



Notable Grand Rounds
of the

**Michael & Marian Ilitch
Department of Surgery**

Wayne State University
School of Medicine

Detroit, Michigan, USA

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THE TRAINING OF THE SURGEON

August 20, 2025

About Notable Grand Rounds

These assembled papers are edited transcripts of didactic lectures given by mainly senior residents, but also some distinguished attending and guests, at the Grand Rounds of the Michael and Marian Ilitch Department of Surgery at the Wayne State University School of Medicine.

Every week, approximately 50 faculty attending surgeons and surgical residents meet to conduct postmortems on cases that did not go well. That “Mortality and Morbidity” conference is followed immediately by Grand Rounds.

This collection is not intended as a scholarly journal, but in a significant way it is a peer reviewed publication by virtue of the fact that every presentation is examined in great detail by those 50 or so surgeons.

It serves to honor the presenters for their effort, to potentially serve as first draft for an article for submission to a medical journal, to let residents and potential residents see the high standard achieved by their peers and expected of them, and by no means least, to contribute to better patient care.

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The Training of the Surgeon

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Note: This paper is an abridged version of the author's presentation at Surgical Grand Rounds at the Michael and Marian Ilitch Department of Surgery, Wayne State University School of Medicine.

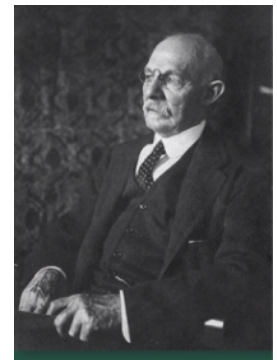
Introduction

This essay is about surgical training: what Halsted built, how scientific publishing and promotion incentives now shape what we call “literacy,” what the work-hour era has actually changed, and why the keystone—graduated autonomy—has eroded and must be rebuilt.

Halsted's Inheritance—Model, Principles, and Culture

William Halsted (1852–1922)—Johns Hopkins chief (from 1890) and co-founder of its medical school—created the first American residency: hierarchical, pyramidal, without a guaranteed end date, culminating in effective independence for the “single resident at the top.” The Halstedian surgical principles (gentle tissue handling, preservation of blood supply, strict asepsis, minimal tension, accurate apposition, obliteration of

dead space, meticulous hemostasis) replaced the earlier valorization of speed. His program institutionalized “see one, do one, teach one” at high velocity; during Halsted's absences for addiction treatment, residents ran the service—an early proof of deep autonomy. The model diffused nationally between the 1930s–1950s, tempered by funding constraints and the GFT (“general fund transfer”) realities that standardized fixed-length residencies.



William Halsted

Halsted also articulated a training triad: (1) scientific study of surgical disease; (2) intense, constant training and availability; and (3) graded responsibility toward independence. Those three pillars remain the right scaffold—but they require honest, twenty-first-century adaptations.

Scientific Literacy Under Pressure: Volume, Incentives, and Predation

The “scientific basis” pillar labors under exponential growth. Historical bibliometrics show phase changes in publication growth: <1% annually (ca. 1600–1750), 2–3% (1750–1930s), and ~8–9% (1930s–2010). In biomedicine, expansion is heavily weighted toward lower-evidence designs (case reports/series, cross-sectional, retrospective cohorts) with a slower rise in randomized trials; review genres (guidelines, narrative/systematic/umbrella reviews, and network meta-analyses) have also surged. The denominator of “what the trainee should know” expands while the day remains 24 hours.

Career incentives amplify the load. Across specialties, advancement criteria still hinge on “productivity” and funding (e.g., R01-level awards), so publication counts become proxy targets. Meanwhile, scientific publishing is extraordinarily profitable: Elsevier reported >\$900M profit with ~36% margins (2010); Wolters Kluwer’s health segment showed ~26% margins (2021). Expenses are low because authorship, peer review, and much editorial labor are unpaid, while reading and publishing often incur fees—especially in open-access venues.

Predatory journals exploit this ecology. They solicit aggressively, charge high APCs, promise (and often fake) “expedited review,” repurpose or acquire journal brands for legitimacy, and collectively publish on the order of hundreds of thousands of articles yearly. Survey data of those listed as “editors” show 40% were unaware of their status; only one-third of authors could define a

predatory journal; the very low survey response rates are themselves consistent with fabricated contact lists. Trainees and junior faculty—whose careers are tied to output—become captive to quantity-over-quality pressures unless programs explicitly teach appraisal, venue selection, and publication ethics.

Even at the entry gate, publication expectations creep upward. In urology, matched applicants in 2021–2023 reported a mean 3.65 publications, with 47% listing at least one first-author urology paper; gastroenterology fellowship applicants at one center rose from a mean 3.17 publications (2009) to 12.65 (2018). At promotion, typical criteria still emphasize independent major-grant funding and multiple first/senior-author papers at associate level, escalating to sustained national/international excellence for full professor. These thresholds help preserve rigor, but they also strengthen the gravitational pull toward “publish anyway,” exactly where predatory models flourish.

