

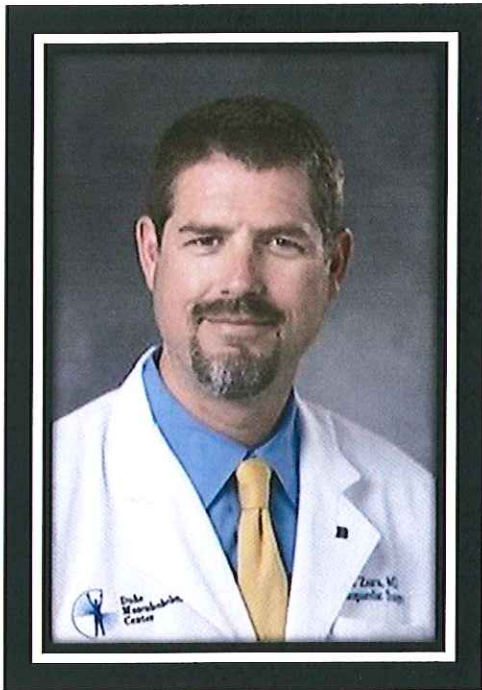
LSU Health
NEW ORLEANS



**DEPARTMENT OF
ORTHOPAEDIC
SURGERY**

**13TH ANNUAL ROBERT D. D'AMBROSIA
LECTURESHIP AND RESEARCH DAY**

JUNE 18, 2016



Robert Zura, MD
Department Head
Department of Orthopaedic Surgery

Welcome and thank you for joining us on this day of celebration of the graduation of our chief residents (Drs. Whatley, Bliss, Rose, and Perry) and our pediatric orthopaedic fellow (Dr. Patel). It is bittersweet to see them go, but it gives us great pride to watch them progress in their careers and to become members of our tremendous alumni.

We commemorate this day with our research presentations. And while this may seem incongruous, it reflects our core mission. Our mission is to care for the people of Louisiana, to educate the next generation of physicians and teachers, and to discover. These five, outstanding, young physicians represent the highest achievement of these goals.

Dr. Bliss, from Dallas, Tx. will present his and Dr. Krause's work on: *Does Insurance Status Affect the Management of Acute Clavicle*

Fractures? Ryan will continue his training in hand and upper extremity at NYU.

Dr. Perry, from Baton Rouge, La. will present his research on the: *Cost Analysis of Primary Arthrodesis vs ORIF of Lisfranc Injuries*. Brian will continue his training in foot and ankle in Tampa Florida at the Florida Orthopaedic Institute.

Dr. Patel, from Borsad, India, will present his and Dr King's work on: *Comparison of Radiographic Outcomes of Patients with Adolescent Idiopathic Scoliosis (AIS) Using Conventional Rod Contouring vs. Pre-operative Surgical Planning and Using Patient Specific Rod*. Dr. Patel will pursue another fellowship in Pediatric orthopaedic surgery in Minneapolis.

Dr. Rose, from NOLA, will discuss his and Dr. Dasa's work on: *Regional Analysis of Opiate Prescriptions for Outpatient Upper Extremity Procedures*. Next year, James will do his fellowship in hand and upper extremity at the University of New Mexico in Albuquerque.

Finally, Dr. Whatley, from Monroe, La. will present his and Dr. Lalonde's work on: *Effect of Lymphedema Treatment on Acute Pilon Fractures*. John is heading off to Minneapolis as well to do his trauma fellowship.

We are fortunate to have two guests with us today as well, Dr. Michael Murphy, Professor of Engineering at LSU will discuss: *A Mechanical Engineer's Perspective of Orthopedic Surgery*.

Finally, Dr. Andy Burgess, who is known and respected by each one of us is joining us from Houston as our visiting professor. Dr. Burgess is the Godfather of orthopaedic trauma and has impacted in one way or another the career and lives of everyone in the room whether it be through his teachings, his mentorship, his discoveries, his development of the current model of trauma care, or by making you and your loved ones safer tonight on your car ride over here. He will regale us with two talks. One will be: *Auto Safety and Orthopaedic Injuries: Two Decades of Progress*. And our day will conclude at my request with Dr. Burgess giving our team his John Border lecture that he gave at the OTA: *Long Term Careers in Orthopaedic Trauma; System Design and Career Development*.

