a risk that the usual generational gulf will be widened, with a negative effect on teaching and mentoring.

I submit that there is no well grounded reason for the resistance to incorporating the changes required by the ACGME. There is no evidence demonstrating the need for extreme work hours or unsupervised patient care in the training of general surgeons, and increasing evidence that there is harm attached to these elements of training. I will provide in the body of this thesis background material supporting the claim that the development of the structure and culture of the surgical residency may have evolved in response to dysfunctional influences, rather than being built on sound pedagogical theory. The resulting surgical identity molded by this culture may then be appreciated as a potentially flawed, dysfunctional social construct. These cultural elements were then naturalized as a necessary normative feature of the making of good surgeons. When the history of surgical residency is framed in this manner, it may provide an opportunity to consider the benefits that may accrue to embracing changes in the structure of residency training programs. These changes, importantly including more humane work hours, may result in both a healthier surgical work force, and the ability to attract a greater diversity of

applicants to the field of surgery. The ability to positively incorporate change may allow the surgical community to creatively and more effectively address the regulatory requirements while meeting resident educational needs. Additionally, a reframing of what is essential to the surgical identity may allow the creation of new models of surgical training and practice that can address the negative impact of job related stress on the surgical workforce.

This work has been structured to include two major parts. Part I will address the history of the development of surgical residency programs, and Halsted's role in the creation of surgical residency in the sections Background History: Regarding Halsted and the Nature of Medical and Surgical Education in the United States at the Start of the 20th Century and Halsted Joins the Faculty at Hopkins. Part I continues with a discussion of the behaviors that may be seen in the impaired physician, with a particular focus on Halsted's behaviors in the section titled The Nature of Addiction and the Impaired Physician. I then proceed with a discussion of the potential impact of these behaviors on specific aspects of the structure of surgical residency, and the slow and limited change in residency structure over time in The Structure of the Traditional Surgical Residency: The Singular Influence of Halsted, Potential Impact of His Strengths and Weaknesses, and the Slow Process of Change. I move the discussion to more recent events and their effects on residency structure in the section Significant Change Comes to Residency Training Programs – Libby Zion and the Introduction of Work Hour Restrictions. Part I is completed with a section titled Resistance to Change that addresses the surgical leadership's response to the ACGME regulations. What is perhaps conspicuous by its absence as a potential explanation in Part I is a discussion that the traditional structure and culture of surgical residency is necessary for the development of the well-trained general surgeon. Unfortunately, a review of

the relevant literature does not provide evidence based pedagogical justification for the traditional structure of postgraduate surgical education.

Part II of this work includes three sections addressing the ethical concerns resultant from the dysfunctional aspects of surgical residency structure, and the response of leadership to the need to change. The first section in Part II, The Persistence of a Potentially Dysfunctional Training Model provides a description of some of the persistent dysfunctional elements in the training structure and the relationship to surgical culture and surgical identity. Surgical Culture, Surgical Identity and the Impact of Work Hour Reform discusses the ethical issues that result from the impact of this change on surgical culture, and by extension, the ability to absorb a traditional surgical identity through the training program. Beyond the Regulations: the Potential Benefits of Change is the final section of Part II, and continues the discussion of ethical concerns, and discusses the potential benefits of embracing, and creatively incorporating the required changes. Overall, this work suggests that there is little evidence to support continued allegiance to the traditional structure of surgical residency training, and increasing evidence of the potential negative attributes of this system. This should allow strong consideration of incorporating work hour restrictions into the surgical culture, anticipating the potential of a positive outcome for the training environment, the applicants the program attracts, and the surgeon the program produces.

PART 1

BACKGROUND HISTORY: REGARDING HALSTED AND THE NATURE OF MEDICAL AND SURGICAL EDUCATION IN THE UNITED STATES AT THE START OF THE 20TH CENTURY

William Stewart Halsted (1852-1922) is often considered the “father” of the American surgical residency system. This is the most enduring, but certainly not the only accomplishment in the course of his outstanding career in surgery. Although it was William Osler who had originally proposed the concept of a residency system to the Medical Board of the John Hopkins Hospital, it was Halsted who guided and nurtured its development.² There were many other American surgeons of Halsted’s era who made important contributions to advancing the science of surgery, including William Keen, Nicholas Senn, Roswell Park, John Deaver, and John Murphy. These men and their contributions are often forgotten while Halsted is still prominently remembered, in large part due to his opportunity to train disciples who would carry his influence and teaching on to future generations of surgeons.³ Harvey Cushing, one of his most illustrious trainees, stated that Halsted “...was one of the few American surgeons who may be considered to have established a school of surgery, comparable, in sense, to the school of Billroth in Vienna”.⁴

Although a relatively undistinguished student during his time at Yale as an undergraduate, exposure to texts on anatomy and physiology in his senior year sparked his interest in studying medicine. Halsted went on to attend medical school at Columbia’s College of Physicians and

² Rutkow IM William Stewart Halsted and the Germanic Influence on Education and Training Programs in Surgery. *Surgery, Gynecology, and Obstetrics* 1978;147:602-606.

³ Rutkow IM William Stewart Halsted. *Arch Surg* 2000;135:1478.

⁴ Cushing H William Stewart Halsted (1852-1922). *Proceedings of the American Academy of Arts and Sciences* 1923;58:599-604.

Surgeons, which was one of the best medical schools in the United States at that time. Despite a lackluster undergraduate career, Halsted was devoted to his studies, and quickly rose to the top of his medical school class. This stellar medical school performance helped Halsted obtain an internship at Bellevue Hospital, a prestigious training opportunity.⁵ Following this somewhat limited training, Halsted sought out two years of what at the time would be considered postgraduate education in Germany and Austria, and was exposed to many of the great surgeons of that era. Having availed himself of these opportunities, Halsted returned to New York as a superbly trained surgeon, committed to starting an active surgical career.⁶

Once Halsted returned to New York, he joined the faculty of his *alma mater*, and took surgical positions at several hospitals, including Bellevue, where he had started his clinical training. He was extremely busy, very talented and much in demand as a surgeon, with a full clinical and teaching schedule. Despite his full surgical workload, he was well liked by the medical students who flocked to his lectures and tutorials. He was appreciated as a friendly and engaging teacher.⁷ During his tenure at Bellevue, Halsted started his lifelong friendship with William Henry Welch, a well respected young professor of pathology and bacteriology. Their personal friendship was supported by their mutual respect for each others talents and dedication to advancing the science of medicine.⁸

Within the first several years of practice and teaching in New York Halsted turned his attention to experimentation with cocaine, as initial reports from Europe lauded its anesthetic

⁵ Cameron JL William Stewart Halsted Our Surgical Heritage. Annals of Surgery 1997;225:445-458.

⁶ Markel H An Anatomy of Addiction Sigmund Freud, William Halsted, and the Miracle Drug Cocaine Pantheon Books, NY 2011 pp43-45.

⁷ Olch PD William S. Halsted and Local Anesthesia: Contributions and Complications. Anesthesiology 1975;42:479-486.

⁸ Colp Jr R Notes on Dr. William S. Halsted. Bull. N.Y. Acad. Med. 1984;60: 876-887.

qualities. The relatively sparse literature available on cocaine at this time included Freud's *Über Coca* which focused on the drug's effects on body and mind, especially its positive effects on depression and anxiety, and Koller's paper on cocaine's use as a local anesthetic in ophthalmology. Not only did these references provide no information on the risk of addiction associated with the use of cocaine, Freud and others, both in Europe and the U.S., supported the use of cocaine to treat morphine addiction.⁹ Upon reading the European reports, Halsted immediately recognized the potential importance of cocaine as a local anesthetic to all fields of surgery. He recruited colleagues and students to assist him in experiments assessing the use of varying doses of cocaine. They quickly also discovered the associated high of injected cocaine, and increasingly found themselves mixing scientific pursuits with pure pleasure. Within a period of weeks to months, Halsted and the others found themselves addicted to cocaine.¹⁰

The extent of Halsted's cocaine addiction, and the addiction's control over his professional life is well documented. Halsted wrote a single manuscript on the subject of cocaine, published in the New York Medical Journal in 1885. It is surprising that this manuscript was published, as it is almost completely incoherent, including the statement "Neither indifferent as to which of how many possibilities may best explain...to write on the subject in hand the greater part of a somewhat comprehensive paper, which poor health disinclined me to complete" In short, this paper spoke more to the author's addiction and deterioration than his findings on cocaine as a local anesthetic.¹¹ Halsted's inattention to his clinical work also demonstrated his significant deterioration. On May 5, 1885 Halsted abandoned a patient with an open fracture in the emergency department of Bellevue hospital,

⁹ Markel H Op Cit pp74-87.

¹⁰ Olch P Op Cit.

¹¹ Halsted WS Practical comments on the Use and Abuse of Cocaine, Suggested by its Use in More than 1000 Minor Surgical Operations. New York Medical Journal 1885;42:294-295.

where he had been called as the attending surgeon. It was his last clinical activity for months as he sank further into his addiction. Halsted left his clinical practice, and spent the next several months abusing cocaine and traveling to Europe in search of rest.¹²

Cocaine is a highly addictive agent. Its use causes flooding of a key pleasure center of the brain with neurotransmitters, and as a result, a rush of intensely pleasurable sensations. Unfortunately, this comes at a cost: a resultant shortage of these mood regulating chemicals, which in turn results in prolonged emotional and physical lows, and, over time, long lasting damage to the brain's pleasure center.¹³

Welch recognized that Halsted's deterioration was due to his incessant abuse of cocaine, and he proved to be a great friend to him. He attempted a personally supervised "intervention" hoping to wean Halsted off cocaine over the course of a three month cruise. When this effort failed miserably, Welch insisted that Halsted seek inpatient rehabilitation at Butler Hospital for the Insane, a well known and respected psychiatric hospital in Providence, Rhode Island. The facility was known to have some limited success in treating morphine addicts, although the staff had no experience with cocaine addiction, which was not yet recognized or described. Welch was able to persuade Halsted to seek treatment by the promise of a position at the newly established Johns Hopkins University School of Medicine in Baltimore where Welch would be moving as professor and dean.¹⁴ Treatment options were quite limited, with efforts directed at rest and removal from the addict's usual environment. Halsted's psychiatrist worked to restore his confidence so as to allow him to return to his career. Unfortunately, Halsted also received

¹² Markel H Op Cit. pp4-6.

¹³ Markel H Op Cit. p105.

¹⁴ Markel H Op Cit. pp108-113.

regular morphine injections to treat the agitation and insomnia of cocaine withdrawal during his six month hospitalization initiating Halsted's life-long addiction to morphine.¹⁵

The era of Halsted's clinical training and surgical practice was a very volatile time in the development of medical and surgical training in the United States. There were few true teaching hospitals, and surgeons were for the most part self taught.¹⁶ The only relatively available structured alternatives were the polyclinic postgraduate medical schools which developed in most major cities, but provided only brief clinical courses.¹⁷ There was great variability in medical education, with most medical schools providing a fairly limited and inferior education. The development of the School of Medicine at Johns Hopkins University, and the near simultaneous building of a teaching hospital to be integrated with the medical school was a relatively novel experiment in U.S. medical education. The Flexner report provides a window on the state of medical education in the decades surrounding Halsted's move to Baltimore and his development of the surgical residency at the Johns Hopkins Hospital.