Constant Training and Human Limits: From “Heroics” to Systems

Halsted’s second pillar—intense, constant training—collided with what we now know about impairment, risk, and well-being. Mid-century residents took in-house call three of four nights for \$50/month; by the 1970s, residents went on strike to move from q2 to q3 call. Parallel evidence accumulated: physicians had markedly higher narcotic addiction rates than the general public, took twice the sedatives/tranquilizers/stimulants in long-run cohorts, and died by suicide at distressing rates (with hundreds documented in obituary data from the 1960s and again between 2003–2017, ~10% surgeons). High-profile contemporaries who disclosed suicidality faced punitive reflexes (e.g., mandated rehab, removal from practice), illustrating how “sick doctor statutes”

can preemptively sideline clinicians even without evidence of impaired judgment or patient harm.

The 1984 death of Libby Zion crystallized public concern. The Bell Commission's recommendations emphasized on-site attending coverage in EDs, tighter supervision for juniors, limits on resident hours, pharmacy automation for drug–drug contraindications, and restraint standardization—policy seeds for the ACGME limits that followed: the 2003 80-hour week (with one day off in seven and 24-hour shifts), the 2011 intern cap at 16 hours (later rescinded), and the 2017 consolidation at 80 hours averaged over four weeks, with 24+4 for transitions. Early critiques argued “no evidence” linked sleep deprivation to errors, predicted diluted professionalism, and warned of lost continuity and experience; the deepest worry was a shift from calling to clock-punching.

What changed? Early syntheses showed no clear safety gains and posited noncompliance, unfunded mandates, and handoff hazards. Newer meta-analysis shows mortality improvements in some contexts, with mixed changes elsewhere; surveys repeatedly found improved resident well-being; randomized comparisons still register perceived losses in professionalism tied to handoffs and “ownership.” The current task isn't to re-argue whether medicine is a calling; it's to build systems where ownership persists across handoffs and where fatigue mitigation doesn't mean abdication.

Graduated Autonomy—Trends, Outcomes, and Practical Models

If preparedness is uneven, hours alone are an incomplete explanation. Across ~1 million VA cases (2004–2019), “resident as primary” has declined across specialties, including general, thoracic, vascular surgery, orthopedics, ENT, and urology. Fellowship directors perceive the effects downstream: in general surgery, substantial fractions of incoming fellows are rated unprepared to

take call, to operate independently for 30 minutes, to suture or recognize complications, or to complete research; in pediatric urology, 26% of program directors reported graduates who didn't meet all four surgical milestones, and 43% of recent graduates didn't feel they met them. Predictors of milestone attainment are unsurprising: psychologically safe learning environments, learner-centered instruction, skills practice with coaching.

Access consequences are not theoretical. Pediatric subspecialists cluster in urban, academic centers (e.g., ~52% in medical-school-affiliated hospitals; ~84% urban, ~1.7% rural). Families drive hours (mean ~4.75 in West Virginia) and spend significant out-of-pocket per visit; wait times at major children's hospitals stretch months; time-sensitive transfers (e.g., testicular torsion) increase orchiectomy risk when delayed. A training system that consistently produces surgeons hesitant to practice without big-center scaffolding becomes an access problem.

Crucially, outcomes justify supervised independence. In rigorously matched VA cohorts, mortality and length of stay do not differ for resident-primary versus attending-primary cases; attending-primary or attending+resident cases can have higher complication rates, and median operative time differences are small (on the order of minutes). When residents run structured, faculty-adjacent minor-procedure clinics, complication and satisfaction rates match attendings' while resident confidence rises. Accreditation and payment frameworks already support graduated oversight (direct for critical portions; indirect with immediate availability otherwise). The conclusion is not to throttle autonomy but to design for it.

From Watching to Doing (and Teaching)

Observation alone is not training. Repeated watching can inflate confidence without building competence. The durable loop is:

observe → *plan* → *act* (with appropriately titrated supervision) → *reflect* → *iterate* → *teach*.

As seniors progress, attendings should increasingly be “barely involved but fully present,” stepping in for clearly defined portions and then cycling back to resident-led performance. Teaching what one has just mastered fixes learning and transmits standards.

Professional Identity Without Generational Myths

The discourse around work-hours often devolves into generational tropes—“snowflakes,” “soft,” “uploading beach pics at 3 a.m.”—sometimes even in print. But research on “generationalism” shows these are ancient, recurring biases: memory bias (projecting one’s current competence backward) and expertise bias (assuming one’s knowledge is universal). Modern professionalism should be framed by career phase, not cohort caricature: what a PGY-1 needs differs from what a chief needs; expectations, feedback, and autonomy should map to that curve. Unrealistic ideals—physicians as a breed apart whose heroics never waver—erode empathy and hasten burnout; team-based professionalism, with visible accountability to patients and colleagues, preserves ownership without nostalgia.

