



EDUCATION

HOW SHOULD WE TRAIN ARTHROPLASTY SURGEONS IN 2023?

DISCLOSURES

- CORIN Ltd- Apollo Robotic TKA platform

DISCLOSURES

Father



Kids I eat table prepared fresh guacamole made from the freshest ingredients with

Attending



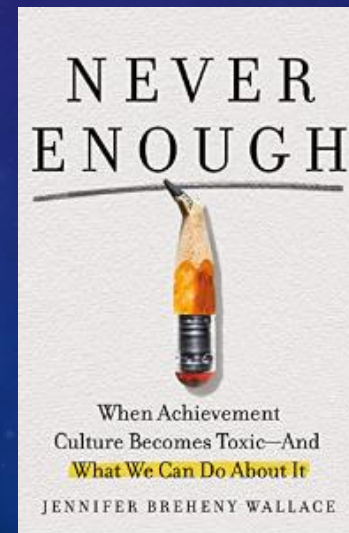
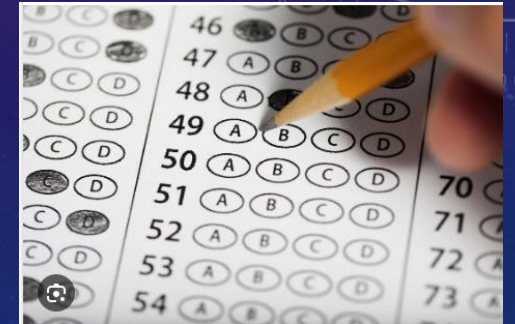
Kids I eat gorditas, chalupas, nachos bell grande w/ cheese and sour cream shot from a gun with

Teaching in Orthopaedic Surgery: Effective Strategies for Educating the Modern Learner in a Modern Surgical Practice

Alexander Koo, BA, Bryan Aristega Almeida, BA, Jona Kerluku, BS, Brian Yang, MD, and Duretti Fufa, MD, FAOA

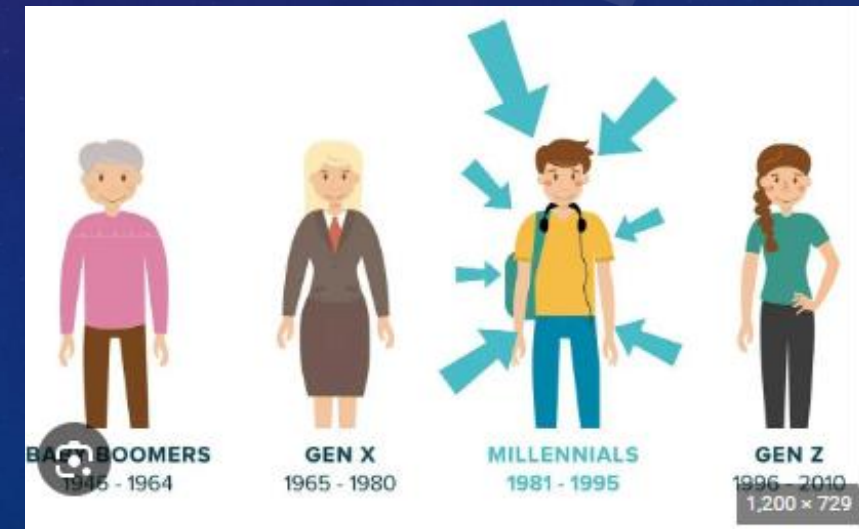
NEW WORLD- RAISING/EDUCATING A CHILD

- Smartphone accessibility
- Departure from standardized tests
- AI/Chat GPT
- Culture of Achievement



NEW WORLD- TRAINING/EDUCATING A RESIDENT/FELLOW

- Smartphone accessibility
- Departure from standardized tests
- AI/Chat GPT
- Growth of technology
- Duty hour regulations
- COVID
- Generational differences



“SEE ONE, DO ONE, TEACH ONE”



WHAT & HOW?

What?

- Technology
- Cementation
- Critical Analysis of Literature
- Financial considerations
- Resilience/ Wellness



How?

- APPs
- Robots
- IR/VR/AR
- Video based lectures
- VBAs
- KSB/GRITs

WHAT?



