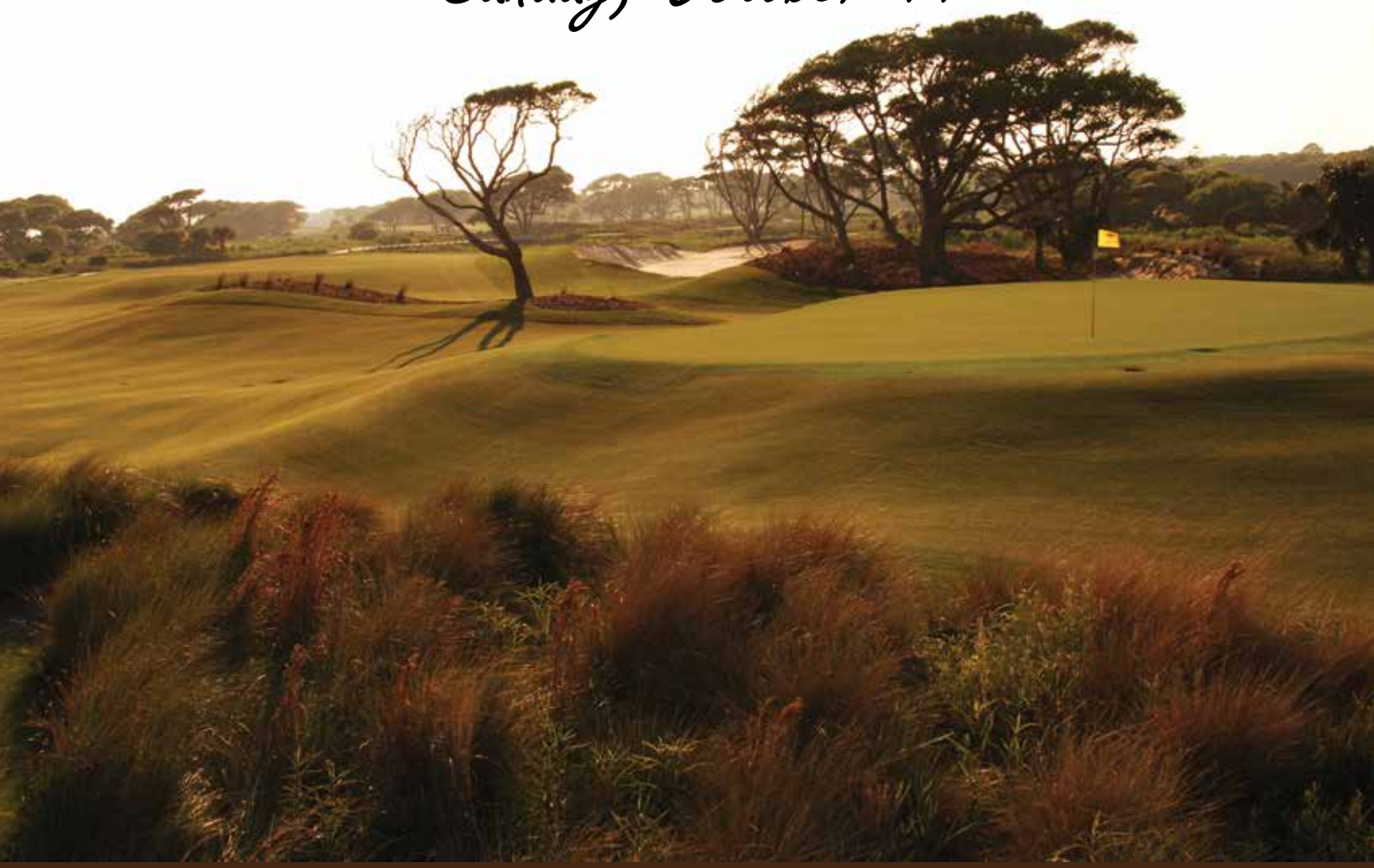
North Carolina Orthopaedic Association

2015 Annual Meeting

Closing Session

Sunday, October 11



October 9-11, 2015 • Kiawah Island Golf Resort

Kiawah Island, South Carolina

This continuing medical education activity is jointly provided by the NCOA and the Southern Regional Area Health Education Center

New Technologies for Total Joint Replacement

Ralph A. Liebelt, MD

Triangle Orthopaedic Associates

New Technology

Dynamic Balancing

Modified Instrumentation for Conventional Surgery

Robotics and Navigation

Patient-Specific and customized implants

3-D printing

Dynamic Balancing

Orthosensor: balancing based on direct recording of pressures within the the tibial trial insert

Requires partnering with the major vendors to manufacture their inserts with the technology

Issues of additional cost , implementation and utility

Very useful as a training tool

Dynamic Balancing

Tissue Guided Surgery

TGS/ Mirror Unicompartmental Arthroplasty

Off of a standard tibial resection a tensor directs a router to prepare the contour of the femur to obtain isometry of the collateral throughout the arc of motion

Latest generation of instruments currently being released

Extensive clinical experience by one surgeon, Jerry Engh with excellent clinical results

Robotics/Navigation

Active

Semiactive

Passive (traditional navigation)

NFC (Navigated Freehand Bone Cutting)

Robotics/Navigation

Passive (traditional navigation)

When part of a robotic system requires no active role for the computer

Clearly demonstrated to reduce outliers, improved accuracy and precision

Very little clinical data which suggests improved outcomes….Does alignment correlate with outcomes?