Conclusions

Halsted’s triad still scaffolds excellent training, but each pillar needs deliberate modernization:

- *Scientific study*: teach appraisal and publication ethics explicitly; mentor toward reputable venues; resist predation; recognize how promotion criteria shape behavior.
- *Intense, constant training*: design schedules and handoffs that preserve ownership; reject the hero myth; attend to well-being without shrinking experience.
- *Graduated autonomy*: measure and intentionally expand the value of operative time; use resident-run clinics and structured independence; align supervision with accreditation standards and outcomes data.

The aim is not to resurrect a nineteenth-century residency. It is to produce twenty-first-century surgeons—scientifically literate, team-accountable, and confidently autonomous—who deliver excellent care in Detroit and Boston, and for families five hours from the nearest children’s hospital.

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References

- Zhao X, Jiang H, Yin J, Liu H, Zhu R, Mei S, Zhu C-T. Changing trends in clinical research literature on PubMed database from 1991 to 2020. *Eur J Med Res.* 2022;27(1):95. doi:10.1186/s40001-022-00717-9. PMID: 35725647; PMCID: PMC9208110.
- Sun J, Mavrogenis AF, Scarlat MM. The growth of scientific publications in 2020: a bibliometric analysis based on the number of publications, keywords, and citations in orthopaedic surgery. *International Orthopaedics (SICOT)*.2021;45:1905–1910. doi:10.1007/s00264-021-05171-6.
- Holzman IR, Barnett SH. The Bell Commission: ethical implications for the training of physicians. *Mt Sinai J Med*.2000;67(2):136–139. PMID: 10747369.
- Horwitz LI. Why have working hour restrictions apparently not improved patient safety? *BMJ.* 2011;342:d1200. doi:10.1136/bmj.d1200. PMID: 21427045; PMCID: PMC3230111.
- Weaver MD, Sullivan JP, Landrigan CP, et al. Systematic review of the impact of physician work schedules on patient safety with meta-analyses of mortality risk. *Jt Comm J Qual Patient Saf.* 2023; Epub Jul 7. doi:10.1016/j.jcjq.2023.06.014.
- Stamp T, Termuhlen P, Miller S, Nolan D, Hutzel P, Gilchrist J, Johnson RM. Before and after resident work hour limitations: an objective assessment of the well-being of surgical residents. *Curr Surg.* 2005;62(1):117–121. doi:10.1016/j.cursur.2004.09.013. PMID: 15708162.
- Sucharew HJ, Simmons JM. Better rested, but more stressed? Evidence of the effects of resident work hour restrictions. *Acad Pediatr.* 2012;12(4):335–343. doi:10.1016/j.acap.2012.02.006. Epub 2012 May 22. (Auger KA, Landrigan CP, Gonzalez del Rey JA, Sieplinga KR noted on slide.)
- Anjaria DJ, Kunac A, McFarlane JL, Oliver JB. A 15-Year Analysis of Surgical Resident Operative Autonomy Across All Surgical Specialties in Veterans Affairs Hospitals. *JAMA Surg.* 2022;157(1):76–78. doi:10.1001/jamasurg.2021.5840.
- Oliver JB, Kunac A, McFarlane JL, Anjaria DJ. Association Between Operative Autonomy of Surgical Residents and Patient Outcomes. *JAMA Surg.* 2022;157(3):211–219. doi:10.1001/jamasurg.2021.6444.
- Wojcik BM, McKinley SK, Fong ZV, Mansur A, Bloom JP, Amari N, Hamdi I, Chang DC, Petrusa E, Mullen JT, Phitayakorn R. The Resident-Run Minor Surgery Clinic: A Four-Year Analysis of Patient Outcomes, Satisfaction, and Resident Education. *J Surg Educ.* 2021;78(6):1838–1850. doi:10.1016/j.j-surg.2021.04.003. Epub 2021 Jun 4. PMID: 34092535.
- Jaeger CD. The Pediatric Urology Fellowship Experience with the Surgical Ability Milestones. Master's thesis, Harvard Medical School, 2022. (SPU Fall Congress 2022 results noted.)
- Cohen AJ, Patino G, Kamal P, Ndoeye M, Tresh A, Mena J, Butler C, Washington S, Breyer BN. Perspectives From Authors and Editors in the Biomedical Disciplines on Predatory Journals: Survey Study. *J Med Internet Res.*2019;21(8):e13769. doi:10.2196/13769. PMID: 31471960; PMCID: PMC6743260.