TECHNOLOGY- ROBOTS

- 70% residents exposed to rTKA during training
- 29% believed robots improve outcomes, 21% disagreed, 50% unsure
- >50% believed robots used primarily for marketing purposes
- 45% believed robotics improved their understanding of the procedure
- 25% felt it compromised their training w/ conventional instruments

Proceedings of The Knee Society 2022

The Impact of Robotic-Assisted Total Knee Arthroplasty on Resident Training

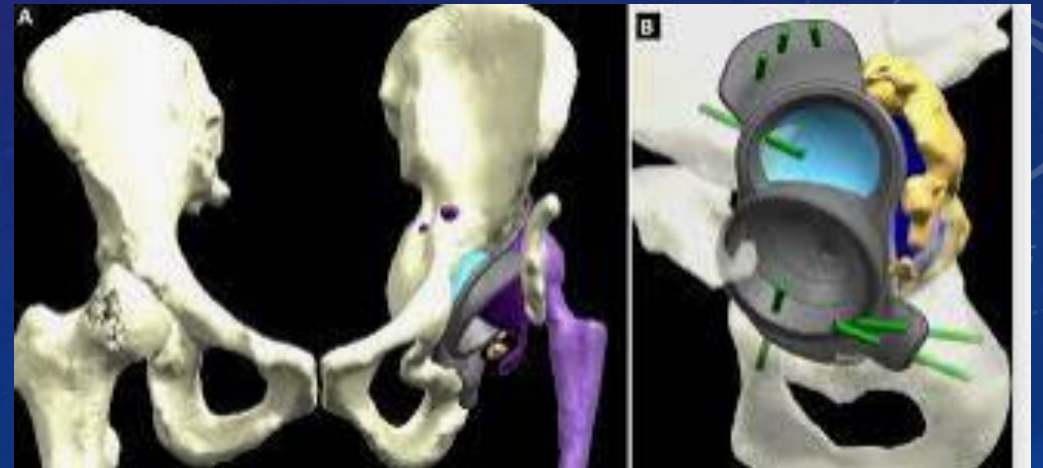
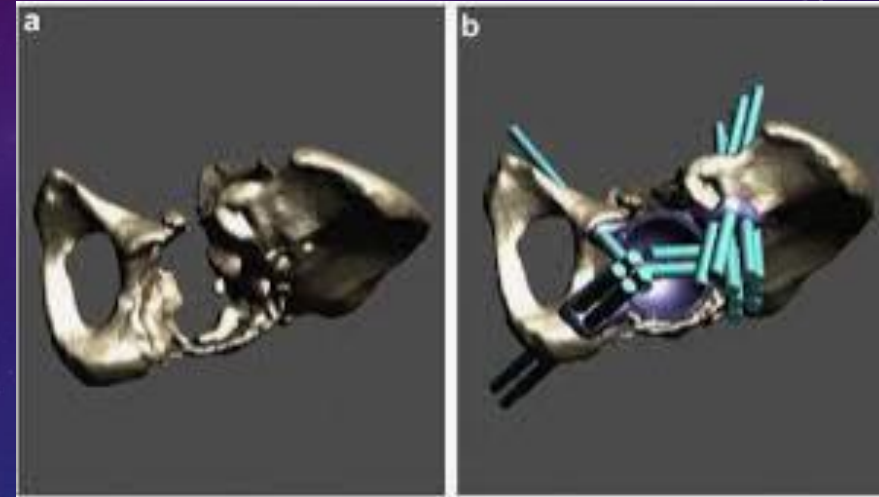
Ian M. Duensing, MD ^a, Wells Stewart, MD ^a, Wendy M. Novicoff, PhD ^a, R. Michael Meneghini, MD ^{b,c}, James A. Browne, MD ^{a,*}

The Journal of Arthroplasty 38 (2023) S227–S231



TECHNOLOGY- CUSTOM IMPLANTS

- Relatively rare cases w/ massive acetabular bone loss
- Surgical planning requires multidisciplinary team w/ engineers and implant reps
 - create a plan & implant that will be feasible/ durable