Useful for extra-articular deformity and retained hardware where conventional techniques may be compromised

Many systems gathering dust at this point

Passive Navigation

GPS- Exactech

Infrared sensors, improved registration with a multitude of algorithms for workflow including gap-balancing

Reasonable cost

Implant specific

Accuracy and precision validated

Clinical studies on-going

Active Robotics

ROBODOC now ThinkSurgical

CASPAR

A few legacy systems

Active Robotics

Some systems have been around for 20 years, including about 25 in use in Europe

Adoption has been spotty

Thinksurgical has reworked the preoperative and intraoperative paradigm

Now available for THR and soon for TKR

Other platforms will be forthcoming

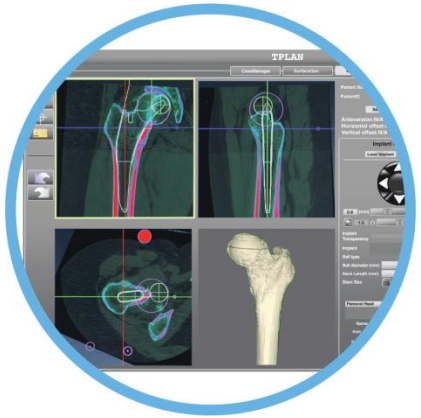
Creative ways to recapture upfront costs

Clinical data showing improved outcomes still lacking

Active Robotic Surgical Workflow

CT Scan
Patient

TPLAN
Pre-Surgical Planning



TCAT
Active Implementation

Core Technology TKA Results

More accuracy in limb alignment[1,2,3,4,5,6,7,8]

Less post-operative bleeding[6,7]

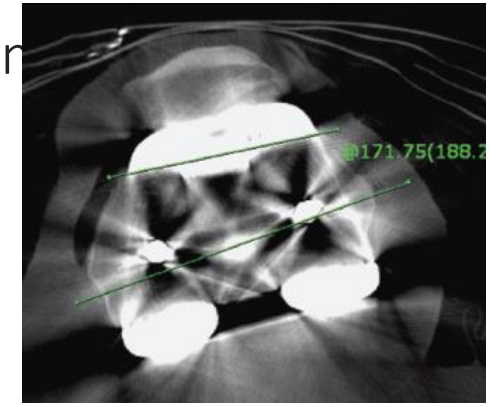
- Active Robotics: 613 ± 318 mL
- Conventional: 933 ± 467 mL

Improved flexion-extension gaps[6]

- Active Robotics: 6% (flexion gap – extension gap) > 2mm,
- Conventional: 20% (flexion gap – extension gap) > 2mm

More accurate transverse plane femoral rotational alignm

- Active Robotics: range 0.02° to 1.15° (mean: 0.52°)
- Conventional: range 0.32° to 4.13° (mean: 2.76°)



Core Technology THA Results

No intraoperative femoral fractures[12]
- Active Robotics: 0/75
- Conventional: 5/71

Improved implant-bone interface contact[9]
- Active Robotics: 96%
- Conventional: 21%

Superior proximal loading and decreased stress shielding[10]

Better anteroposterior alignment and vertical seating[11]

Less leg length variance[12]
- Active Robotics: range 0-12mm
- Conventional: range 0-29mm

Active Robotic **Conventional**

Semiactive Robotics

MAKO RIO – haptic for Uni knee, THR and soon TKR

Acrobat Sculptor

PFS Blue Belt – for Uni knee

MAKO

Uni knee- Medial, Lateral, Patellofemoral and Bicompartmental

Total Hip Replacement- Available for Anterior and Posterior approaches

Soon Total Knee replacement

MAKO- Clinical Summary

Robotic THR cohort had Higher HHS, Lower dislocation rate… total 300 THR, one surgeon

Robotic cup placement more accurate than fluoroscopically guided

BMI did not affect results of Uni knee and cup placement in 2 separate studies

Robotic THR learning curve did not increase clinical complications

Multiple studies showing very low revision rates, both early and late

Some early studies suggesting improvement in clinical outcomes compared to traditional Uni

Blue Belt- PFS

Imageless registration

All controls in the cutter

Less bulky platform

Cost reduction

Open platform

Navigated Freehand/ Smart-tools

Based on preop 3-D imaging or computer navigation

Open platform

Potential lack of tactile feedback or issues with cutting eburnated bone

Likely less expensive

Somewhat patient specific

Many of these systems will be launched over the next couple years

Robotics- Advantages

Improved implant placement and sizing

Precision and accuracy

Some may reduce OR time (eg THR MAKO)

Allow a great deal of latitude in developing the surgical plan

Some clinical studies which suggest reduced early complications related to technical issues

With THR we now have a tool to allow us to begin to study how to customize cup orientation, combined anteversion etc for the patient. Rather than a “safe zone” we could orient based on sagittal alignment, spine issues, ligament issues, etc

Robotics- Disadvantages

Cost, cost, cost….

Potentially steep learning curve

Additional personnel in the OR, setup time, instruments

Implant specificity, closed platforms, but conventional implants

Mechanical or electrical failures, plans for backup

Preop imaging…radiation, cost, ect

Cannot correct for a flawed preop plan

Patient Specific-Custom Implants

PSI has been around for many years with variable adoption

Cost savings questionable

Clinical Outcomes not definitively improved

The addition of a custom implant makes this potentially truly patient specific

Why Customized Implants?

Understanding Principle Drivers of Dissatisfaction

Early Implant Failure

- Leg alignment
- Poly wear
- Implant engineering

Early failures only 1-2%, but significant when they occur

Residual Pain

- Component fit
- Internal rotation of the femur/tibia

10-15% of TKA patients have clinically significant residual pain[1,2]

Compromised Function

- Limited range of motion & stiffness
- Knee instability
- Proprioception

Dissatisfied patients report that their knee does not feel normal at more than 2x the rate of satisfied patients[3]

[1] Brander VA et al. Predicting total knee replacement pain: A prospective, observational study. *Clin Orthop Relat Res*. 2003;416:27-36.

[2] Katz JN et al. Association Between Severe Pain in the Early Months Following Total Knee Replacement and Functional Outcomes Over Five-Year Follow-Up. *World Congress of OA*. Abstract 80.

[3] Noble PC et al. Patient expectations affect satisfaction with total knee arthroplasty. *Clin Orthop Relat Res*. 2006;452:35-43.