We are blessed and honored to have had the opportunity to work with and teach and learn from these young men. And we are thrilled to have Drs. Murphy and Burgess visit.

Robert Zura, MD

Schedule of Events

- 7:30 am- 8:00 am Continental Breakfast**
- 8:00 am - 8:05 am **Vinod Dasa, MD/** Director of Orthopaedic Research
Introduction
- 8:05 am - 8:10 am **Robert Zura, MD/** Department Chairman
Opening Remarks
- 8:10 am - 8:55 am* **Andrew Burgess, MD /** Vice Chairman of Orthopedic Surgery,
Chief of Orthopedic Trauma, and Professor in the Department of
Orthopedic Surgery at the University of Texas Medical School
Auto Safety and Orthopaedic Injuries: Two Decades of Progress
- 9:00 am - 9:10 am* **Ryan Bliss, MD /** Chief Resident
*Does Insurance Status Affect the Management of Acute Clavicle
Fractures?*
- Faculty Advisor: Peter Krause, MD
- Fellowship: Hand and Upper Extremity at New York University
New York, NY
- 9:15 am - 9:25 am* **Brian Perry, MD /**Chief Resident
Cost Analysis of Primary Arthrodesis vs ORIF of Lisfranc Injuries
- Faculty Advisor: Michael Hartman, MD
- Fellowship: Foot & Ankle at Florida Orthopaedic Institute
Tampa, FL
- 9:30 am - 9:40 am* **Viral Patel, MD /** Fellow
*Comparison of Radiographic Outcomes of Patients with Adolescent
Idiopathic Scoliosis (AIS) Using Conventional Rod Contouring vs. Pre-
operative Surgical Planning and Using Patient Specific Rod*
- Faculty Advisor: Andrew King, MD
- 9:45 am - 10:00 am BREAK
- 10:00 am - 10:10 am* **James Rose, MD /** Chief Resident
*Regional Analysis of Opiate Prescriptions for Outpatient Upper
Extremity Procedures*
- Faculty Advisor: Vinod Dasa, MD
- Fellowship: Hand and Upper Extremity at University of New Mexico
Albuquerque, NM

10:15 am - 10:25 am*

John Whatley, MD / Chief Resident
Effect of Lymphedema Treatment on Acute Pilon Fractures

Faculty Advisor: James Lalonde, MD

Fellowship: Ortho Trauma at Hennepin County Medical Center
Minneapolis, MN

10:30 am - 11:00 am*

**Michael C. Murphy, PhD/Professor of Mechanical Engineering-
LSU**
A Mechanical Engineer's Perspective of Orthopedic Surgery

11:05 am - 11:35 am*

Andrew Burgess, MD
*The John Border Lecture: Long Term Careers in Orthopaedic Trauma;
System Design and Career Development*

11:40 am - 11:45 am

Closing Remarks

*Denotes there will be 5 minutes of Q & A followed by the presenter's talk.

**Refreshments provided by:

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Does Insurance Status Affect the Management of Acute Clavicle Fractures?

Ryan Bliss, MD; Arthur Mora, PhD; Peter Krause, MD

Objectives:

Acute clavicle fractures are a very common orthopedic problem, representing at least 2.6% of all fractures. The management has evolved over the past decade with a trend from nonoperative to operative management. However, there is still debate in the orthopedic community about the proper indications for surgery. The purpose of this study is to evaluate whether insurance is an unrecognized factor that plays a role in determining whether a patient receives surgery. We hypothesize that insured patients are more likely to receive operative care, compared to the uninsured or underinsured.

Methods:

A retrospective, cross sectional analysis was performed using the Healthcare Cost and Utilization Project (HCUP) data for Florida in the year 2010. Discharge level data from emergency departments and ambulatory surgery settings were used to identify clavicle fractures by ICD-9 codes 81000, 81002 and 81003. Internal fixation was identified using the CPT code 23515. Clavicle fractures that did not result in a CPT code of 23515 were assumed to have been managed nonoperatively. Multivariate logistic regression, allowing for intragroup correlation among surgeons, was utilized to determine the influence of payer source on treatment modality adjusting for race, age, number of chronic conditions, and gender.