CEMENTING STEMS

- 90% anticipated they would be performing hemiarthroplasty in their future practice
 - 1/5 planned to go into Arthroplasty
- Only 37% felt their training w/ cement technique to be very/comprehensive
- 40% felt less than satisfied w/ their training
- 17% reporting training was inadequate or non-existent

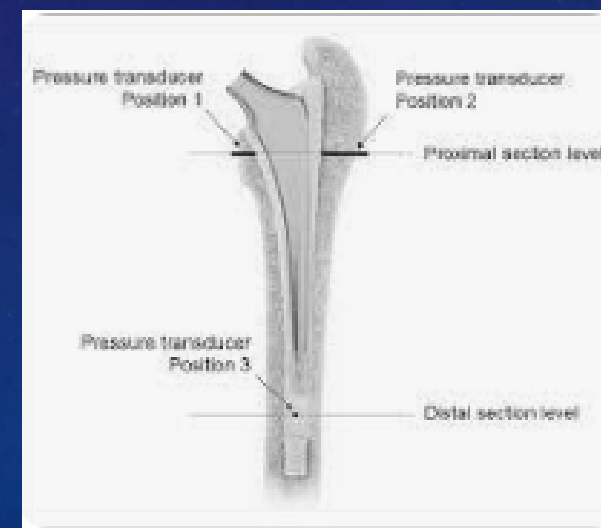
Proceedings of The Hip Society 2021

Are We Training Surgeons to Cement a Femoral Component in Hip Arthroplasty? The Trainees' Perspective

J. Conner Ryan, MD ^a, Ian M. Duensing, MD ^a, Wendy M. Novicoff, PhD ^a, James A. Browne, MD ^{a, *}


^a Department of Orthopaedic Surgery, University of Virginia, Charlottesville, Virginia

The Journal of Arthroplasty 37 (2022) S536–S539



CRITICAL ANALYSIS OF LITERATURE

Editorial: Should Orthopaedic Residents Be Required to Do Research, or Would Critical Reading Programs Be a Better Use of Their Time?

 Leopold, Seth S. MD¹

- In 2020, 116 orthopaedic journals
 - ↑50% in past 5yrs
- ACGME resident requirement-complete 1 publishable paper by graduation
- No similar standard for journal clubs
 - JAMA “User’s Guides to the Medical Literature”
 - ClinOrthop.org “Peer Reviewer Tool”



Clinical Orthopaedics and Related Research 480(6):p 1025-1027, June 2022.

FINANCES- PERSONAL

- Trainees often have significant debt-> stress
 - 76% had >\$200,000 in student loans (Garrett Med Educ Online 2022)
- Formal education on financial literacy lacking
 - 42-79% of residents felt they had 'below average' understanding of finance, investing and savings
 - 79-95% agreed that it should be taught during residency
- Topics to consider: managing debt, retirement planning, and business of medicine

The Case for Needed Financial Literacy Curriculum During Resident Education

Arianna L. Gianakos, DO,^{*} Scott D. Semelsberger[†], Ali Al Saeed[‡], Charles Lin, MD,[§] Jennifer Weiss, MD,^{||} and Ronald Navarro, MD^{||}

Journal of Surgical Education • Volume 80/Number 4 • April 2023




FINANCES- DEVELOPING A PRACTICE

- First major, independent decision
- Very little formal curriculum dedicated to this topic
 - Comparing contracts
 - Understanding documentation, coding, and billing
 - Choosing the 'right' partners

REVIEWS: TRAINING ROOM

An Orthopaedic Surgeon's Guide to Billing and Coding





Rozell, Joshua C. MD;  Lin, Charles C. MD, MS; Skeeahan, Christopher D. MD



RESILIENCE

- Developed characteristic that propels one to personal & professional success
- Distinct from burnout and wellness-curriculum
- Dynamic trait that should be built during training & fortified in practice-to take on overwhelming challenges faced in future

Resilience in Residency and Beyond

 Dove, James H. MD;  Kutschke, Michael J. MD;  Fadale, Paul D. MD;  Akelman, Edward MD

JBJS Reviews 11(6):e22.00242, June 2023.



HOW?