This report, authored by Abraham Flexner and commissioned by the Carnegie Foundation, provided a critical assessment of the state of medical education throughout the U.S.¹⁸ Flexner undertook an enormous task with this report, and examined all the medical schools in the U.S. and Canada, the allopathic schools and the schools representing the various competing sects of medical practice active at that time, the homeopathic, eclectic, and osteopathic schools. Overall, the report painted a very distressing picture of medical education and medical practitioners. Flexner found that there had been an overproduction of uneducated,

¹⁵ Markel H Op Cit. pp140-142.

¹⁶ Rutkow IM Surgery, Gynecology and Obstetrics vol. 147 Op Cit.

¹⁷ Rutkow IM John Wyeth (1845-1922) and the Postgraduate Education and Training of America's Surgeons. Arch Surg 2002;137:748-749.

¹⁸ Flexner A Medical Education in the United States and Canada. A Report to the Carnegie Foundation for the Advancement of Teaching Bulletin Number Four (1910) NY NY 10022 Accessed at http://www.carnegiefoundation.org/sites/default/files/elibrary/Carnegie_Flexner_Report.pdf

ill trained medical practitioners, primarily due to the large number of proprietary medical schools that had little or no university or hospital affiliation to support basic and clinical education, and a lack of consistency as to what should be the standards of a medical education. The very variable, and overall poor, quality of medical school education was especially concerning as the previous model of medical education, private apprenticeship to a practicing physician, had all but vanished by the mid to late 1800's. Flexner identified the negative public health impact of having a large number of poorly trained practitioners, and noted that there was no other country in which there was so great, and so potentially fatal a difference between the best, average, and worst of physicians. A theme throughout the report, beyond the description of the deficiencies of the individual schools, was the increasing ethical responsibilities physicians now had to both society and the individual patient, due to the rapid scientific progress in the field of medicine with new opportunities to improve patient outcome.

Although the Flexner report discusses the extremely poor education provided by almost all the eclectic and homeopathic schools, it provides little discussion of the influence of these unorthodox medical practitioners. The emergence of medical and surgical sectarianism in the mid 1800's was a potentially serious threat to the professional survival of allopathic medicine, perhaps in part due to the relatively limited scientific support for the medical practice of the time. Homeopathy and eclecticism were the two most prominent of these health care movements, and they sought professional status for their practitioners, alongside the allopathic physicians. Although homeopathy grew in stature through the late 1800's, with the development of numerous homeopathic colleges and hospitals, homeopathic surgeons in particular adopted many of the same practices as their allopathic peers, such as aseptic surgical procedures. With the rapid changes in medical science throughout the early decades of the 20th century, and the

improvement in the teaching of scientific method throughout all medical schools following the Flexner report, the homeopathic schools faded away, and the few homeopathic surgeons were relatively easily incorporated into the allopathic world. Eclecticism and physiomedicalism remained a much smaller sect, with little professional stature, and more quickly disappeared from the medical scene.¹⁹

Throughout his report, Flexner spoke strongly of the need for there to be an integration of education from the university level, through the medical school, and finally extending to the clinical education in the hospital, to allow the physician to have the proper scientific background to incorporate new and evolving medical information, and apply this knowledge to thoughtful clinical practice. Interestingly, Flexner specifically spoke to deficiencies in surgical teaching, noting that surgeons still taught mostly by demonstration, rather than moving on to more modern methods, and asking the student to bring his/her scientific understanding and investigation to the area of discussion. The medical school and teaching hospital that William Welch was recruited to develop at Hopkins was relatively unique in addressing these concerns, and it is noted several times throughout the report as an example to be emulated. Hopkins was the first medical school to require an undergraduate degree prior to starting medical school and is described in the report as “the first medical school in America of genuine university type... with its own hospital, in which the training of physicians and the healing of the sick harmoniously combine to the infinite advantage of both” Flexner also stressed that change would need to come mostly from within, supported by those physicians who were “well trained and self sacrificing...who represented the high ideals” of the medical profession.

¹⁹ Rutkow IM William Tod Helmuth and Andrew Jackson Howe Surgical Sectarianism in 19th-Century America. Arch Surg 1994;129:662.

The discussion of the state of medical education in the late 1800's and early 1900's provided by the Flexner account provides an understanding of the genuinely unique nature of the "experiment" in medical education provided by the Johns Hopkins Medical School and Hospital. This background is critical to help understand at least in part the widespread adoption of the structure and style of residency or postgraduate medical education developed at Hopkins. Within the context of great variability and lack of standardization in medical education, Hopkins had been identified as a leader in U.S. academic medicine, and it was not unreasonable for other hospitals to attempt to adopt Hopkin's educational methods. Although postgraduate education was not the focus of the Flexner report, it was briefly addressed. Recognizing the need for systematic training in the various medical and surgical specialities, Flexner found that just as there needed to be standardization and oversight for medical education the same was true for residency training.²⁰ The report was clear in asserting a need for state control, maintaining that while individualism and liberty of the individual physician would be curtailed by this process, there would be a significant public health benefit to the overall community by providing protection from inadequately trained practitioners. This tension between legislative or state control versus internal professional oversight persists through to the current era, and is a theme addressed in this paper. While the state came to control licensure for medical practitioners, the American College of Surgeons was formed in 1913 in part to provide professional, rather than legislative, control over the quality of surgical care and the standards for the education and training of surgeons. Residency programs, modeled on the program developed at Hopkins, were recognized as critical to the control of quality among surgeons.²¹

²⁰ Flexner A Op Cit.

²¹ Pinkus RL, Sauder R Creating Standards of Excellence for Residency Training in Neurological Surgery: A Historical Approach. In The Pursuit of Excellence Through Education Ed. Ferrari M Lawrence Erlbaum Associates, Publishers Mahwah, NJ 2002.

HALSTED JOINS THE FACULTY AT HOPKINS

As promised, after his discharge Halsted joined Welch at Hopkins, and went to work in the pathology laboratory to allow for close supervision. Both Halsted and Welch hoped that long hours and hard work would contribute to his rehabilitation.²² Perhaps Halsted recognized, or hoped, that near total dedication and fixation on his work in the lab, perfecting his techniques and carefully documenting his results, would protect him from falling into recurrent use of cocaine. This behavior could be consistent with the efforts during rehabilitation to alter and take control of his environment. Tight control could possibly be very important after experiencing the total lack of control due to drug addiction.²³ I argue in this paper that Halsted tightly controlled his work environment, both in the lab and in the clinical arena, in part to meet the needs of his addiction. Given his construction of a rigidly controlled life in the lab in the hopes of both perfecting his surgical technique and perhaps preventing relapse, it is possible that consciously or unconsciously Halsted attempted to also organize his clinical life to either help protect him from relapse into addiction, or help hide ongoing addictive behavior. Halsted's time and counseling at Butler Hospital may have prepared him to see his work life as an ongoing recovery program to help maintain his abstinence.

Unfortunately, despite Halsted's efforts, and Welch's supervision, Halsted suffered a relapse of his cocaine addiction and required an additional nine month stay for rehabilitation at Butler Hospital. After his discharge, Halsted returned to his work in the lab with renewed energy, but his personality seemed changed. He appeared remote and guarded, avoided close relationships, and stayed focused only on his work.²⁴

²² Markel H Op Cit. p149.

²³ Baldisseri MR Impaired Healthcare Professional. Crit Care Med 2007;35:S106-S116.

²⁴ Markel H Op Cit. pp152-153.

Despite these difficulties, in a little over two years after his final discharge from Butler Hospital, Halsted was appointed surgeon-in-chief at the Johns Hopkins Hospital. Two years following that, he was named professor of surgery at the medical school. Although he had achieved international renown as a technically proficient surgeon, and had a relative lack of administrative responsibilities by today's standards, Halsted did not operate frequently, spending only about three mornings a week in the operating room. He was relatively rigid and protective of his time.²⁵ There was an understanding among his subordinates that he would leave the operating room at noon after a morning of surgery, and that he was not to be disturbed at home after leaving the hospital in the evening. This behavior is a marked departure from his previous work style while practicing surgery in New York.²⁶

Cushing, in conversation with Harvard surgeon Elliott Cutler, suggested "that it might even seem that the whole Halsted school of surgery which I have called a School for Safety in surgery may have been due to this drug addiction." Here Cushing refers to Halsted's change from being a rapid operator to becoming a very slow and methodical surgeon, dedicated to the precise details of surgery.²⁷ While this change is on a smaller scale than the potential long lasting impact on the culture of surgical training that I am suggesting in this paper, it still speaks to the fact that although he was able to maintain his career, there was a significant effect of drug addiction on his professional demeanor. Halsted's repeated and often extended absences from work are also consistent with continued substance abuse. William Osler's *Inner History of the Johns Hopkins Hospital* published decades after both his and Halsted's deaths clearly states that Halsted remained addicted to morphine throughout his time at Hopkins. Although the

²⁵ Rutkow IM The Unpublished Letters of William Halsted and Harvey Cushing. Surgery, Gynecology, and Obstetrics 1988;166:370-382.

²⁶ Markel H Op Cit. p197.

²⁷ Markel H Op Cit. pp238-239.

manuscript was to have been kept sealed until the centenary of the Johns Hopkins Hospital in 1989, it was published in 1969. It most likely was written during Osler's later years at Hopkins, between 1902 and 1905. Here Osler states "When we recommended him as full surgeon to the Hospital in 1890 I believed... that he was no longer addicted to morphia....About six months after the full position had been given I saw him in a severe chill, and this was the first intimation I had that he was still taking morphia. Subsequently...gained his full confidence. He had never been able to reduce the amount to less than three grains daily."²⁸

THE NATURE OF ADDICTION AND THE IMPAIRED PHYSICIAN

As discussed in this work, the structure of surgical residency was not designed based on identified pedagogical principles, nor was it a theoretically grounded and empirically developed training model. Many key elements of the structure of the residency program, including the extended period of training and the singular devotion of the resident to his/her work at the hospital, which often extended from the day into the night, were specifically designed and put in place by Halsted, based in part on his observation and interpretation of the system of training in Germany at the end of the 19th century. While we have evidence to support the truth of Halsted's ongoing addictions during his long tenure at Johns Hopkins Hospital, we have no first hand information of his understanding of his disease of addiction, or what steps he might have taken proactively to try and control or work alongside his disease. We do have some information of the general understanding of narcotic addiction during this time period (though there was no true understanding of cocaine addiction at this time, Halsted having the misfortune of being one of the first recognized cocaine addicts). A better appreciation of the meaning of addiction during

²⁸ Osler, W The Inner History of the Johns Hopkins Hospital. The Johns Hopkins Medical Journal 1969;125:184-194.

Halsted's time, combined with our current knowledge regarding the impaired physician, may allow an understanding of behaviors that may be anticipated in that situation.