Mechanical Alignment

Bal et al., JOA 2014

Contents lists available at ScienceDirect

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org

Improved Radiographic Outcomes With Patient-Specific Total Knee Arthroplasty

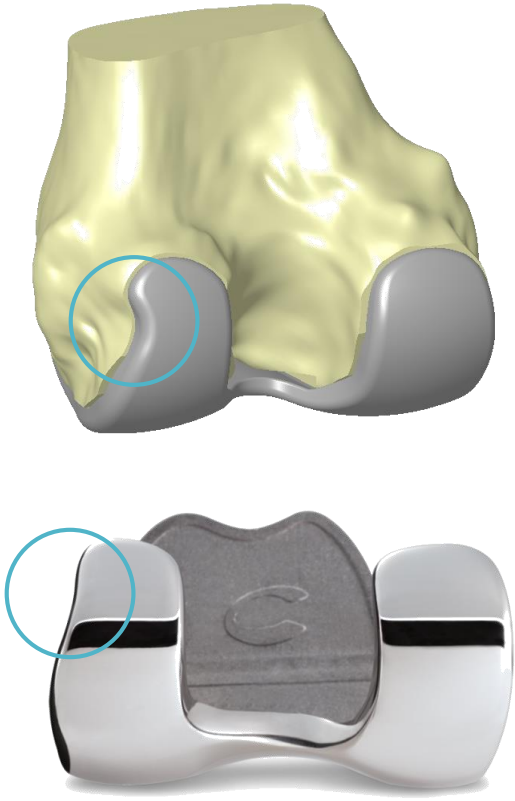
Conrad B. Ivie, MD [a], Patrick J. Probst [b], Amrit K. Bal [c], James T. Stannard [d], Brett D. Crist, MD [a], B. Sonny Bal, MD, JD, MBA [a]

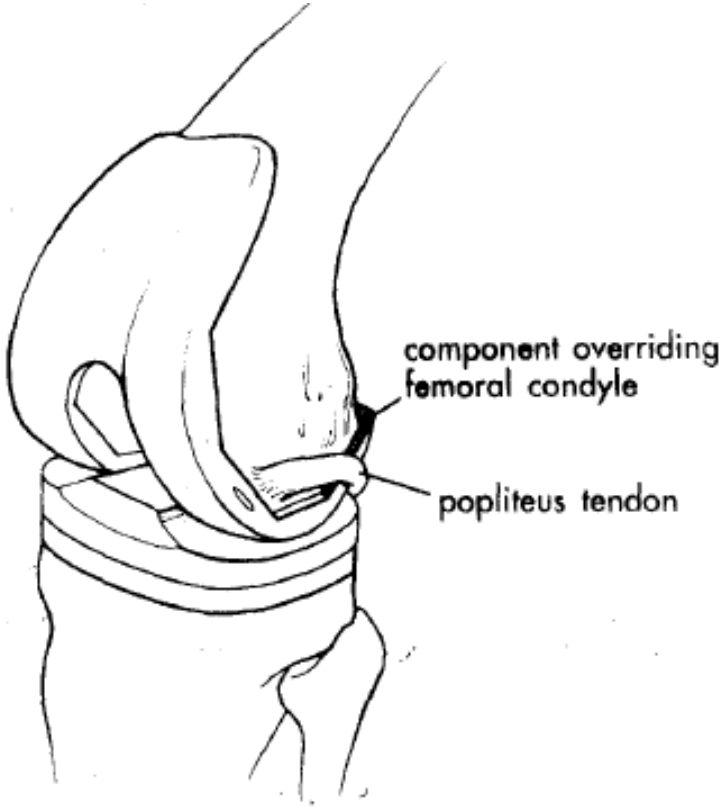
- Comparison of 100 iTotal TKRs to 100 OTS (Off The Shelf) implants with conventional instruments
- iTotal was 1.8 times more likely to be within +/- 3 degrees neutral mechanical alignment

Personalized Position, Shape & Fit

Patient matched, anatomic femur to avoid sizing compromises

Personalized fit can help avoid soft tissue issues such as (e.g., popliteus tendon “popping”), which traditionally would require releases to correct[1]



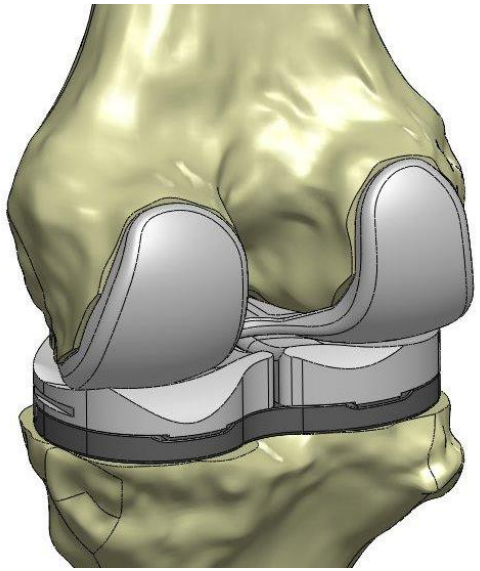


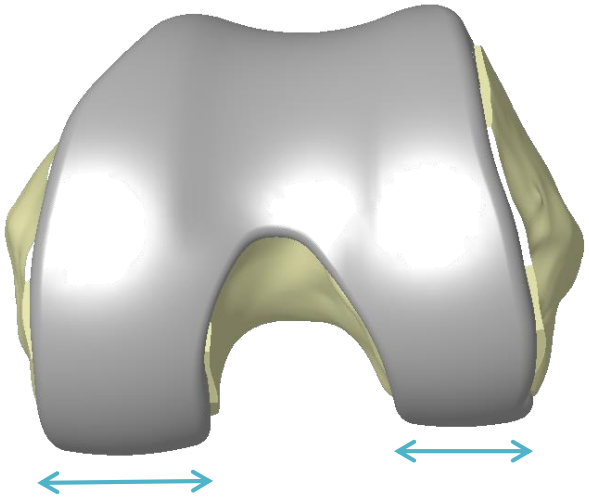
[1] Barnes, C.L., Scott, R.D.; Popliteus Tendon Dysfunction Following Total Knee Arthroplasty; *J Arthroplasty*; 1995; Vol. 10; No. 4, pp. 543-545.

Personalized Position, Shape & Fit

Patient matched, anatomic femur to avoid sizing compromises

Symmetric total knee designs force compromises between complete coverage and overhang. Variations in anatomy make it virtually impossible to fit in all areas of the femur.