APPS

- Smart Phone Chat Apps (SPCA)
- Facilitates efficient communication and educational opportunities
- Real time discussion of pre-op planning and surgical decision making
- Effective case log and online library
- Develop emotional maturity through self reflection and self criticism

Smart Phone Chat Apps for Teaching and Assessment in Orthopaedic Residency Training

Lavadia WT¹, MD, Sana EA², PhD, Salvacion MS³, DMD

Malaysian Orthopaedic Journal 2023 Vol 17 No 1

(a) ADULT ORTHO: Oct-Dec...

Resident 1	Sharing his reflections of the case: What went well What to do differently next time?	
<p>Good pm!</p> <p>Postop case: 64/M</p> <p>Diagnosis: Surgical site infection; COM tibia left, s/p 2nd stage Masquelet (10/16/2019)</p> <p>Procedure: Debridement + application of antibiotic cement spacer ICD- M86.662 CPT- 11044</p>	<p><u>What went well?</u> The team was able to do good exposure and adequate debridement. Undue soft tissue tension was avoided by extending the previous incision proximally and distally.</p>	<p><u>What to do differently?</u> The team initially had problems in bleeding due to venous congestion probably due to inappropriate pneumatic cuff size. Appropriate cuff size and pressure should always be kept in mind.</p>

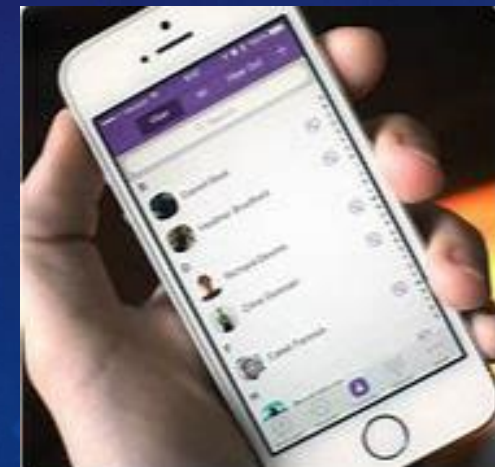
(b) ADULT ORTHO: Oct-Dec... ADULT ORTHO: Oct-Dec... ADULT ORTHO: Oct-Dec...

Showing intra-operative findings and his case log in the PBO e-logbook



Purulent material over the bone graft

With antibiotic cement spacer



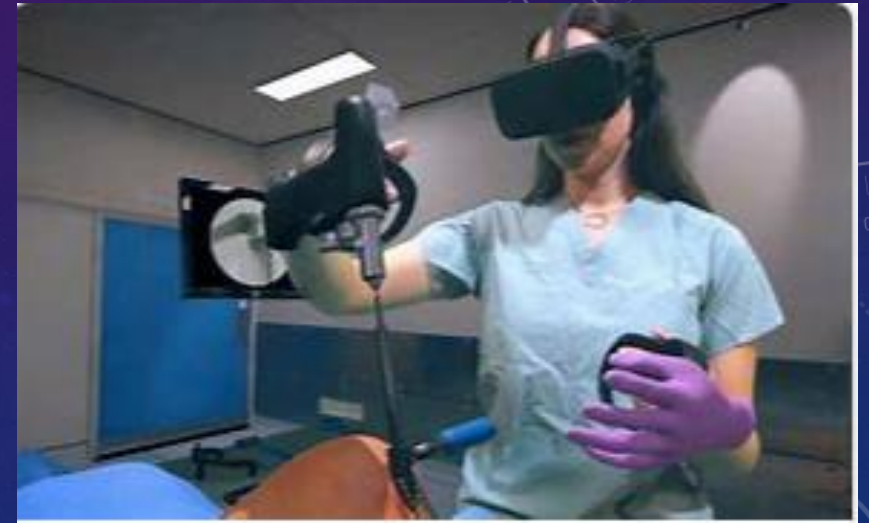
TECHNOLOGY- ROBOTS/ SENSORS

- Planning software provides incredibly detailed information
- Iterative adjustments to component alignment, size, and rotation->
 - effects on gaps/ balance/forces across the knee