Morphine had first been isolated as the major active alkaloid of opium in the early 19th century, and for several decades it was prescribed enthusiastically, as it was relatively unique as a powerful and effective agent at a time when physicians had few available drugs. It wasn't until decades later that addiction was seen as a disease, and the physician's role in causing addiction was recognized. The early years of Halsted's addictions were a very active time in terms of interest in and treatment of addiction. For these few decades, addiction was seen as a medically treatable disease, with the rise of many institutions dedicated to treatment and cure. By the early 20th century, interest in the treatment of addiction had waned, perhaps in part due to a demographic shift in those addicted. In the early decades of the 20th century, there was a shift away from the iatrogenically addicted, upper class patient (such as Halsted), and the picture of the addict, often a member of the urban poor, had become much less appealing. Cocaine addiction was also increasingly recognized during this time period, and was seen as a source of significant social and public health problems. Increasingly, the writing of this time described the addict as having a perverse, antisocial personality.²⁹

Halsted would have been very well aware of the shifts in the medical understanding of addiction, and the evolving negative view of the addict by the medical profession may certainly have stimulated him to do his best to hide his addictions. It is well understood today that healthcare professionals are generally very good at hiding signs and symptoms of substance use and abuse. Additionally, impaired physicians can be difficult to identify due to both their skills

²⁹ Aurin M Chasing the Dragon: The Cultural Metamorphosis of Opium in the United States, 1825-1935. *Medical Anthropology Quarterly*, New Series 2000;14:414-441.

at hiding their symptoms of substance abuse and their well developed denial mechanisms.³⁰ It is interesting to consider whether part of Halsted's investment in a tightly controlled surgical residency program was a reflection of his inability to control the substance abuse affecting his personal and professional life. Many physicians are accustomed to maintaining control over numerous aspects of their work environment. It is possible to imagine that the difficulty of admitting that he was unable to control his chronic substance abuse may have lead Halsted to even further exert control in the arenas where he was able; in the operating room and over the surgical residents.

Despite Halsted's attempts to hide his addictions, many of the reported "eccentricities" of his work habits are now recognized as signs of substance abuse in the workplace. These behaviors include his frequent absences from work without reasonable explanation, his relative inaccessibility to both patients and staff, as highlighted by the common knowledge that he was not to be disturbed after retiring for the evening, and arriving late and then leaving the operating room abruptly, turning over the patient care to an unsupervised resident staff. In retrospect, Halsted met the criteria of an impaired physician, a physician unable to fulfill his professional responsibilities because of drug addictions.³¹ Beyond Osler's writings, which were sealed for decades prior to publication,³² there appeared to be little contemporaneous recognition of the extent of his disease, or its effects on his work. While detection of an impaired physician may be difficult, colleagues may also be reluctant to report their suspicions regarding a fellow physician. Factors that may deter reporting include intimidation, certainly a factor to consider in working with the surgeon in chief, and the need to protect the hospital's reputation, also important in the

³⁰ Baldisseri MR Op Cit.

³¹ Baldisseri MR Op Cit., Berge KH, Seppala MD, Schipper AM Chemical Dependency and the Physician. Mayo Clin Proc 2009;84:625-631.

³² Osler W Johns Hopkins Medical Journal Op Cit.

setting of a brand new medical school and hospital.³³ Although most studies suggest that overall, physicians have similar rates of substance abuse as compared with the general population, a greater concern is raised by physician substance abuse due to the physician's responsibility for critical aspects of patient care. In discussions on the need to identify impaired physicians and involve them in intensive treatment programs, both the physician's health and their patients' safety are considered. The literature on impaired physicians supports the concerns of negative effects on patient care and safety due to a variety of factors including avoidance of rounds and patient contact, inappropriate orders and documentation, deterioration of technical skills, and diversion of drugs of abuse meant for patients' pain relief. Most of the limited literature on physician substance abuse, and the structure of most physician health committees, focus on the protection of patient safety.³⁴ What is critical in considering Halsted's addiction is that he not only had responsibility for patients, but also for the development of the surgical residency system. There is evidence in the writings of Cushing and other Halsted residents that Halsted often turned over the care of his patients to the residents, relatively effectively removing the patient from the care of Halsted as an impaired physician, but raising the question of adequate supervision of both the patient's surgical care and resident education.³⁵ In contrast to the situation of patient care, there is no evidence of any mediating effect of Halsted's influence on the surgical residency system. It seems reasonable to explore the concern that Halsted's substance abuse would potentially have negative effects on the nature of the surgical residency system that he was creating. I suggest that the potential for Halsted's addictions to negatively affect the development of surgical residency has not been appreciated by subsequent generations

³³ Baldisseri MR Op Cit., Johnson TM Physician Impairment: Social Origins of a Medical Concern. *Medical Anthropology Quarterly*, New Series 1988;2:17-33.

³⁴ Berge KH, Seppala MD, Schipper AM Op Cit., Marrow CK Sick Doctors: The Social Construction of Professional Deviance. *Social Problems* 1982;30:92-108.

³⁵ Markel H Op Cit. pp237-238.

of surgeons, including those in leadership positions. This dysfunctional aspect of Halsted's life and practice has not been recognized as part of the historical and cultural context within which residency training programs developed.

THE STRUCTURE OF THE TRADITIONAL SURGICAL RESIDENCY: THE SINGULAR INFLUENCE OF HALSTED, POTENTIAL IMPACT OF HIS STRENGTHS AND WEAKNESSES, AND THE SLOW PROCESS OF CHANGE

Prior to Halsted's creation of the Hopkins surgical training program, the opportunities in the U.S. for postgraduate surgical education were limited. Halsted himself had only a single year of postgraduate training at Bellevue, and recognized the need to travel to Europe to receive adequate training in surgery.³⁶ Halsted spoke of the need to move past the era of the proprietary medical school, and to accept the superior education offered by the endowed university medical school, although these were still few in number. In an address delivered at Yale in 1904, Halsted stated that the opportunities for surgical training were still quite limited. He noted as proof of the generally inadequate training the "...so-called sacrifices which our young men to-day are willing, nay most eager, to make in order to obtain a training which seems even to them not only desirable but absolutely essential for success of a high order"³⁷ This statement would seem to imply that Halsted did not see the long hours spent at the hospital, being available for patient care both day and night, without dedicated break periods, to be an exceptional price to pay for excellent training in surgery. An important piece of the argument I present in this paper is that surgical residency training was not systematically designed to meet specific educational needs,

³⁶ John KD, Modlin IM A Brief Historical Perspective and a Comparison of the Current Systems of Surgical Training in Great Britain, Germany and the United States of America. *Surgery, Gynecology, and Obstetrics* 1993;177:622-632.

³⁷ Halsted WS The Training of the Surgeon. *Bulletin of the Johns Hopkins Hospital* 1904;15:267-275.

but instead grew organically, responding to the influences in the culture within which it developed. Cushing has written that “Halsted was a man who taught by example rather than precept.”³⁸ Halsted appears to admit to this sort of development when he refers to “...conditions which have evolved in a natural way at the Johns Hopkins Hospital where the plan of organization of the staff differs from that which obtains elsewhere in the country”. He outlines a term of service for the successful surgical resident as extending over the course of eight years. Halsted does not provide information regarding the specific course of study, or “competencies” to be gained over these long years in training, but instead notes that the few men he has trained have done very well, and that many others are “eager for the opportunity to be tested as to their fitness to rise to the position...” He states, “We need a system, and we shall surely have it, which will produce not only surgeons but surgeons of the highest type...”³⁹

Halsted’s training system, a pyramid with many junior level trainees, with fewer kept on as each year as training advanced, resulting after eight years or more in a single chief resident, was emotionally and physically challenging. Nevertheless, it was the model adopted by U.S. surgical residency programs for decades. There was a relatively rigid hierarchy that served as the framework for the residency, and this hierarchy helped to provide for both safety of the patients and professional control over the residents.⁴⁰ The trainees also allowed Halsted to maintain a distance from his patients, as the majority of both preoperative and postoperative care was passed on to them. The initial residents trained by Halsted provided him the opportunity to share his surgical genius and training style on a broader scale, as these trainees left Hopkins and established surgical programs promulgating his teachings, and training culture, across the U.S.

³⁸ Cushing H Op Cit.

³⁹ Halsted WS Bulletin of the Johns Hopkins Hospital Op Cit.

⁴⁰ Pinkus RL Sauder R Op Cit.

and Canada.⁴¹ Although Halsted never left Hopkins after joining the faculty, he exerted significant influence over surgical residency training programs throughout the U.S. through the work of his trainees, and the residents they subsequently trained.

Harvey Cushing, the “father” of neurosurgery in the U.S., and perhaps Halsted’s most eminent trainee once observed that Halsted “spent his medical life avoiding patients”.⁴² Despite this observation, and his concerns about the mentoring he received in his own training, Cushing adopted most of the Halstedian model of surgical training when developing his own neurosurgical training program in Boston. Cushing incorporated the surgical skills and judgment developed through this physically demanding model. He also undertook to partner these skills with the moral lessons defining the good physician, passed on by Sir William Osler, Cushing’s true mentor at Hopkins.⁴³ Halsted was noted to avoid patients, students, and colleagues during his time at Hopkins, a marked change from his socially active life in New York. It is impossible to prove that this change was due to Halsted’s addictions, and if so whether the distance he placed between himself and others was designed to create a controlled environment to minimize his risk of relapse, or to hide his ongoing use and more severe relapses, but the timeline does suggest a relationship. An appreciation that Halsted’s potentially addiction related behaviors may serve as an impetus of some of the specific features of surgical culture embedded within the structure of the traditional surgical residency is important. An example of a behavior that had persisted for decades in the culture of surgical training, and that can be seen as

⁴¹ Carter BN The Fruition of Halsted’s Concept of Surgical Training. *Surgery* 1952;32:518-527. Blalock, A Address of the President Problems in the Training of the Surgeon. *Annals of Surgery* 1950;131:609-616 .

⁴² Harvery, AM The Influence of William Stewart Halsted’s Concepts of Surgical Training . *The Johns Hopkins Medical Journal* 1981;148:215-236.

⁴³ Pinkus RL Mistakes as a Social Construct: An Historical Approach. *Kennedy Institute of Ethics* 2001;11:117-133.

similar to behavior surrounding Halsted's practice at Hopkins, is the classic aphorism: "call if you need, but to call is a sign of weakness."⁴⁴

An important issue in assessing a training program is whether the training process results in the end product of a skilled professional. That said, reflecting on the history of the length of development of the training program may also have merit. Although there is a need for some relatively intense immersion in the clinical environment to allow the development of the judgment and technical skills of a surgeon, it is possible that the residency system may not have been created primarily to serve the specific curricular needs of the surgical resident. Instead, the structure of surgical residency may also be seen as consistent with what one could expect to have developed in response to Halsted's need to hide his chronic struggles with addiction. Having a large cohort of trainees, eager to work hard to allow their continued training with Halsted, may have enabled his ongoing addictions.

Although Halsted spoke of graded responsibility as residents advanced through the program, his supervision of the residents was spotty at best.⁴⁵ Attending supervision of surgical residents, especially in the off hours, remained limited over the ensuing decades until the institution of the ACGME reforms, which included requirements regarding supervision in addition to the duty hour regulations. Although attending supervision was quite limited, historically surgical chief residents have provided a great deal of teaching and supervision of junior residents. Chief residents, while more experienced than the junior residents, generally lack the depth and breadth of experience of a more experienced surgical attending. This relatively narrow range of experience may seriously limit the transmission of knowledge and skills. Traditionally, surgical attendings were not to be disturbed at night, with surgical residents

⁴⁴ Kellogg KC, Breen E, Ferzoco DJ, et al. Resistance to Change in Surgical Residency: An Ethnographic Study of Work Hours Reform. *J Am Coll Surg* 2006;202:630-636.

⁴⁵ Cushing H. *Op Cit.*, Rutkow IM. *Op Cit.*

taking responsibility for patient care during these hours. This pattern of care was historically justified as an opportunity for residents to gain confidence and independence. If such patterns of behavior, or customs in training, entered the ethos of training as an evolution in structure in response one person's addiction related behaviors, this possibility could open the door to questioning the pedagogical foundation for such aspects of training.