3-D fit, not just A/P and M/L

No sizing compromises

Traditional Knee Replacement

The Challenge of Component Rotation

Internal rotational error of the tibial component is a major cause of pain after total knee replacement

D. Nicoll,
D. I. Rowley

From the University of Dundee, Dundee, United Kingdom

This study used CT analysis to determine the rotational alignment of 39 painful and 26 painless fixed-bearing total knee replacements (TKRs) from a cohort of 740 NexGen Legacy posterior-stabilised and cruciate-retaining prostheses implanted between May 1996 and August 2003.

The mean rotation of the tibial component was 4.3° of internal rotation (25.4° internal to 13.9° external rotation) in the painful group and 2.2° of external rotation (8.5° internal to 18.2° external rotation) in the painfree group ($p = 0.024$). In the painful group 17 tibial components were internally rotated more than 9° compared with none in the painfree group ($p < 0.001$). Additionally, six femoral components in the painful group were internally rotated more than 6° compared with none in the painfree group ($p = 0.017$). External rotational errors were not found to be associated with pain.

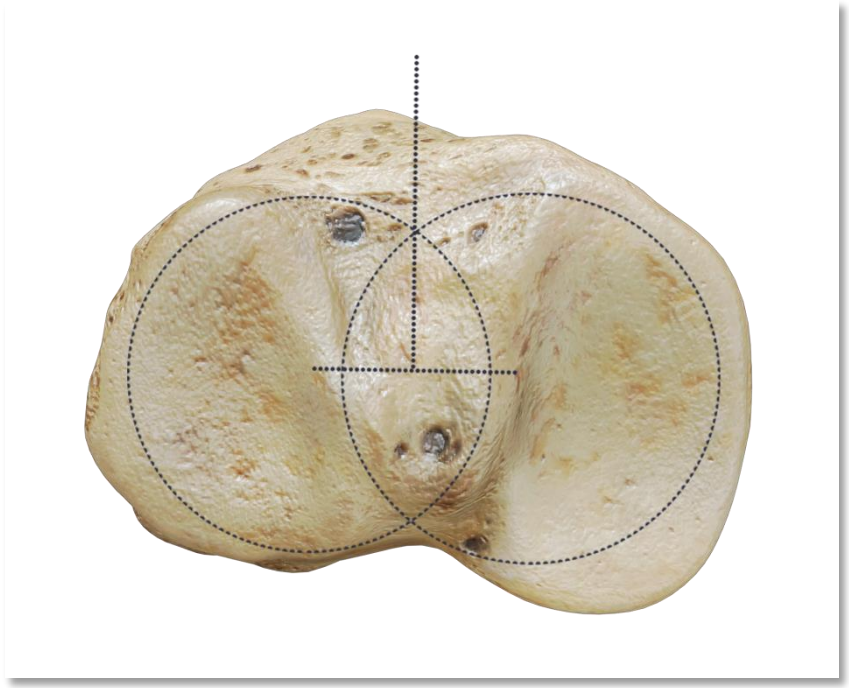
Overall, 22 (56.4%) of the painful TKRs had internal rotational errors involving the femoral, the tibial or both components. It is estimated that at least 4.6% of all our TKRs have been implanted with significant internal rotational errors.

J Bone Joint Surg BR. 2010;92-B:1238-44

Personalized Position, Shape & Fit

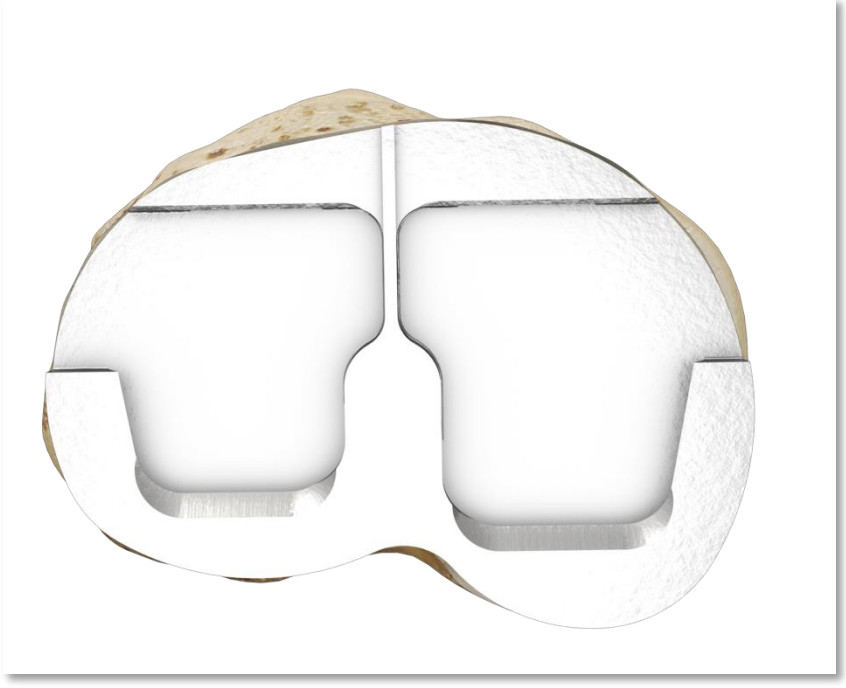
Designed for proper rotation and fit to avoid known causes of pain

Rotational Alignment



Center of baseplate set to the center of the medial and lateral condyles, shown to be a reliable method of tibial component rotation[1,2]

Patient-Specific Shape & Fit



Implant profile is then matched to cortical rim, with slight relief to allow +/- 5º intra-operative adjustment without implant overhang, a potential source of pain.[3]

[1] Cobb JP; The Anatomical Tibial Axis – Reliable Rotational Orientation in Knee Replacement; *J Bone Joint Surg [Br]*; 2008;90-B:1032-8.