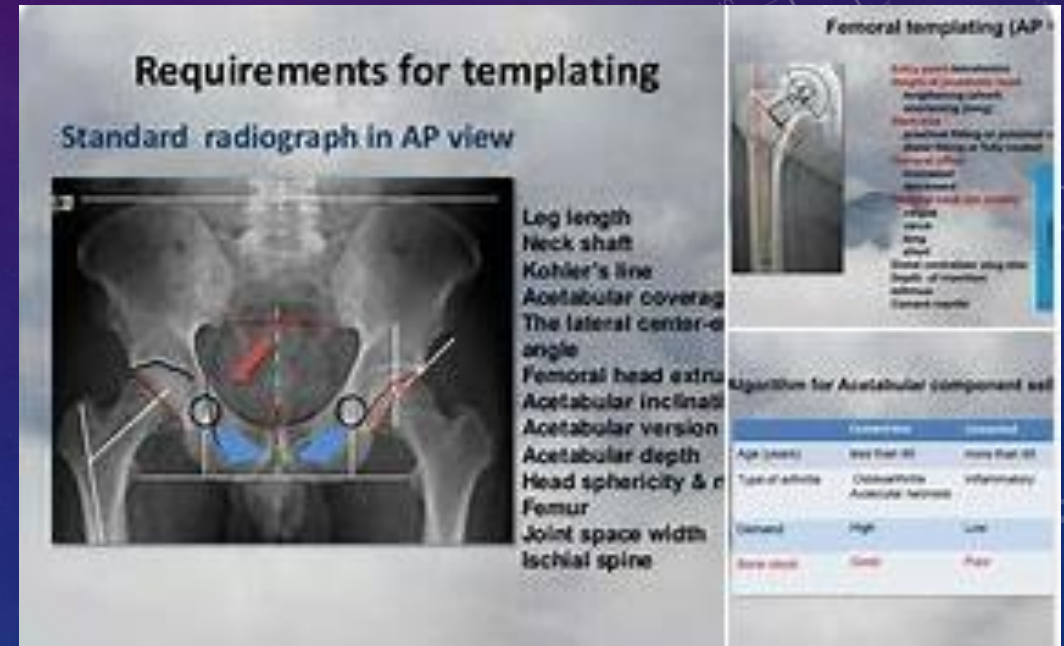
VIRTUAL /IMMERSIVE REALITY

- Ability to practice technical skills
 - Without risking harm to patients
 - Cheaper than cadaveric training resources
- Multiple studies demonstrating efficacy in acquiring skills
 - VR vs cadaver lab for revTSA (Crockatt JBJS Open 2023)
 - VR vs technique guide for UKA (Barry JAAOS 2022)
- Self reported- valuable – to the trainees
- Need for improvement in/ expansion of software modules



VIDEO BASED- TEACHING

- Ubiquitous since pandemic
- Asynchronous, allowing flexibility
 - Distinct sites
 - Different learning styles
 - Repetition/review
 - Preparation for the OR
 - a la VuMedi surg technique videos
- Time/effort effective for the educator



VIDEO BASED- ASSESSMENT

- Ability to assess global performance and/or specific skills, reassess missed points during live assessment, and a good coaching tool
- Allows for detailed constructive feedback, asynchronous assessment time, anonymous assessment, multiple assessors
- **Limitations-** poor AV quality, questionable feasibility for assessing readiness for practice

Video-based assessment (VBA) of an open, simulated orthopedic surgical procedure: a pilot study using a single-angle camera to assess surgical skill and decision making

[Obaid Al-Hubaishi](#), [Troy Hillier](#), [Megan Gillis](#), [William Oxner](#), [Andrew Trenholm](#), [Glen Richardson](#), [Ross Leighton](#) & [Andrew Glennie](#) ✉



GRITS

- Global Index for Technical Skills
 - Previously validated for Gen Surg residents
- ABOS & RRC recently mandated surgical simulation skills training (17 modules)
- Determined that it is valid, practical, and reliable in evaluation of Ortho residents,
- Correlates to performance in OR
- Considered valuable to residents