It would be very difficult to provide data demonstrating the necessity of allowing significant periods of unsupervised patient care and surgical intervention in the process of surgical training. Additionally, it would be difficult to demonstrate that unsupervised patient care and surgical intervention is specifically necessary to allow for resident maturation and independence. In Cushing's correspondence with and reminisces of Halsted he comments on seeing relatively little of Halsted during his years as resident. Cushing also writes of his discomfort with taking on surgical procedures without Halsted's supervision and guidance. While he initially thought that this may have been due to Halsted's trust in his abilities, he recognized years later, following Halsted's death, the potential impact of Halsted's lifelong addictions on his personality, especially his aloof and removed approach to others.⁴⁶ It is very important to appreciate that while the origins of a culture may be obscure, once the patterns of practice are established they may not be easily changed. This issue is critical, as successfully changing surgical training, as is required under the current ACGME regulations, is dependent on changing surgical culture.⁴⁷ While there has always been some tension around, but general acceptance of, the need for continued innovation in the technology surrounding surgical

⁴⁶ Rutkow IM Surgery, Gynecology, and Obstetrics Op Cit.

⁴⁷ Hargreaves DH Op Cit.

intervention⁴⁸, the need for an accompanying cultural change in training has not been as well recognized.

Halsted's addictions, and the effects on his behavior, may provide an explanation for some of the structural aspects of the surgical residency program. An alternative explanation to consider regarding the demanding clinical expectations and rigid hierarchical system initially put in place in Halsted's surgical training program is the risk both surgeon and patient accepted in proceeding with surgery during that era. Due to the lack of antibiotics and other supportive measures, surgical procedures around the time of Halsted were often accompanied by significant morbidity and mortality. Both the surgeon and the patient understood surgery to be a risky endeavor. Cushing in his writing on the practice of neurosurgery identified that surgeons of this era needed to balance a boldness to move forward with operative intervention with strict discipline and broad surgical knowledge, as there was almost no room for error in protecting the patient's well being, given the very limited diagnostic and therapeutic armamentarium of the day. The importance of respect for the surgical hierarchy, the models provided by teachers, and a willingness to assume personal responsibility for patient care with all the potential accompanying errors and complications, can be more easily accepted in an era when the surgeon's greatest, and some extent only, resource was his own knowledge and professional moral virtue.⁴⁹ Given the limitations of medical science in the early 20th century, all physicians were well advised to maintain an attitude of imperturbability, and to develop the ability to carry on calmly despite distressing and difficult circumstances.⁵⁰ While speaking to the demands of the field and to the personality type that may be supportive of, if not necessary for, a successful

⁴⁸ Pinkus RL, Sauder R Op Cit.

⁴⁹ Pinkus RL, Sauder R Op Cit.

⁵⁰ Osler W Aequanimitas with other Addresses to Medical Students, Nurses and Practitioners of Medicine 3rd Edition MacGraw-Hill Book Company NY Toronto London 1943

career in surgery, this explanation does not address all the issues that are of concern in the culture of surgical training. The issues of personal responsibility and the inherent risks in the practice of surgery do not entirely explain the often limited provision of supervision, and the early insistence on independence that became part of surgical culture.

Other than noting the prolonged time required for adequate training and the need for the graduated introduction of responsibilities, Halsted provides little guidance on structuring the resident's education. He was clear regarding his aim not only to train surgeons, but to train surgeons who would become great teachers and leaders, and carry his surgical principles out to a broader audience and future generations. I argue in this paper that these trainees brought with them to the new training programs they developed not only Halsted's principles of surgical technique, such as the delicate handling of tissues, but also the values of the culture in which they had been "raised" as surgeons, a culture that I argue was potentially negatively influenced by Halsted's addictions.

The transmission of Halsted's legacy throughout the U.S. cannot be easily overstated. A paper published in 1952 documents the spread of first and second generation Halstedian trainees and demonstrates that these surgeons assumed leadership positions at university programs across the country including Cincinnati, Cornell, Harvard, Yale, Pittsburgh, Stanford, Columbia, George Washington, and Virginia. Many of the first generation of Halsted trained surgeons in turn developed resident training programs in surgery similar to what they had experienced at Johns Hopkins, giving rise to a second generation of surgeons exposed to the Halsted influence.⁵¹ It is not implausible to presume that many of Halsted's attributes, both positive and negative, have been handed down from generation to generation through this process. This Halstedian

⁵¹ Carter BN Op Cit., Harvey AM Op Cit.

method of postgraduate surgical education underwent limited revisions over the course of several decades.⁵²

One of the more “significant” revisions was the change from a pyramidal structure, where many trainees would enter the training program but few would progress to the most senior level, to a rectangular program, where all entering trainees would receive complete training in surgery if continued competence was demonstrated over time. Within the rectangular surgical residency all the residents within each cohort would be exposed to the same clinical rotations. During the final year of training, they would each have the opportunity to serve as chief resident on a variety of surgical services. The Halstedian pyramidal structure of surgical residency was very much influenced by the German system of surgical training, in which there was a strong competitive spirit among trainees for the top position.⁵³ The change to a rectangular program was first introduced by Edward Churchill at the Massachusetts General Hospital in 1939. A significant impetus for this change was the professional and credentialing difficulty created by having large numbers of surgeons with varying and generally limited training. The rectangular program solved this problem by providing a consistency in training that did not exist in the Halsted system. Additional benefits of a rectangular training program included the ability to train greater numbers of surgeons, which proved enormously important during WWII, and perhaps most importantly for the residents themselves, the elimination of a great deal of the competition for professional survival that was a constant stress within the pyramidal system. The move from pyramidal programs to rectangular programs occurred slowly across the country over the ensuing

⁵² Ravdin IS Problems of Surgical Residency Training. J.A.M.A. 1957;165:1373-1376.

⁵³ Rutkow IM Surgery, Gynecology and Obstetrics vol 147 Op Cit.

decades, but eventually there was a complete conversion.⁵⁴ The move from the traditional Halstedian pyramidal structure to the rectangular residency structure did strike at relatively significant aspect of surgical culture, the competition to gain the chief resident position. In contrast to the changes required in the post-Zion era, the need for change was recognized within the profession. This may provide some explanation as to why, based on a review of the literature, this change was incorporated with seemingly far less concern than the ACGME work hour restrictions.

While the elimination of competition was of significant benefit to the residents, few other changes were made to the culture or work hours of the surgical training system.

Overall, Churchill still recognized that surgical training should be prolonged. His program suggested a minimum of five years that included significant service obligations by the residents to the care of patients. Although there were limited changes in the content of surgical training over the ensuing decades, generally reflecting the expansion of surgical technique and changes in surgical disease, there was little further change in the core structure of residency programs. Additionally, there has been very little discussion in the surgical literature regarding stress during surgical residency, and nothing on the issues surrounding sleep deprivation during surgical training and practice until the later 1980's. Prior to that time, publications pertaining to surgical residency generally address concerns regarding overall surgical manpower needs and issues related to changes in training style due to changes in reimbursement for care, and the availability of insurance, in the form of Medicaid and Medicare, for the poor and elderly.⁵⁵

⁵⁴ Grillo HC To Impart This Art: The Development of Graduate Surgical Education in the United States. *Surgery*. 1999;125:1-14., Grillo HC Edward D. Churchill and the "Rectangular" Surgical Residency. *Surgery* 2004;136:947-952.

⁵⁵ Blalock A Op Cit., Ravdin IS Op Cit., Gawande A Two Hundred Years of Surgery. *New England Journal of Medicine* 2012;366:1716-1723.

SIGNIFICANT CHANGE COMES TO RESIDENCY TRAINING PROGRAMS – LIBBY ZION AND THE INTRODUCTION OF WORK HOUR RESTRICTION

Since 1989, external events have resulted in a change in focus regarding residency training among the surgical leadership. This is reflected in the great number of publications in the surgical literature discussing resident work hours and patient care responsibilities over the past two decades. This discussion has occurred in response to the legislation surrounding resident work hours, an issue that has been evolving since 1989. Libby Zion's highly publicized death in 1984 proved to be a sentinel event stimulating an evaluation of the oversight and structure of residency training.

In March of 1984, Libby Zion was seen in the emergency room at New York Hospital/Cornell Medical Center and admitted to the hospital for further evaluation and treatment. Her diagnosis was unclear at the time of her admission and throughout the eight hour of care she received in the hospital prior to her death. She exhibited symptoms of acute onset delirium. During her care in both the emergency room and on the inpatient unit she was evaluated and treated by interns and residents in the internal medicine training program. Although there was a phone consultation with her attending private physician, she was not physically examined or evaluated by an attending physician during the course of her brief stay. Libby Zion died in the early morning hours of March 5th, 1984, less than 24 hours after her admission to the hospital.⁵⁶

During the ensuing investigation by both the State Board for Professional Medical Conduct and the Board of Regents, and during the course of a civil trial, concerns regarding appropriate oversight of the residents' work and the issue of resident fatigue were raised. The

⁵⁶ Robins N The Girl Who Died Twice: Every Patient's Nightmare: The Libby Zion Case and the Hidden Hazards of Hospitals Delacorte Press NY NY 1995.

impact of these issues on patient and resident safety and resident education were discussed at length. The physician who was caring for Ms. Zion throughout the night was an intern in her first year of postgraduate training after medical school. The intern caring for Ms. Zion had her last, pre-mortem contact with her at approximately 4:30 am, after having been at work continually caring for numerous complex patients for at least 20 hours. Following extensive investigations and consideration of the evidence by a grand jury, the Committee of the State Board of Professional Medical Conduct and the Board of Regents, no medical malpractice or criminal charges were supported against the intern and resident involved. The need for changes in the system of residency education however was highlighted throughout the trial and its prominent media exposure.

What did eventually result from this event was a new set of regulations regarding residency training. In 1989, New York State adopted the recommendations of the Ad Hoc Advisory Committee on Emergency Services, more commonly known as the Bell Commission. New York State Department of Health Code, Section 405, also known as the Libby Zion law, regulated and limited the number of hours that interns and residents could work.⁵⁷ In 2003 the Accreditation Council for Graduate Medical Education (ACGME) adopted similar regulations affecting all residents throughout the U.S., limiting the resident work week to no greater than 80 hours, with no work shift greater than 24 hours, and requiring adequate rest period between duty periods. Additional changes were made in 2011, to take effect in the 2012-2013 academic year, to further limit excessive work hours: residents in their first postgraduate year of training, previously referred to as interns, can now work for a maximum of 16 hours per day.⁵⁸ Although

⁵⁷ Libby Zion Law accessed 09/01/2012 at http://en.wikipedia.org/wiki/Libby_Zion_law

⁵⁸ ACGME Duty Hours accessed 09/01/2012 at <http://www.acgme.org/acgmeweb/tabid/271/GraduateMedicalEducation/DutyHours.aspx>

physicians were involved with the creation of these complex regulations, there was little direct involvement of the leadership of the major surgical organizations.⁵⁹

RESISTANCE TO CHANGE

There is some importance in considering whether some norms of behavior and elements of the structure of surgical residency may have developed in part in response to accommodations made for Halsted's addictions. The resistance to change in the residency structure is strong among the leadership of surgical training programs. Some aspects of this reluctance to change may be valid, in that the "end product", the board certified general surgeon, has been recognized as a well trained professional, critical to the mission of the medical profession overall.