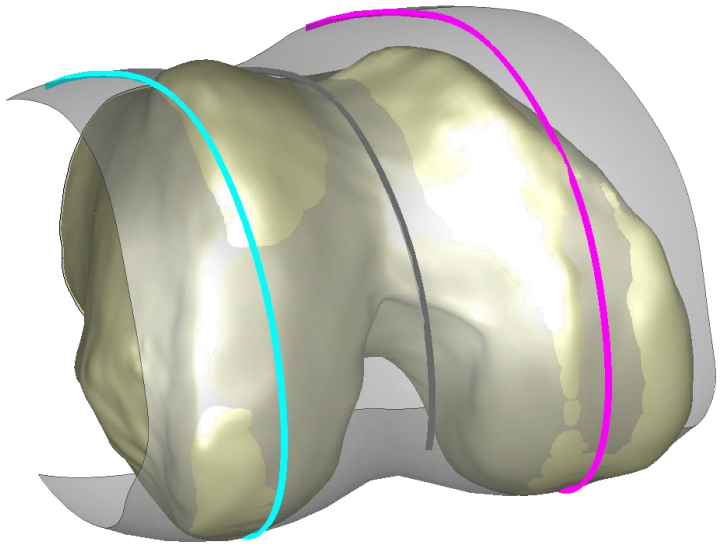
[2] Lützner et al.: Rotational alignment of the tibial component in total knee arthroplasty is better at the medial third of tibial tuberosity than at the medial border. *BMC Musculoskeletal Disorders,* 2010 11:57.

[3] Chau R, et. al.,; Tibial component overhang following unicompartmental knee replacement - does it matter?; *Knee*; 2009; V16:pp. 310-313.

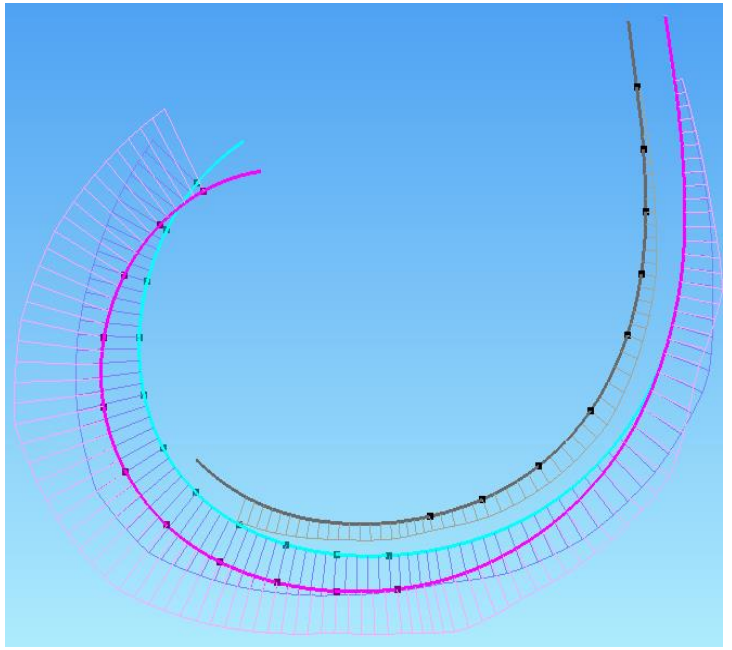
Respect Patient's Condylar Geometry

iShape™ Sagittal 'J' Curves

Studies have also shown that standard TKR geometry, including single radius designs, alter knee kinematics.[1] With iTotal, the patient's anatomic 'J' curves, corrected for deformity, provide the basis for the implant design.



Patient's natural articulating geometry extracted from 3D femoral anatomy



Curves are corrected for deformity and then used as the basis for femoral implant design

[1] Bull AM, Kessler O, Alam M, et al. Changes in kinematics reflect the articular geometry after arthroplasty. *Clin Orthop Relat Res*. 2008;466(10):2491-9.

Femur Matched Offset Polys

Facilitates proper balancing of offset femur and joint line

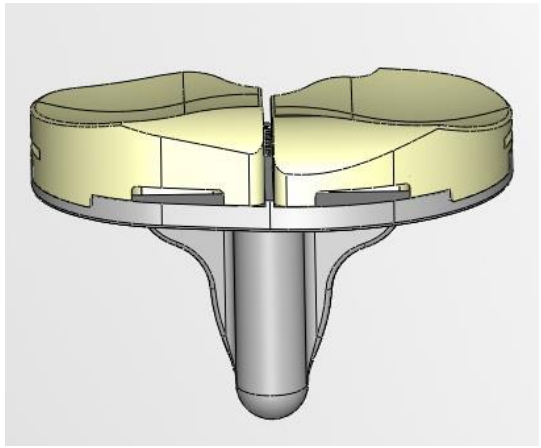
Separate medial and lateral poly inserts matched to femoral offset

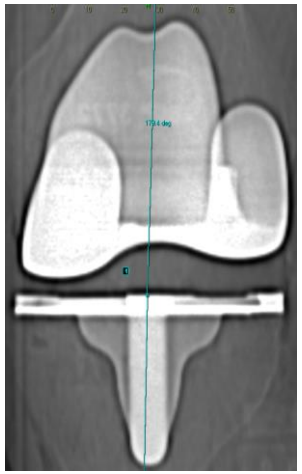
Offset helps mimic varus angle of normal tibial plateau

Medial insert more conforming than lateral insert to facilitate rollback

3 lateral thicknesses (medial+offset)

3 medial insert options (6, 7, and 8mm)



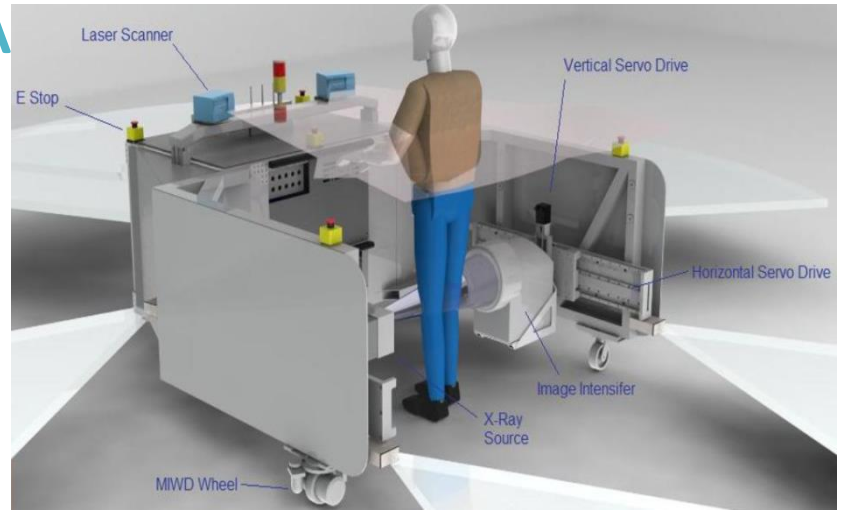


X-rays show two legs with different offsets, but both aligned to neutral mechanical axis