Results:

In total there were 7,858 clavicle fractures that met criteria for inclusion. Observations were removed from the analysis if there was missing personal demographic data or if the ability to track patients from the emergency department to follow-up care was not possible. Therefore, the final sample consisted of 5,185 clavicle fractures of which 233 received internal fixation (4.5%). The odds of a patient with private insurance receiving internal fixation was 7.58 times (95% CI=4.04,-14.21], $P<0.001$) greater than a self-pay patient, all else being held constant. Patients defined by "other" sources of coverage, a group that includes worker's compensation, CHAMPUS (military), CHAMPUSVA (veterans) or other government insurance other than Medicare and Medicaid were also associated with an increased likelihood of receiving internal fixation by a factor of 6.80 (95% CI= 3.15,14.64, $P<0.001$) relative to self-pay patients, all else being held constant. The likelihood of patients with Medicare or Medicaid receiving internal fixation did not differ statistically from self-pay patients.

Conclusion:

Patients with any form of insurance, when compared to the self-pay, Medicare, and Medicaid populations, have a higher likelihood of operative intervention. As there continues to be debate about management of clavicle fractures, this study suggests that an underlying factor that determines whether a patient receives operative care may be payer source or the patient's ability to pay. Future areas of inquiry could examine why insurance has this effect and whether insurance status plays a role in surgical decision-making in other orthopedic injuries and diseases.

A Cost Analysis of Primary Arthrodesis versus ORIF of Lisfranc Injuries

Brian T. Perry, MD, Karim A. Meijer, MD, Michael W. Hartman, MD

Background:

The integrity of the Lisfranc joint, or tarsometatarsal joint complex, is imperative to normal foot biomechanics and function. Current literature is inconclusive as to whether primary arthrodesis versus open reduction internal fixation (ORIF) is the superior treatment option for all Lisfranc injury variants.

Questions/Purposes:

The purpose of our study was to determine if there was an optimal treatment option based on a cost analysis as viewed from a single payer perspective. We hypothesized that primary arthrodesis would have less of a financial burden given the higher reoperation rate seen with ORIF.

Methods & Materials:

Two Level 1 randomized, prospective controlled trials and 1 retrospective cohort review were identified directly comparing the two treatment options. A decision tree analysis was used to look at the data from each primary treatment option as well as any secondary surgeries patients incurred. Surgical costs were based on 2016 Medicare rates and adjusted to better reflect private insurance rates. We assembled two decision tree models to account for the variation in facility reimbursement rates based on if the surgery was performed in an ambulatory surgery center or a hospital outpatient setting. One- and two-way sensitivity analysis was then applied to our model to reflect variation in costs and reoperation rates.

Results:

Based on the decision tree model, the expected cost for ORIF was \$18,612.66 compared to \$19,803.17 for primary arthrodesis in the hospital setting. A difference of \$1,190.51 which decreased to only \$51.53 in the ambulatory surgery center setting. However, after one- and two-way sensitivity analysis was applied, the model revealed small percentage changes in surgical costs or secondary surgery rates could alter the expected outcome in favor of primary arthrodesis.

Conclusions:

Given the narrow difference in projected costs of the two treatment paths and the susceptibility of the model to flip with only small percentage changes in surgery costs and secondary surgery rates, we believe our financial analysis supports surgeon discretion for determining the optimal surgical solution for each unique Lisfranc injury pattern without unreasonable financial burden on the payer.

Key Words:

Cost analysis, economic analysis, decision tree, tarsometatarsal joint complex, Lisfranc

Level of Evidence:

Economic Level III

Opiates Prescribed for Outpatient Upper Extremity Surgery: A Quantitative Regional Analysis

James C Rose, MD, Devin Bourgeois, BS, Vinod Dasa, MD

Background:

Management of pain in the postoperative setting is a challenge for the practicing orthopaedic surgeon. Balancing the need for pain control with an awareness of the growing rate of addiction and mortality from opiate prescription drugs (OPDs) is a task that is increasingly urgent. There are no national prescription guidelines to establish a reference standard of prescription quantities for routine outpatient surgery. This study examines regional OPD prescription levels in order to form a published baseline of current prescribing behavior.

Methods:

A retrospective review of all adult patients undergoing one of 12 common outpatient upper extremity procedures was conducted using an electronic medical database of multiple regional academic centers. All outpatient OPD prescriptions received by each surgical patient on the day of surgery and for 90 days postoperatively were converted to morphine equivalents (MEs) and summed to give each patient a total OPD dose. The patient data was analyzed by surgery type as the primary measurement, as well as by age and gender.