That said, there has been increasing recognition of the significant impact of workplace related stress on the health and strength of the surgical workforce. Change is required to fulfill regulatory requirements, but may also bring other positive effects. A broadening of the understanding of the potential influences on what became the model of surgical residency may allow some openness to change.

Until the imposition of external regulations, there had been relatively little discussion in the surgical literature of the need to restructure or adjust postgraduate surgical education. Most of the discussion had in the past centered on adapting the nature of surgical rotations in residency to meet the training required to care for any changes in the disorders most commonly encountered by the practicing general surgeon. Additionally, surgical residencies have adapted to include training in the use of new technologies that have become available for the general surgeon, such as minimally invasive and robotic surgery. Much less discussion had addressed

⁵⁹ Debas HT, Bass BL, Brennan MF, et al American Surgical Association Blue Ribbon Committee Report on Surgical Education:2004. *Annals of Surgery* 2005;241:1-8.

the need to restructure the residency program overall to allow for adaptability to meet current and future challenges to surgical practice or workforce needs.⁶⁰ While there has been an openness to incorporating new technologies, even as these new techniques have replaced older, more “heroic” or extensive surgeries, there has been a reluctance to adopt the more cultural and structural changes in the practice of surgery and care of the patient, such as constrained work hours and team approach to care.

The surgeon’s ability to recognize and admit errors in a “public” session, (the public being limited to other surgeons) is a very important social control mechanism reinforcing personal responsibility in the care of the patient.⁶¹ What is critical to recognize is that over the ensuing decades since the development of the surgical residency system there has been a much greater overall acceptance that even bedside health care is dependent on a vast system with multiple practitioners. While the surgeon must accept personal responsibility for the care he/she provides, there needs to be an understanding that this work is positioned within a complex system, with most errors being system errors.⁶²

Previously the surgical literature was sparse regarding the educational objectives served by both the structure of surgical residency and the need for exhausting work hours. Over the two decades since the enactment of regulations regarding resident work hours however there has been an outpouring of response. These responses express concern about the potential for negative impact of such regulatory limitations on surgical training. Cushing, in his discussion of training in neurosurgery, emphasized the need for experiential learning, within a strict and precise hierarchy, as he felt that the development of sound surgical judgment was dependent on

⁶⁰ John KD, Modlin IM Op Cit.

⁶¹ Bosk, Charles Forgive and Remember: Managing Medical Failure Chicago University Press Chicago 1979 pp 114, 121-122.

⁶² Consensus report To Err is Human: Building A Safer Health System released 1999 accessed at <http://www.iom.edu/Reports/1999/To-Err-is-Human-Building-A-Safer-Health-System.aspx>

prolonged experience.⁶³ More recently, a position statement by the American College of Surgeons addressing the issue of duty hour restrictions stated that “...mastery in surgery requires extensive and immersive experiences that extend over a substantial period of time. Also, the hallmark of the surgical professional is commitment to and responsibility for the continuum of care of the surgical patient. This critical sense of responsibility is inculcated in residents only through appropriate experiences that require sufficient duty hours.”⁶⁴

The post-Zion development of external regulatory oversight of surgical training has culminated in significant conflict between the ACGME and the surgical leadership, including the American College of Surgeon, the American Board of Surgery, and the Residency Review Committee. Understanding that changing the structure of the training program will result in change to the culture of the program, the surgical leadership has expressed the desire to maintain professional autonomy and control over the structure of surgical training. There does not appear to be recognition on the part of surgical leadership that the nature of surgical training and the surgeons created by this culture are valid spheres of concern for the larger society, or that surgical training may reasonably fall under the control of social policy.⁶⁵ In response to the externally imposed changes, there has been an outpouring of anger, pain and angst from the surgical leadership, including chairmen of major academic departments of surgery, and officers of major surgical organizations.⁶⁶

Josef E. Fischer, who has served as chairman of two academic surgical training programs and as an officer for several of the major surgical organizations, has written frequently on his

⁶³ Pinkus RL, Sauder R Op Cit.

⁶⁴ ACS Task Force on the Resident 80-Hour Work Week Position of the American College of Surgeons on Restrictions on Resident Work Hours Presented to the Institute of Medicine Consensus Committee 2008 Accessed at <http://www.facs.org/education/statement.pdf> on October 8th, 2012.

⁶⁵ Pinkus RL Op Cit.

⁶⁶ O'Neill Jr. JA Surgical Education: Foundations and Values. J Am Coll Surg 2009;208:653-662.

view of the mismatch between the practice of surgery and work hour reforms. He laments that although surgeons had “prized our ability to stay up nights; we functioned while fatigued and trained our acolytes to do similarly. Society has rejected that...”⁶⁷ Additionally, he notes that the 80 hour work week has generated an amazing amount of negative response from the community of surgeons, and goes on to describe this response as a personal, deeply felt “heartache” associated with unprecedented dismay and angst.⁶⁸ Interestingly, the regulations regarding work hour reform in the U.S. were preceded by resident work hour limitations in Great Britain and Germany, regulations that were instituted as those medical systems came under government control. Ironically, Germany, which served as the original model for Halsted’s development of surgical residency, had developed much tighter night call and overall work hour restrictions, limiting residents to 60 to 70 hour work weeks, at least a decade before the initial ACGME regulations in the U.S.⁶⁹

Since the late 1980’s, in anticipation of the enactment of legislation concerning resident work hours restriction in New York State, there have been a significant number of publications attempting to quantify the extent of a negative impact the work hour regulations are likely to have on postgraduate surgical education. A number of different metrics have been studied, including the number and breadth of operative cases completed during training, resident exposure to different surgical subspecialties, opportunities to see patients in the outpatient clinics, and in-service exam scores. The findings of these studies have not consistently demonstrated a negative effect of work hour limitations on surgical training as measured by these

⁶⁷ Fischer JE Abandonment. *J of Gastrointestinal Surgery* 2003;7:827-830.

⁶⁸ Fischer JE Continuity of Care: A Casualty of the 80-Hour Work Week. *Academic Medicine* 2004;79:381-383.

⁶⁹ John KD, Modlin IM Op Cit.

various outcomes.⁷⁰ While these articles often note the relatively arbitrary choice of an 80 hour work week limit⁷¹, none addresses what educational or competency goals provided the foundation for previously structuring the standard surgical residency to include at least five clinical years of training with night call every other or every third night. A relatively thorough review of the surgical literature provides very little data linking either the length or intensity of residency training to the acquisition of specific surgical skills or knowledge.⁷² Most commonly, support for the pre-Zion structure of surgical residency rests on the knowledge that it has in general “worked” to turn out an excellent product, a well trained general surgeon.⁷³ Although the authors often voice concern that the required changes are not evidence-based, their description of the residency system as a “century-old paradigm of graduate surgery education” similarly provides little evidence-based justification for the previous status quo.⁷⁴

Although all postgraduate training has been affected by the ACGME regulations, surgical residency programs have generally needed to make the most extensive changes to move from 110 hour work weeks prior to the regulations to the mandated no greater than 80 hour work weeks. Perhaps in response to the challenges involved in making these more extensive changes, and perhaps due to the conflict between the Halstedian model of professionalism and continuity of care and the work hour limitations, the response from the surgical leadership has been more extensive and more negative than that from other specialties. A recent survey of both internal medicine and general surgery program directors found that, consistent with previous work, a greater percent of surgical residency directors believed that the ACGME regulations would have

⁷⁰ Johna S Limitations in Resident Work Hours. Arch Surg 2011;146:11., Curet MJ Resident Work Hour Restrictions: Where Are We Now? J Am Coll Surg 2008;207:767-776.

⁷¹ Fischer JE Academic Medicine Op Cit., Britt LD “Halstedian 2” Residency Training. Arch Surg 2002;137:271-273.

⁷² Neumayer L Changing the Surgical Education Paradigm for the 21st Century. Am J of Surg 2012;203:282-286.

⁷³ O’Neill Jr JA Op Cit.

⁷⁴ Nauta RJ Five Uneasy Peaces: Perfect Storm Meets Professional Autonomy in Surgical Education. J Am Coll Surg 2006;202:953-966.

a negative impact on the learning environment, and on the morale of residents and faculty, without improving the safety of patients.⁷⁵

⁷⁵ Shea JA, Willett LL, Borman KR. Anticipated Consequences of the 2011 Duty Hours Standards: Views of Internal Medicine and Surgery Program Directors. *Academic Medicine* 2012;87: 895-903.

PART II

THE PERSISTENCE OF A POTENTIALLY DYSFUNCTIONAL TRAINING MODEL

Surgical residency program directors and surgical residents both anticipate that the process of residency training will result in a well-trained general surgeon. According to the standards endorsed by the American College of Surgeons, being a well-trained surgeon depends not only on the acquisition of excellent diagnostic and technical skills, but also on the incorporation of traditions and principles of surgical practice. These principles include an appreciation of the need to support the social contract between the surgical profession and society, to place the welfare of the patient above all else, and to participate in self-regulation by setting, maintaining and enforcing practice standards.⁷⁶ Residency training must therefore provide for both training in the medical and technical skills expected of the surgeon and the transmission of the ethical principles of surgical practice. Didactic teaching in surgical residency is extremely limited, especially in the more senior years of training, and adult experiential learning is stressed.⁷⁷ This is true for all of the core competencies outlined by the ACGME, including professionalism, which states that residents must demonstrate compassion, integrity and respect for others, responsiveness to patient needs that supersedes self-interest, and accountability to patients, society and the profession.⁷⁸ The surgical resident's education concerning ethics and professionalism is strongly influenced by the structure and culture within which he/she is trained. It is therefore reasonable to be concerned that the resident's work environment, including the

⁷⁶ American College of Surgeons Statements on Principles accessed on 09/02/2012 at http://www.facs.org/fellows_info/statements/stonprin.html#anchor116209.

⁷⁷ O'Neill Jr. JA Op Cit., Fischer JE Enhancing the Current Broad-Based Training System and its Necessity. *The American Surgeon* 2007;2:130-135.

⁷⁸ ACGME Core Competencies accessed on 09/02/2012 at http://www.acgme.org/acwebsite/RRC_280/280_corecomp.asp

numbers of hours at work, the intensity of the work involved, relationships with both superordinates and subordinates, and the behaviors modeled by the surgical faculty will contribute to residents' understanding of a surgeon's professional norms and ethics. If residency training remains mired in controversy about being forced to abandon features of training that, in fact, are not pedagogically grounded, and that may actually have a negative impact on the trainee, the clear transmission of the core ethical principles of surgical practice may be impeded. Revealing that some of the features of the training environment may have evolved organically, in response to the needs and behaviors of the founder of the surgical residency system may allow for a more dispassionate evaluation of what are the critical elements needed for the training of surgical residents.