Implanted With Either a Traditional or Personalized TKA

Komistek, ICJR Pan Pacific 2014

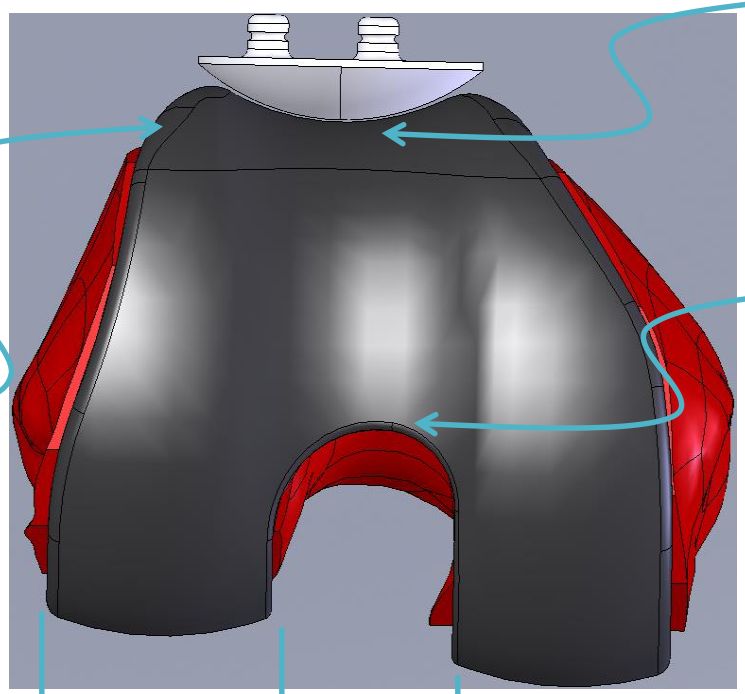
- Single surgeon series
- Two different types of CR TKA
  - *Customized Individually Made (CIM)*
  - *Off-the-Shelf (OTS)*
- First study to utilize mobile fluoroscopy
- Deep knee bend to max flexion



[1] Komistek. In Vivo Kinematics for Subjects Implanted With Either a Traditional or a Customized, Individually Made TKA. ICJR Pan Pacific 2014 Annual Meeting. Poster #O21A2

Engineered Design Features

Wear optimization and engineered function



Single radius dome patellofemoral joint

Extended trochlear groove to guide patella in deep flexion

Lowered lateral trochlea to decompress soft tissue

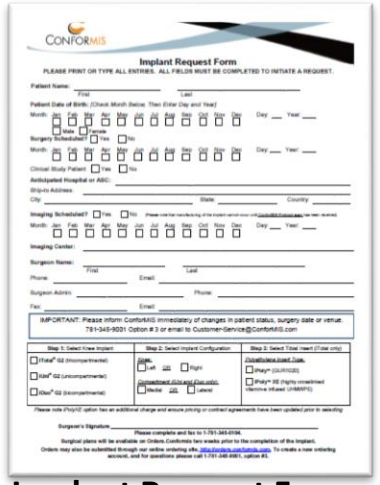
Intercondylar notch width driven by patient anatomy rather than need to accommodate upsizing and downsizing

Wide coronal geometry for high conformity to poly with low constraint

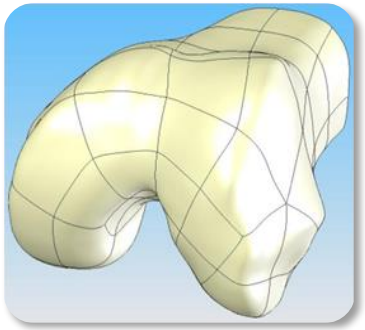
Customized Implant "Delivery Model"

A Model for a More Efficient Joint Replacement System

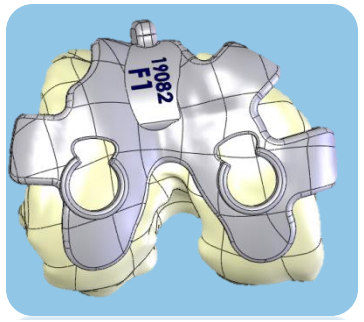
Patient imaging study at validated center



Implant Request Form (IRF) submitted



3D Image processing



Implant & iJig® design & manufacture

One package delivered for Surgery

6 Week Delivery Time

Customized Implant "Delivery Model"

Efficient, Pre-Sterilized, Disposable

Single use kit delivered a few days before surgery

One reusable instrument tray

iTotal G2 instrument set and implants provided for use in the OR

True Patient Specific Fit and Shape

3-D Printing

Custom implants for filling bone defects…custom revision augments for TKR, THR

Conformis utilizing for it’s cutting blocks and implants

As it becomes more economical, may be able to develop “live” implant production.

New ingrowth surfaces, better flexural rigidity for implants.