Results:

After exclusion criteria were applied, 1,601 patient records were analyzed and the total MEs tabulated. The most commonly performed procedure was carpal tunnel release, followed by open reduction and fixation (ORIF) of the distal radius and ORIF of the metacarpals. The procedure with the highest mean 90-day dose of OPDs prescribed was also carpal tunnel release (905 MEs), followed by distal radius ORIF (713 MEs). Females and patient aged > 35 years were found to have been prescribed more MEs ($p < 0.05$). The patients in the top 5% of total MEs prescribed were analyzed as a separate data group; they were found to represent more than 20% of the total MEs prescribed and were predominantly middle-aged, female, and undergoing carpal tunnel release.

Conclusions:

This paper establishes a regional "snapshot" of OPD prescribing habits, both to serve as a current practice guideline and also to illustrate potential targets to reduce the quantity of OPDs prescribed. Per our data, carpal tunnel release patients are routinely prescribed the equivalent of 90 pills of 10mg oxycodone for a relatively simple soft tissue release over a 90-day postoperative course. Preoperative counseling about realistic pain expectations, especially for elective procedures such as carpal tunnel releases, and non-narcotic therapeutic measures to reduce postoperative pain may prove to be effective strategies to combat the ongoing OPD epidemic.

Level of evidence: IV

Effect of Lymphedema Treatment in Management of Acute Pilon Fractures

John M. Whatley, MD; Danielle Tatum, PhD; James A. Lalonde, MD
Craig C. Greene, MD; Kevin B. Riche, MD

ABSTRACT

Background: Patients who have suffered a length-unstable pilon fracture are typically staged with an external fixator to stabilize the ankle until the surrounding soft tissue is amenable for surgery, which can be more than 2 or 3 weeks. We sought to determine the effect(s) of lymphedema treatment in the management of pilon fractures. We hypothesized that patients who received lymphedema treatment would exhibit reduced time to surgery compared to those who did not.

Methods: Adult patients (≥ 18 years) who underwent open reduction internal fixation (ORIF) of pilon fractures between admit years 2005-2014 were identified by Current Procedural Terminology (CPT) codes indicative of placement of an external fixator (CPT code 20690) and by a CPT code for ORIF of a pilon fracture (CPT code 27826, 27827, or 27828). Receipt of lymphedema treatment was determined by physical therapy and physician notes.

Results: Eighty-two patients with 84 ankle pilon fractures were included. Forty-eight (57%) ankles received lymphedema treatment. There were no significant differences in population demographics between the control and treatment groups. Median times to internal fixation in the control and treatment groups were 20 days (IQR 15.5-30) and 11 days (IQR 6-18), respectively. This difference was statistically significant ($p = 0.001$). Additionally, there was no significant difference in the incidence of overall wound complications between the control and treatment groups ($p = 0.246$).

Conclusions: Lymphedema treatment of acute pilon fractures significantly decreased the median time to internal fixation by nine days. Importantly, this therapy did not result in more wound complications than the conventional approach. These promising results warrant future prospective study.

Level of Evidence: Level IV; Retrospective review

Comparison of radiographic outcomes of patients with Adolescent Idiopathic Scoliosis (AIS) using conventional rod contouring vs. pre-operative surgical planning and using patient specific rod.

Patel Viral, M.D.; Heffernan Michael, M.D.; Lindsey Felicia, PAC; ^{King} Andrew, M.D.

Background

There are lots of research is available which suggest that clinical outcome of patients with spinal surgery is directly related to the post-operative spinal sagittal balance. To best of our knowledge, very minimal publications are published on preoperative surgical mapping and patient specific pre-bend rod use for adolescent idiopathic scoliosis for better spinal sagittal balance correction.

Questions/purposes

Our aim is comparing radiographic spinal sagittal balance in conventional rod bending vs. pre-operative surgical mapping and patient specific pre-bend rod in pre-operative and post-operative radiograph.