Many features of the pre-Zion surgical residency structure, including the extreme work hours and the consigning of patient care to relatively unsupervised residents may have developed simply as part of the natural evolution of surgical residency, and have remained as an historical artifact. These aspects of residency training may result in a dysfunctional work environment, which presents ethical concerns related to both patient care and the residents' moral growth and emotional health. It is critical to recognize the impact that the structure and culture of surgical residency may have on many of the behaviors that are absorbed during training and that have been incorporated into the ideal surgical identity.⁷⁹ I use the phrase ideal surgical identity to describe some of the attributes that have traditionally been prized in the surgical personality. These attributes include a passion for hard work and long hours, a pride in the stress and the physicality of the job and a commitment to independence and control of the patient's care. I suggest that many of these "model" behaviors are to some extent dysfunctional, especially in

⁷⁹ Sise CB, Sise MJ Organizational Rites and Culture in a Surgical Residency Program. *Current Surgery* 1989;46:365-371., Carpenter RO, Austin MT, Tarpley JL, etal. Work-Hour Restrictions as an Ethical Dilemma for Residents. *Am J Surg* 2006;191:527-532.

today's practice environment. While these elements of surgical training may not have been developed with forethought on Halsted's part to conceal his addictions, they may still have evolved to address both his strengths and weaknesses, and this distancing from his clinical responsibilities may have suited him. Many of the traditional structures of surgical residency, including the extended hours at work at the hospital providing patient care and undertaking surgical interventions with very limited attending supervision, have been enshrined by later generations of surgical leadership as critical to surgical education and the maturation of the surgical resident, with very limited documentation in the literature of the theoretical or empirical support for these elements of training.⁸⁰ While the extended hours of care provided by surgical residents may have been more pertinent in Halsted's time, when options for patient monitoring were limited to frequent examinations by a trained observer, current medical technology has generally eliminated the need for constant bedside attendance in all but the most critically ill patients.⁸¹

While it is perhaps arguable that the extended work hours of the early cohorts of surgical residents were appropriate to meet patient needs, it is much more difficult either academically or ethically to support a system of residents performing surgery with minimal supervision, yet the surgical training culture of "see one, do one, teach one" was entrenched for decades. The practice of relatively unsupervised patient care and surgical intervention by residents may increase resident stress, and limit educational gain, as errors may not be recognized and corrected.⁸² While it is generally stated by residency program directors that residents need opportunities to learn (and unfortunately, often fail) on their own, in order to allow their

⁸⁰ Fischer JE *The American Surgeon* Op Cit. 2007., Fischer JE *Academic Medicine* Op Cit.

⁸¹ Levin R *Beyond "The Men of Steel" The Origins and Significance of House Staff Training Stress.* *General Hospital Psychiatry* 1988;10:114-121.

⁸² Chiu PPL, Hilliard RI, Azzie G, Fecteau *Experience of Moral Distress Among Pediatric Surgery Trainees.* *J Ped Surg* 2008;43:986-993.

development into mature, independent surgeons, there is sparse evidence in the literature supporting this position. It is reasonable to consider whether this is a rationalization of a cultural remnant initially established in response to the forces on the evolution of surgical residency programs, rather than a researched pedagogical plan. An alternative explanation to consider is whether this was a more reasonable style of practice decades ago when both our ability to successfully intervene in the course of surgical disease, and our view of the patient-physician relationship were much different than they are today. Regardless of its origin, this aspect of surgical residency training may be seen as dysfunctional from its inception, and was broadly eliminated in large part due to the ACGME requirements regarding supervision. Direct attending oversight of resident patient care and surgical intervention may allow both a relatively independent learning opportunity and provision of patient safety. Unfortunately, there may be staffing, economic, and academic workload issues that limit the utilization of this model.

While there is sparse evidence in the surgical literature of the need for unsupervised patient care by surgical residents to allow for adequate training and maturation, there is increasing evidence of the potential for negative effects of this practice. There is increasing evidence in the surgical education literature that surgical residents appreciate the attending surgeon's presence and teaching in the operating room. A study of operating room teaching behaviors found that residents highly valued a supportive learning climate, with calm and courteous interactions with the attending, feedback without belittling, and the demonstration of enthusiastic interest in teaching.⁸³ These valued behaviors stand in stark contrast to the teaching model provided by Halsted, whose behaviors were then modeled by subsequent generations of surgeons, creating a gap between the educational needs of residents and the teaching styles of

⁸³ Iwaszkiewicz M, DaRosa DA, Risucci DA. Efforts to Enhance Operating Room Teaching. *J of Surg Ed* 2008;65:436440.

attendings. For residents, role ambiguity and the demand to take on responsibility beyond one's ability and training may also increase stress.⁸⁴ The traditional culture of surgical residency may not be conducive to requesting help when faced with either an excessive work load or a task above the resident's skill set. In addition to the negative impact on effective teaching and patient care, the traditional "surgical" behavior and attitudes modeled by attending surgeons may influence the stress assimilated by the residents. Surgical residents may easily incorporate a model of strict self-reliance and feel a need to tough it out through stressors, rather than develop more appropriate ways of adapting to, and understanding human limitations and stress.⁸⁵

Our understanding today is that substance abuse and addiction are disease states rather than moral failings or primarily criminal activity. This framing allows for clarity in appreciating that the process of identifying and treating the impaired physician should not be punitive, but instead should aid the physician in returning to optimal professional functioning while also providing for the protection of patients. The current focus is on rehabilitation of the involved physician, recognizing the extensive resources that have already been invested in their training, and the potential contributions that they may make to society if they can be returned to health.⁸⁶ Perhaps it is reasonable to extrapolate from this example and to consider the potential for a similar process of recognizing and addressing impairment of the surgical residency training program itself (my apologies to those who would agree that corporations are not people). There are important positive aspects of surgical residency training programs. These programs have been responsible for the training of several generations of general surgeons, who have then gone on to provide significant benefits to patients and the health care system as a whole. Certainly

⁸⁴ Linn BS, Zeppa R Does Surgery Attract Students who are More Resistant to Stress? *Ann Surg* 1984;200:638-643.

⁸⁵ Levin R Op Cit.

⁸⁶ Baldisseri MR Op Cit.

rehabilitation, to address the dysfunctional elements that have become ingrained while supporting the strengths of the programs overall would be preferable to eliminating the programs. Although Halsted did not have the opportunity to receive ongoing supportive care, and relapsed into chronic substance abuse shortly after his hospitalizations, there is currently an opportunity to examine surgical residency for practices that may be similar to the addiction related behaviors of the founder, and ask if change, or rehabilitation, can be provided. A critical element for the success of any rehabilitation program is the acceptance of a need for recovery and change. For the surgical leadership to positively embrace changes in the structure of surgical residency training, there must be an acceptance of the need for change, and the potential for benefits secondary to change. There is a need to change to fulfill regulatory requirements. There is also increasing evidence of the negative impact of stress related to the surgeon's workload. As surgical residencies are required to undergo change, the ability to positively embrace and incorporate this change may benefit from a more complete and transparent understanding of the creation and evolution of surgical residency training.⁸⁷ An understanding of the weaknesses of the founder of the surgical residency system, and the possible relationship of these weaknesses to elements in the culture of surgical residency, may allow for a more open acceptance of change. To allow for growth of the profession there is a need to provide both faculty and residents the skills needed to deal with conflict related to changes in values and job demands.⁸⁸

⁸⁷ Kellogg KC, Breen E, Ferzoco SJ, etl Op Cit.

⁸⁸ Pinkus RL Op Cit.

SURGICAL CULTURE, SURGICAL IDENTITY AND THE IMPACT OF WORK HOUR REFORM

There has been a great deal written on the importance of both undergraduate and graduate medical education on the socialization process of physicians. Postgraduate education, the period of residency training, has specifically been appreciated as an opportunity for trainees to crystallize their professional identities, and incorporate and personalize this professional identity. An important aspect of this socialization process for surgical residents is the development of a sense of what is professionally right and wrong. The immersive nature of the training environment allows the resident to learn what the important elements are to incorporate into their professional identity as a surgeon.⁸⁹ A great deal of this learning is influenced by the behavior modeled by the surgeons involved in the training process. The chronic exposure to an environment that consists primarily of other surgeons, with limited opportunities to spend extended periods of time with others outside the training environment, further reinforces the adoption of behaviors modeled by the residents' superiors. The time commitment and stress of the residency may result in an erosion of residents' boundaries of their personal life, and there may be an increased dependence on the job and the interactions there for their emotional, social, and intellectual gratification.⁹⁰ These limitations may further reinforce the residents' modeling of the behaviors seen in the surgical attendings. These transmitted behaviors reside within an organizational culture of shared values and norms that help provide meaning and direction as the surgical resident progresses through the training process.

This organizational culture, the culture of the surgical residency, had been relatively stable over a period of decades, and was responsible for providing a space within which behavior

⁸⁹ Brooks JV, Bosk CL Op Cit., Sise CB, Sise MJ Op Cit.

⁹⁰ Levin R Op Cit.

could be modeled, allowing incoming trainees to incorporate a traditional surgical identity and learn and integrate the norms of their professional roles. This process allowed incoming trainees to be molded as much as possible to be similar to previous generations of surgeons, allowing for a continuity of the surgical culture. One aspect of the work environment that had been seen as critical to incorporating new trainees into the surgical culture, and critical to the surgical identity itself, had been the extended work hours expected of the surgical residents. Historically, surgical residents had routinely worked 90 to 110 hour weeks, covering call in the hospital every other to every third night, and taking pride in having the opportunity to be the hardest working physician in the hospital. The model of the iron surgeon - a deeply committed physician who thrived on hard work and adversity, and who was relatively impervious to the usual human needs such as regular meals and sleep - was incorporated into the understanding of the ideal surgical identity.⁹¹ Surgical residents have historically been expected to carry on even if fatigued, without any show of weakness.⁹²

Over time, intense training, with dedication and a strong sense of responsibility to both the patients and fellow surgeons has become a key component of surgical culture. Josef Fischer has written about the pervasive, visceral reaction of the surgical leadership to the externally imposed work hour reforms, explaining this as a reaction to a perceived attack on what he describes as a core aspect of surgical identity; dedication to continuity of care and responsibility to the patient.⁹³ In his writing, and that of others, the essential nature of continuity of care, and the time commitment it involves, to surgical culture and identity is generally accepted with little theoretical support, other than the need to provide excellent patient care. The primacy of this

⁹¹ Cassell J On Control, Certitude, and the “Paranoia” of Surgeons. *Culture, Medicine and Psychiatry* 1987;11:229-249.

⁹² John KD, Modlin IM Op Cit.

⁹³ Fischer JE *Academic Medicine* Op Cit.

concept is so accepted within surgical culture that there is no further discussion of its possible historical roots, and little discussion of alternative models for providing comprehensive, attentive, patient care. Persistent focus on the place of continuity of care within the culture of surgery may limit efforts to incorporate other mechanisms to provide quality patient care within remain on the preservation of the historic vision of surgical identity, rather than assessing new models of providing care.

By strictly limiting hours at work, the externally imposed ACGME work hour restrictions do strike at a core element of the traditional surgical identity. These changes limit the ability of the individual surgical resident to provide continuity of care to his/her patients. Additionally, due to these restrictions current residents are undergoing a somewhat different structure of surgical training than those responsible for training them. Both surgical residents and attendings see the current residency environment as less intense, and much less of a physical trial, than what had been endured by residents in the past. There has been a concern that this change in the physicality of the training process may negatively impact the ability of current residents to incorporate the traditional surgical ethos and values. The ability to work an unlimited number of hours had been seen both functionally and symbolically as important to the core of what it means to be surgeon, and this work has now been devalued and forbidden. The work hour restrictions may result in surgical residents having difficulty in taking on what has been traditionally recognized as an appropriate surgical identity. Surgical attendings, who had incorporated the traditional surgical ethos that included hard work and near continuous commitment to patients, and who valued the physical stress of their own residency training, may have trouble adapting to the new model, and accepting the current residents and recent trainees as peers.⁹⁴

⁹⁴ Brooks JV, Bosk CL Op Cit.