New Technology- Summary

Several new platforms have been and are being added which may improve outcomes

Cost implications have to be considered until we have some reasonable proof of the benefit of these technologies as we are all getting squeezed to save, yet being held more accountable for some issues we have little control over

More clinical data over longer followup will be needed to sort out the cost-benefit

The Vendors need to take more responsibility for funding these studies to validate their technology/ implants

Thank you

Duke Orthopaedic Surgery

Navigating the Visit Navigator – How to Get Through a day at the Office with Epic EMR

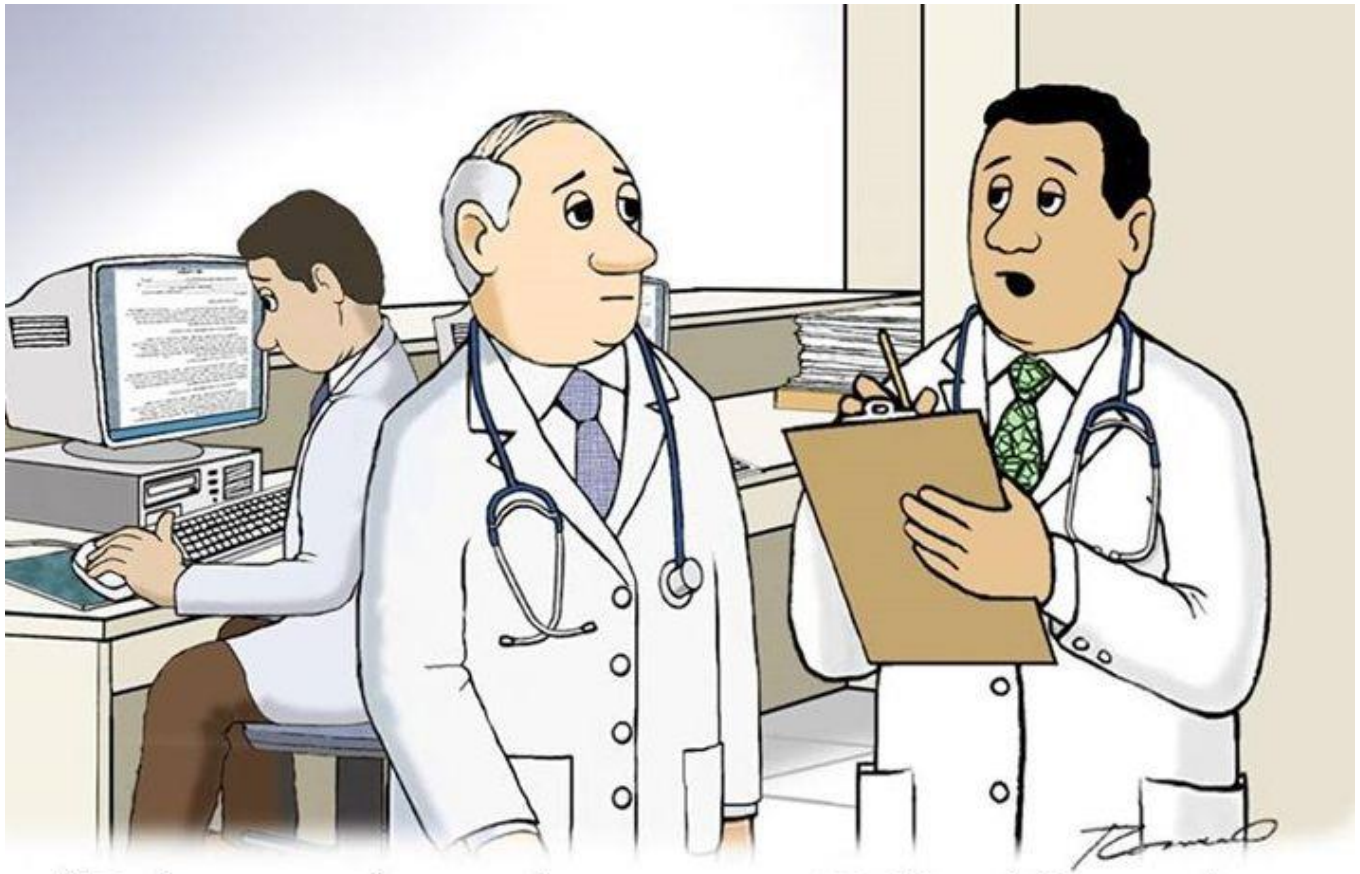
Cynthia L. Emory, M.D., Wake Forest School of Medicine