Respect for Tissue				
1	2	3	4	5
Frequent unnecessary force on tissues or caused damage by inappropriate use of instruments		Careful handling of tissue but occasionally caused inadvertent damage		Consistently handled tissue appropriately with minimal damage to tissues
Time and Motion				
1	2	3	4	5
Many unnecessary moves		Efficient time/motion but some unnecessary moves		Clear economy of movement. Maximum efficiency
Instrument Handling/Knowledge				
1	2	3	4	5
Tentative/awkward moves or inappropriate use		Competent use of instruments, occasionally awkward		Fluid moves with instruments. No awkwardness
Flow of Operation				
1	2	3	4	5
Frequently stopped, seemed unsure of next move		Some forward planning, reasonable progression		Obviously planned course, effortless flow
Knowledge of Specific Procedure				
1	2	3	4	5
Deficient knowledge. Required specific instruction at most steps		Knew all important steps of operation		Demonstrated familiarity with all steps of operation
Use of Assistants (if applicable)				
1	2	3	4	5
Consistently placed assistants poorly or failed to use		Appropriate use of assistants most of the time		Strategically used assistants to best advantage at all times
Communication Skills				
1	2	3	4	5
Frequent problems working with team or fails to communicate		Appropriate communication with team most of the time		Co-ordinates surgical team in a superior manner
Depth Perception (Laparoscopic Procedures Only)				
1	2	3	4	5
Constantly overshoots, swings wide, slow correction		Some overshooting but quick to correct		Accurately directs instruments in correct plane
Bimanual Dexterity (Laparoscopic Procedures Only)				
1	2	3	4	5
Uses only one hand, poor coordination between hands		Uses both hands but does not optimize their interaction		Expertly uses both hands to provide optimal exposure

KSB

- Knowledge Skills Behavior (ABOS)
- 11 domains scored 1-5
 - Knowledge of steps, technical performance, visuospatial skills, efficiency and flow-> global assessment
- Free text feedback

11:26
Mail
Dr. Erik Hansen ABOS Skills
Assessment (OP-Score) of Dr. Ramesh Ghanta for 9/25/2023 7:30 AM Primary Total Hip Arthroplasty

4 (of 11) Knowledge of Specific Procedural Steps: Understands steps of procedure, potential risks, and means to avoid/overcome them

☐ 1: I had to do.
☐ 2: I had to talk them through.
☐ 3: I had to prompt them from time to time.
☒ 4: I needed to be in the room just in case.
☐ 5: I did not need to be there.

Previous Next

Definitions

abos.org

11:28
Mail
Dr. Erik Hansen ABOS Skills
Assessment (OP-Score) of Dr. Ramesh Ghanta for 9/25/2023 7:30 AM Primary Total Hip Arthroplasty

10 (of 11) Global Evaluation

☐ Novice
☒ Low Intermediate
☐ High Intermediate
☐ Competent - requires only supervision
☐ Advanced Expertise

Previous Next

Novice

Attending surgeon provides maximum assistance. Demonstrates knowledge of anatomy. Demonstrates basic operative skills (e.g., incision, excision, wound closure). Positions

abos.org

11:29
Mail
Dr. Erik Hansen ABOS Skills
Assessment (OP-Score) of Dr. Ramesh Ghanta for 9/25/2023 7:30 AM Primary Total Hip Arthroplasty

11 (of 11) Feedback to Resident
(600 character limit)

Improving use of both hands in coordinated fashion for surgical approach. Able to safely place initial

Previous Submit

abos.org

CLOSING THOUGHTS



FINANCES- COST EFFECTIVE CARE

- 60% of healthcare costs are influenced by decisions physicians make
- >70% of programs reported faculty do not receive formal training on cost effective care
- 83% noted residents are not provided adequate access to info and education regarding costs
- Residents queried for cost containment opportunities-> selected to undergo cost savings analysis (Chen JBJS Open 2023)
 - Eliminating unnecessary PT/OT- \$8.6M/yr
 - Conserving reusable drill bits- \$2.2M/yr

Healthcare spending was approximate 20% of US GDP

Encouraging and incorporating trainee feedback in cost reduction strategies will have positive impact

Teaching of Cost-Effective Care in Orthopaedic Surgery Residency Training

A Survey of Residency Programs in the US

Morgan Hadley, MD, Achraf Jardaly, MD, Kyle Paul, MD, Brent Ponce, MD, FAOA, Brent Wise, MD,
Joshua Patt, MD, FAOA, and Kimberly Templeton, MD, FAOA

JBJS Open Access • 2023:e22.00111.