While work hour restrictions are not the only change in the work environment for both surgeons and surgical residents over recent decades, they were externally imposed without the opportunity for any significant modification by the surgical leadership, and, as they are very visible, they have become a focus for discussions on the meaning of professionalism in the changing healthcare milieu. Work hour restrictions, and a belief that current surgical residents are receiving a less rigorous training than in the past, raise concerns among attending surgeons and the surgical leadership about the potential for an erosion of professionalism among current trainees. The very common issue of tensions between generations within a profession may be exacerbated by these differences, with the current generation of trainees concerned that they may not be exposed to the benefits of traditional training, and the older generations of surgeons left to question the personal and professional traits they had been taught to value.

BEYOND THE REGULATIONS: THE POTENTIAL BENEFITS OF CHANGE

The literature on the impact of the work hour limitations on patient safety and surgical education is mixed, but there does appear to be a relatively consistent positive effect on quality of life measures for residents.⁹⁵ What has been less well addressed in the literature is the potential impact these changes may have on other issues that may be the product of traditional surgical culture. These issues include the surgeon's risk of experiencing emotional burnout, and the difficulties encountered in recruitment for surgical residency and the associated problem of retention of residents. There is the potential for a number of positive consequences as a result of the work hour restrictions. The traditional model of surgical residency has produced several generations of well trained general surgeons, and there are valid concerns about meeting the educational needs of surgical residents within a shortened work week. Despite this, there is

⁹⁵ Curet MJ Op Cit.

increasing appreciation of the human price paid for the stresses of this work environment. The possibility of providing appropriate training within a more humane model should be acknowledged, recognizing that new educational methods may need to be incorporated into residency training to meet this goal. It is important to understand the weight of tradition and its potential negative effect on efforts to assimilate change.

A study of surgical resident responses to work hour regulations found that many residents neutralized the effect of these limits on their identification with the traditional surgical identity by focusing on the intensity of the work, and the need for increased efficiency and organizational skills with limited work hours. These residents were able to focus on the enduring physicality and stress of the residents' work, and found that they could still identify with the traditional surgical identity. Many residents were found to have embraced the work hour limitations. These residents welcomed what they appreciated as an improved quality of life for themselves and the opportunity to have flexibility in creating their own personalized professional identity. Additionally, residents who embraced the decrease in work hours recognized the reduction would be valuable in attracting and retaining a more diverse group of physicians, who might otherwise be deterred from a career in surgery. The study did identify residents who were fearful of the changes, and what impact they may have on their training and their acceptance within the community of surgeons. While these residents welcomed an improved quality of life, they remained concerned about the potential for a loss of clinical experience. Overall, the authors stressed that by challenging the traditional norms, the work hour regulations had an important impact on the nature of surgical culture and professional identity.⁹⁶ These findings speak to the enmeshed relationship between the structure and culture of surgical residency, and the role of the residency program in instilling a surgical identity. As this culture changes, in response to shifts

⁹⁶ Brooks JV, Bosk CL Op Cit.

in the structure of residency, it is likely that the nature of the ideal surgical identity will also change. In addition to assessing the impact of work hour restrictions on patient safety, surgical education and resident quality of life, it will be important to appreciate the potential impact these restrictions and the changes residencies make to accommodate to them, may have on the incorporation of a revised surgical identity.⁹⁷ It will be important that current and future generations of surgeons are able to incorporate an identity that although different from the traditional iron-surgeon still allows them to feel accepted into the community of surgeons. This may help support mentoring and teaching from one generation to the next. An appreciation of the history and nature of traditional surgical identity, and the perceived impact of the work hour restrictions, may also be important in structuring changes that meet ACGME requirements and that are acceptable to both residents and attending. This is especially true as noncompliance with the regulations remains high.⁹⁸

Since the 1980's there has been a great deal of literature addressing the short and long term negative effects of sleep deprivation. Both acute and chronic sleep deprivation can have negative effects on mood and cognitive and motor performance. Chronic sleep deprivation can also have negative effects on long term health, with an increased risk of obesity, diabetes and cardiovascular disease. Excessive sleepiness has been linked to other personal safety concerns, such as motor vehicle collisions. Within the surgical culture there has been a strong tradition of denial of the potential negative impact of sleep deprivation and fatigue on surgical performance. Interestingly, there is evidence to suggest that sleep deprivation itself may further limit an individual's ability to assess its impact on his/her own performance. One study has found that although surgical residents worked significantly more hours per week than other residents, as a

⁹⁷ Kellogg KC, Breen E, Ferzoco SJ, et al Op Cit.

⁹⁸ Tabrizian P, Rajhbeharrysingh J, Khaitov S Persistent Noncompliance with the Work-Hour Regulation. Arch Surg 2011;146:175-178.

group they perceived sleep deprivation to have less impact on their performance. These authors found that the surgical residents believed that they needed less sleep than others, and had adapted to sleep deprivation, but they also admitted to feeling pressure to work longer hours than the regulations permitted.⁹⁹ These findings speak to the importance of work hour restrictions, and compliance with these restrictions, in helping to promote both resident and patient safety, as self regulation may not be very effective in this area. The importance of addressing the risk of workplace fatigue has been appreciated in other “industries” that require a well-developed safety culture,¹⁰⁰ and over time, with continued education and regulation, there may be better recognition within surgical culture of the great potential for positive outcomes from work hour restrictions.

An argument has been made that long hours during residency training are necessary to prepare surgeons for the long work hours they will face in practice, but this may be an example of a self-fulfilling prophecy. Residents may have assimilated the message that prolonged work hours were expected of the surgeon, and continue to follow this model after graduation. Work hour restrictions in residency may provide residents a more reasonable work model that will benefit them as a guide throughout their future practice. Finding the correct tools to provide quality surgical education and patient care within the work hour restrictions may allow surgical residents and attendings to appreciate that their demonstration of professionalism, and their surgical identity is not directly linked to working exhausting hours. As a professional, the surgeon should be primarily focused on furthering the patients’ and society’s needs, rather than his/her own. In being altruistic, the surgeon is providing an important good, quality surgical

⁹⁹ Woodrow SI, Park J, Murray BJ, et al Differences in the Perceived Impact of Sleep Deprivation Among Surgical and Non-Surgical Residents. *Medical Education* 2008;42:459-467.

¹⁰⁰ McCormick F, Kadzielski J, Landrigan CP Surgeon Fatigue A Prospective Analysis of the Incidence, Risk, and Intervals of Predicted Fatigue-Related Impairment in Residents. *Arch Surg* 2012;147:430-435.

care, to the patient, at some personal cost. But this cost must be balanced; the quality of care will likely be negatively impacted if the provider is overworked and chronically fatigued. Within this framework, one can envision a moral obligation to accept work hour restrictions.¹⁰¹ The potential negative effects of acute and chronic sleep deprivation further strengthen the moral obligation to accept work hour restrictions. The focus should be kept on providing quality care for the patient, balancing the benefits of continuity of care with patient safety, rather than fulfilling a historic professional ideal. There is no evidence that physicians as a group, or surgeons as a subgroup, have an intrinsic ability to perform at or above baseline after prolonged periods of wakefulness. There is therefore good reason to have work hour restrictions in place to help protect patients from harm, respecting the ethical principle of nonmaleficence.¹⁰² In addition to the impact on the principles of beneficence and nonmaleficence, some have argued that work hour restrictions may also support the principle of patient autonomy.¹⁰³ As chronic and acute sleep deprivation is likely to negatively impact surgical performance, it may be reasonable to consider if this information should be included in the informed consent discussion with the patient and/or their surrogate, to allow for a truly informed, autonomous decision. The institution of work hour restrictions should minimize the risk of this occurrence.

An appreciation that medical education and the practice of medicine are intertwined moral enterprises may allow the application of the principles of beneficence and nonmaleficence to both physician training and patient care. Recognition of the negative impact of sleep deprivation on the residents themselves, beyond the risk to patients, should also be understood as

¹⁰¹ Ritchie K Professionalism, Altruism, and Overwork. *The Journal of Medicine and Philosophy* 1988;12:447-455.

¹⁰² Czeisler CA Medical and Genetic Differences in the Adverse Impact of Sleep Loss on Performance: Ethical Considerations for the Medical Profession. *Transactions of the American Clinical and Climatological Assoc* 2009;120:249-285.

¹⁰³ Nurok M, Czeisler CA, Lehmann LS Sleep Deprivation, Elective Surgical Procedures, and Informed Consent. *New England Journal of Medicine* 2010;363:2577-2579.

an ethical issue. The moral climate of the surgical residents' work environment is in part dependent on its basic structural elements, including work hours and the availability of supervision. Exhausting work hours and excessive night call responsibility may have a negative impact on the residents' development of empathy and compassion, profoundly important professional traits for all physicians¹⁰⁴ On some level, it may be hard for residents to deeply care for others, including their patients, if they do not feel cared for themselves. Surgical residents in particular may feel they face a significant ethical dilemma in both reporting and working within the work hour restrictions, while trying to balance a variety of influences including internalized expectations, duty to patients, and respect for truthfulness. This tension may result in the resident under-reporting their work hours, because of significant risks to the training program associated with noncompliance with the regulations. Understanding the history and culture of surgical residency, it may be important to incorporate teaching on the necessity of truthfulness in reporting work hours in surgical training in the resident's education on professionalism.¹⁰⁵ While work hour restrictions may provide benefits to both patients and residents, incorporating these regulations into the structure of surgical education and surgical culture raises many ethical issues that will need to be addressed.

While at present the work hour regulations address only the hours worked by residents, there has also been an impact on attending surgeons. As I discuss above, the work hour regulations challenge long held beliefs of surgical culture, resulting in a distancing between older and younger generations of surgeons, with the potential for a negative impact on mentoring and training. Additionally, there is a concern that limiting resident work hours has shifted work

¹⁰⁴ Higginson JD Limiting Resident Work Hours is a Moral Concern. *Academic Medicine* 2009;84:310-314.

¹⁰⁵ Carpenter RO, Austin MT, Tarpley JL, et al. *Op Cit*.

responsibilities to attending surgeons.¹⁰⁶ Although these are very valid concerns, there is an opportunity to reframe this required change as providing potential benefit to the entire surgical community. Incorporating the concept of limiting work hours throughout the surgical community, including attending surgeons, if not by regulation then by adapting the culture of surgery, may help address some concerns facing the surgical workforce.

Surgeon stress and burnout, and difficulty in recruiting medical students to surgical residencies, have a negative impact on the overall health of the surgical workforce. The issue of surgeon stress and burnout has become an area of increasing research interest over the past decade. There has been increasing recognition that there is a fine line separating dedication from overwork. While surgeons have been trained and acculturated to work long hours without complaint, the potential effects of this chronic stress are finally being appreciated and documented. Although surgeons may believe that they are more resilient than other physicians, the norms and expectations regarding commitment that are carried on from surgical residency and the environment of the surgical workplace may place the surgeon at significant risk of overwork.¹⁰⁷ A substantial proportion of surgeons experience distress or burnout during the course of their career. Burnout is a clinical syndrome characterized by emotional exhaustion, depersonalization, and a decreased sense of personal accomplishment, often resulting in decreased effectiveness at work.¹⁰⁸ Burnout is a critical issue to study, as there are negative consequences for both the surgeon, and those with whom he/she interacts, including patients and family members. Symptoms of burnout may include emotional and physical exhaustion and poor judgment, potentially leading to ineffectiveness and patient care errors in the workplace.