Patients and Methods

One Hundred and forty-five patients who underwent posterior spinal instrumentation and fusion between November 2012 and February 2016 at a single institution and by a single surgeon were reviewed. Of these, 58 met our inclusion criteria of AIS, index procedure, pre-operative x-rays and post-operative x-ray and 87 patients excluded from our study. Of these, 29 patients had pre op surgical planning and pre-bend rod used (UNID rod Group) and 29 patients had conventional rod contouring intra-operatively (Non-UNID rod Group). Demographic, surgical, neurological and radiographic data were retrospectively reviewed on all patients.

Results

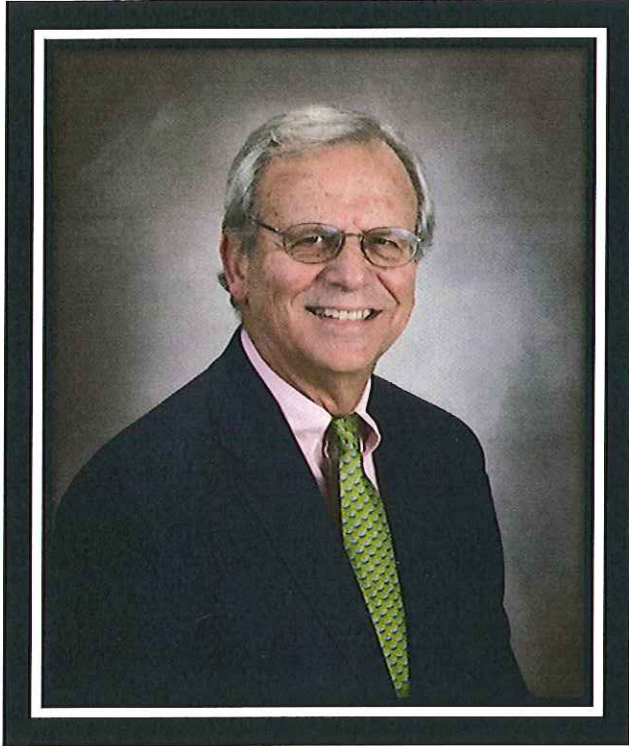
The median age of the patients in UNID rod Group was 14 years (range 12-11 years). There were 9 males and 20 females with median BMI was 19.81. The median age of the patients in Non-UNID rod Group was 15 years (range 10-20 years). There were 4 males and 25 females with median BMI was 19.89. In UNID rod Group, mean estimated blood loss was 37.88 ml per level fused, mean operative time was 19.71 minutes per level fused and mean number of level fused was 10.24. In Non-UNID rod Group, mean estimated blood loss was 42.42 ml per level fused, mean operative time was 21.6 minutes per level fused and average number of level fused was 9.48. UNID rod patients' average time per level fused is 1.89 minutes less as compare to Non-UNID rod Group which is statistically significant. UNID rod Group patients' average blood loss per level fused is 4.54 ml less as compare to Non UNID rod Group which is statistically significant. Both Group patients had same neurological exam post-operatively as compare to pre-operative neurological exam. Change in the spino-pelvic parameters from pre-operative xrays to post-operative xrays is compared between both Groups. UNID rod Group patient's change in spino-pelvic parameter, thoracic kyphosis, lumbar lordosis, cobb angle correction, truncal shift and sagittal vertebral axis is not statistically significant as compare to Non UNID rod Group. There were three complications in from of scar revision, postoperative pneumothorax and Early PJK of all patient and complication rate is 5.17%.

Conclusions

Pre surgical planning and pre bend rod method in AIS patients as similar sagittal spine correction as compare to conventional rod contouring patients group. Also pre surgical planning and pre-bend rod method do save operative time but do not have any effect on blood loss during surgery as compare to conventional rod contouring method.

Level of Evidence

Level IV, Case series



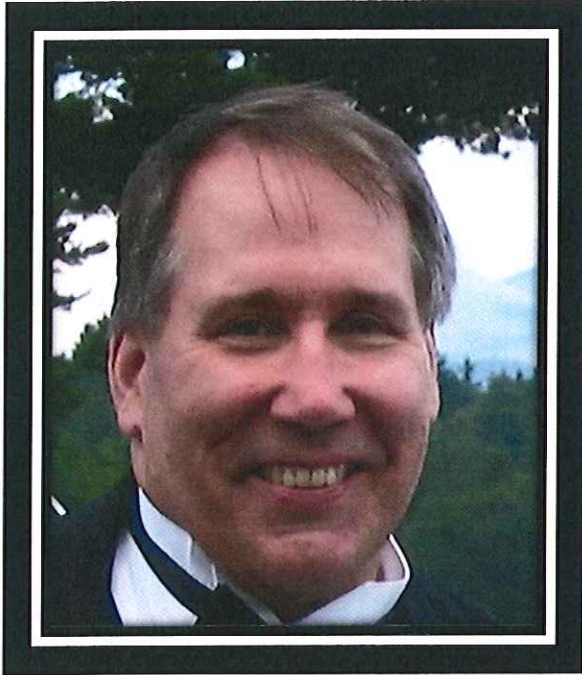
Dr. Andrew R. Burgess
Professor and Vice-Chairman of the
Department of Orthopaedic Surgery
University of Texas Medical School at
Houston, Chief of Orthopaedic
Trauma

Dr. Burgess received his medical degree from Albany Medical College in New York, where he also completed his orthopaedic residency training. He completed trauma fellowships at the Shock Trauma Center at the Maryland Institute for Emergency Medical Services System in Baltimore, Maryland, and a second AO Trauma Fellowship in Chur, Switzerland.

He has been active in crash injury research and motor vehicle design, and was a leader of University of Maryland's CIREN (Crash Injury Research and Engineering Network) center. He has been selected as a Landstuhl Scholar to educate staff and participate in the care of our wounded warriors at Landstuhl Regional Medical Center, Germany, 2007 and 2011.

Dr. Burgess is a founding member and past President of the Orthopaedic Trauma Association (OTA). He is a member of numerous medical societies and committees. His affiliations include the Motor Vehicle Safety Research Advisory Committee and The American College of Surgeons, where he also served on the Committee on Trauma. He was named in "Best Doctors in America", first elected in 1992. He has won "teacher of the year" awards at Johns Hopkins University, the University of Maryland and Orlando Regional Hospital.

Dr. Burgess is board certified by the American Board of Orthopaedic Surgery.



Michael C. Murphy, PhD
Professor of Mechanical
Engineering-LSU

Michael Murphy, a Roy O. Martin Lumber Co. Professor of Mechanical Engineering at Louisiana State University in Baton Rouge, received the BS degree in Mechanical Engineering from Cornell University in 1977 and an MS in Aeronautics from Caltech in 1978. Between 1978-1985 he was with the Missile Systems Group of Hughes Aircraft Company in Canoga Park, CA as a member of the technical staff and staff doctoral fellow. He received his PhD from MIT in Mechanical Engineering in 1990 and spent the next two years as an instructor for design there, before joining the Department of Mechanical Engineering at Louisiana State University in Baton Rouge in 1992. He spent 1992-1993 as a visiting scientist at the Institut für Mikrostrukturtechnik at Forschungszentrum Karlsruhe (IMT-FzK). At LSU, he helped establish the microsystems research facilities and program. In 1995, he was awarded an NSF CAREER proposal for work in medical applications of microsystems. He spent his sabbatical in 2005 at the Center for Engineering in Medicine with Dr. Mehmet Toner.

Professor Murphy's research is focused on biomechanics and biomedical applications of microsystems. Based on experiments with marker arrays mounted on skeletal pins and the skin, his group has shown that knee kinematics vary depending on the task and that skin markers do not accurately represent skeletal kinematics. They have used robotic workspace tools to model the passive constraints in the knee. They have demonstrated passive ultrasonic stress sensors, tools for arthroscopically testing cartilage health, and modular micro-/nanofluidic systems. The work on modular systems addresses the factors affecting the limits of modularity and includes work on the use of passive alignment structures in polymer devices ($< 12 \mu\text{m}$), thermal isolation of temperature zones in stacked and planar modules, highly parallel micro-titer plate formatted systems with microfluidic reactors at each well location, demonstration of gasketless seal technology, two phase flow for high throughput, and high flow rate capture of target cells ($750 \mu\text{L}/\text{min}$). His group has also pioneered novel tools for assembling multi-scale polymer microfluidic systems. These have been applied to a diverse set of biomedical applications including CTC capture, rapid thermal reactors for mutation detection using PCR/LDR, and the characterization of the type of stroke.

Department of Orthopaedic Surgery



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