¹⁰⁶ Shea JA, Willett LL, Borman KR, et al Op Cit.

¹⁰⁷ Balch CM, Freischlag JA, Shanafelt TD Stress and Burnout Among Surgeons. Arch Surg 2009;144:371-376

¹⁰⁸ Balch CM, Shanafelt TD Combating Stress and Burnout in Surgical Practice: A Review. Adv Surg 2010;44:29-47.

The literature on burnout suggests that the long hours and lack of control over the work schedule experienced during training may lay a foundation that influences surgeons to develop maladaptive responses to stress. These habits may then persist throughout the surgeon's professional life, leading to the risk of burnout and a chronic imbalance between career and personal life. A study of practicing surgeons found that 40% had either a high emotional exhaustion score and/or a high depersonalization score and were considered burned out. Professional factors that were associated with a higher risk of burnout included a higher number of nights on call per week and working more hours per week.¹⁰⁹ Burnout was not only a significant predictor of career satisfaction, but has also been linked with an increased risk of medical error, poor patient satisfaction, and medical malpractice suits. Burnout has also been associated with the decision to take early retirement and leave practice.¹¹⁰ Of even greater concern, in a large study of surgeons, both a greater frequency of overnight call and burnout demonstrated a positive correlation with suicidal ideation.¹¹¹ A similar study regarding alcohol use disorders among surgeons found that 15% of respondents had a score that was consistent with alcohol abuse and dependence. Burnout was more frequent in surgeons with alcohol abuse or dependence.¹¹²

There appears to be increasing evidence that excessive work hours and night call may play a role in surgeon burnout and associated professional and personal dysfunction. This issue is critical for both the individual surgeon and the surgical leadership in working to maintain the health of the surgical workforce. Burnout may have a negative effect on the surgical workforce

¹⁰⁹ Shanafelt TD, Batch CM, Bechamps GJ, et al. Burnout and Career Satisfaction Among American Surgeons. *Ann Surg* 2009;250:463-471.

¹¹⁰ Shanafelt TD, Sloan J, Satele D. Why do Surgeons Consider Leaving Practice? *JACS* 2011;212:421-422.

¹¹¹ Shanafelt TD, Balch CM, Dyrbye L, et al. Special Report: Suicidal Ideation Among American Surgeons. *Arch Surg* 2011;146:54-63.

¹¹² Oreskovich MR, Kaups KL, Balch CM, et al. Prevalence of Alcohol Use Disorders Among American Surgeons. *Arch Surg* 2012;147:168-174

by both decreasing professional effectiveness and increasing the incidence of early retirement. While surgical culture may traditionally prize self-denial and resilience, current studies suggest that there is a significant price to be paid for years of overwork. It is not unreasonable to suggest that although the structure and culture of surgical residency resulted in the creation of well trained general surgeons, the excessive work hours and career-life imbalance that residents and then attending surgeons were asked to adapt to have the potential for negative long term effects. Some have suggested that a restructuring of surgical education, with a new way of thinking about work-life balance, is necessary to successfully move forward with surgical training.¹¹³ In the light of acknowledging that change is required, the work hour regulations may be seen as a challenging but positive opportunity to improve the work environment for both residents and attending surgeons.

While efforts to address and minimize burnout and distress are critical to maintaining the health of current residents and attending surgeons, consistent success in recruitment into the surgical workforce is also important. Negative perception of the surgical lifestyle deters medical students from applying to surgical residencies, and also affects the retention of surgical residents. This negative perception is due in large part to the practicing surgeon's long work hours and difficult work-life balance. The dissatisfaction that surgeons' themselves may voice regarding their work hours and night call may strengthen negative perceptions and further deter medical students and resident from training in surgery. A recent survey found that the majority of surgeons believed that they worked too many hours, with a negative effect on family life. Although most of the surgeons reported that they were satisfied with their career, approximately

¹¹³ John KD, Modlin IM Op Cit., Balch CM, Freischlag JA, Shanafelt TD Op Cit.

one third of those surveyed were not able to achieve an acceptable work-life balance and would not recommend surgery as a profession to their children.¹¹⁴

There has been increasing concern expressed in the surgical literature that the surgical lifestyle, both in residency and in practice, must be improved to allow for improved recruitment into surgical residencies. Part of the concern regarding recruitment is related to the “gender gap” faced by surgery as a profession; although women make up approximately 50% of medical school graduates only 25% of surgery residents are women. This gap, along with a recent decline in interest in surgical careers among male medical students, has created an unsustainable situation regarding long term maintenance of the surgical workforce.¹¹⁵ Two issues that are critical to the recruitment and retention of surgical residents have their roots in the cultural norms that have persisted throughout the evolution of surgical residency. Although often presented as a “women’s issue”, the excessive work hours and inattention to personal life expected in the traditional surgeon’s lifestyle deters recruitment of both men and women among the current generation of medical students. There is increasing appreciation that advocacy for change from within the surgical leadership will be critical to creating a more sustainable, attractive surgical lifestyle. Negative role models may also have a significant impact on resident recruitment and retention. Abusive and/or disinterested behavior by attending surgeons, while tolerated in the past, may create a hostile work environment and negatively impact surgical education for both medical students and residents.¹¹⁶ These uncomfortable interactions may also deter students and residents from considering a career in surgery. The institution of work hour regulations, and the acceptance and incorporation of this change by the surgical leadership, may help create a more

¹¹⁴ Troppmann KM, Palis BE, Goodnight JE, et al. Career and Lifestyle Satisfaction Among Surgeons: What Really Matters? The National Lifestyles in Surgery Today Survey. *JACS* 2009;209:160-169.

¹¹⁵ Borman KR Gender Issues in Surgical Training: From Minority to Mainstream. *Am Surg* 2007;73:161-165.

¹¹⁶ Whittemore AD The Competent Surgeon Individual Accountability in the Era of “Systems” Failure. *Ann Surg* 2009;250:357-362.

welcoming and inclusive surgical culture. This may then allow for a broadening of those who may be attracted to a career in surgery and improve long term recruitment into the surgical workforce. Even though outright sexual harassment and discrimination are now recognized as unacceptable, the long work hours of residency training and surgical practice have remained a cultural barrier to many women and an increasing number of men considering the field of surgery and many surgeons trying to ascend the academic ladder. The limitations imposed by the traditional surgical work-life often resulted in the perceived need to sacrifice other personal responsibilities, such as children and family. This is now often seen by medical students and residents as an unacceptable choice to face in choosing a career. Diversifying the surgical work force has the potential to bring benefits to the field, beyond improved recruitment. A diversified work force has the potential to bring new perspectives to chronic problems faced by the field, see new opportunities for improvement and change and consider new areas for exploration.¹¹⁷

Making a career in surgery accessible to a more diverse group of applicants may not only provide benefits to the field of surgery but is also a matter of justice. Not everyone who desires to be a surgeon will have the opportunity or ability to succeed, but it is a violation of the principle of justice to limit access to what is a prestigious career based on criteria that may not speak to the ability to be a good surgeon. Limiting recruitment to those who may be willing and able to endure exhausting work hours may deny those who would become good surgeons access to the field, resulting in both a personal loss, and a loss to the profession of surgery. The incorporation of work hour reform into surgical culture may be a key step in making surgery more “humane” and accessible, but this will require that the surgical leadership is open to change

¹¹⁷ Chafetz JS Feminist Theory and Sociology: Underutilized Contributions for Mainstream Theory Ann Rev of Sociology 1997;23:97-120.

in the model of training and practice from the tradition of continuous immersion to a more researched and structured model.¹¹⁸

¹¹⁸ Frangou C Special Report Critical Mass With the Stakes High, Women May Assume Crucial Role in Surgery's Future Accessed from the Association of Women Surgeons Website @ http://www.womensurgeons.org/aws_library/CovidenCriticalMass.pdf, Evans SRT From Surgical Resident to Postdoctoral Student in Surgery JACS 2004;198:422-423.

CONCLUSIONS

The past decade has been a critical period for surgical training programs, and for the surgical workforce as a whole. The enactment of the work hour restrictions and requirements for supervision as mandated by the ACGME in 2003 has imposed an external control on a previously relatively autonomous profession. This relatively novel external regulation of the professional training environment has led to an often stated concern by the surgical leadership that residency programs will be so limited as to result in inadequately trained surgeons.

Evaluations of resident clinical exposure and test scores have not provided consistent evidence to support this concern. What is less often stated is the fear that this enforced change will strike at the core of the surgical identity. Work habits that have been maintained for decades in the surgical culture, including exhausting work hours and night call and personal responsibility for patients' continuity of care cannot be supported under the new regulations. There are clearly valid concerns that changes in the training environment may result in potentially negative changes in the end "product", the well trained general surgeon. Interestingly, the surgical literature is nearly silent on the possibility of positive opportunities arising from work hour restrictions which may include a more humane work place environment, decreased risk of burnout, and improved ability to recruit a stable, diverse surgical workforce.

While there is the potential for both negative and positive effects of the imposed work hour restrictions, I have argued in this thesis that deeply rooted aspects of the surgical culture have limited the ability of the surgical leadership to explore the possible positive aspects of this change, and hindered the potential for creative responses to the need to restructure surgical training. Certainly, many elements contribute over time to the creation of a professional identity,

but I have focused on the potential influence of Halsted's chronic addictions and associated behaviors on the structure of surgical residency, which in turn influences and guides surgical culture and the development of surgical identity. I have chosen to focus on Halsted as he was critically involved as the primary architect of the surgical residency program in the U.S., despite struggling with a decades long addiction to cocaine and morphine. In reviewing the intertwined history of Halsted and his addictions and the development of surgical residency, I have presented the possibility that many of the attributes of core surgical identity and associated norms of behavior, including the 100+ hour work week, may have evolved organically in response to Halsted's strengths and weaknesses. Although development through chance does not by itself negate the potential for effectiveness of the training process, there may be benefit in exploring this understanding of surgical culture. I argue that this framing the "iron surgeon" mentality as a historical artifact opens new opportunities in understanding the surgical identity and addressing the work hour restrictions. Rather than seeing the regulations as an attack on surgical identity, this more nuanced stance may allow a more productive incorporation of the work hour restrictions into surgical training programs and surgical culture. Acceptance of these regulations has the potential for many positive outcomes including a decrease in tension and improvement in mentorship across the generations of surgeons, improved health of the surgical workforce by helping to address sleep deprivation and burnout, and greater success in recruitment and retention with a more humane surgical lifestyle. There has been little discussion in the literature of the ethical issues associated with the new regulations, but awareness of these concerns may be important in successfully incorporating the required change into surgical training programs, and importantly, into surgical culture. The work hour regulations may help with the creation of a more ethical work place environment, a setting that respects residents and the stress they faces in

their role by attempting to moderate the physical stress of the job. While the issues of continuity of care are real and an ongoing concern, limitations on work hours may minimize the risk of errors related to the decrement in cognitive and technical skills seen with sleep deprivation. Over time, this should minimize harm and provide a benefit to patients. On a broader scale, recognition of the need to balance professional autonomy with the surgeons' fiduciary responsibilities to patients may allay concerns regarding the social controls established over the profession. My belief throughout this thesis is that a reframing of the origin of the traditional surgical identity as a historical artifact, rather than composed of elements critical to the work of a surgeon, may allow an acceptance of change in the surgical culture supporting residency training and practice, and may result in a more creative and positive embrace of the work hour regulations, with the possibility of a number of positive consequences.

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