Joe Minchew, M.D., Duke University Health System

North Carolina Orthopaedic Association Annual Meeting, October 11, 2015

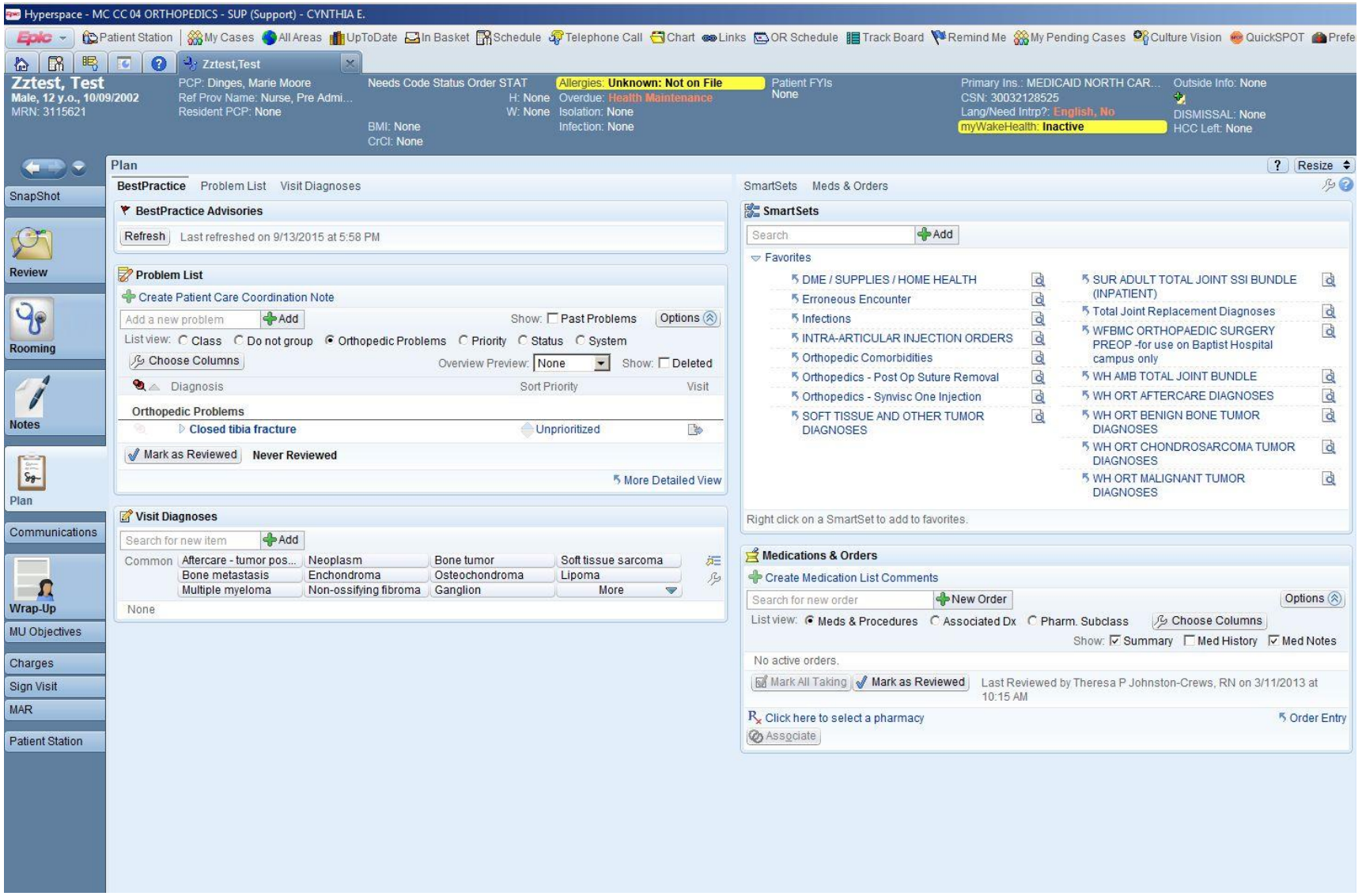
Wake Forest® School of Medicine

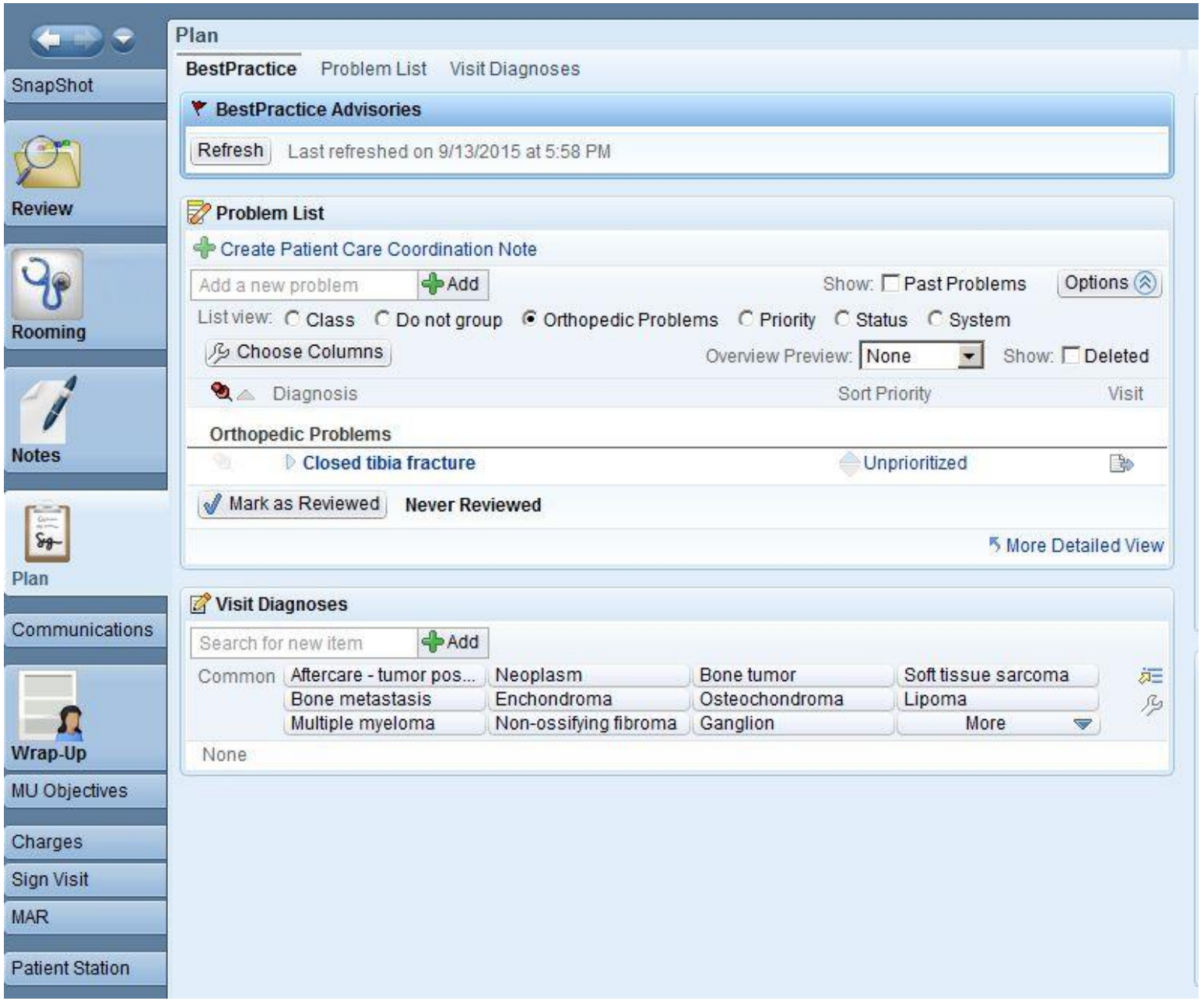
North Carolina Orthopaedic Association NCOA



"I hear there's a new ICD-10 code for carpal tunnel syndrome caused by clicking too many times in an EMR system."

Problem List




SnapShot
Review
Rooming
Notes
Plan
Communications
Wrap-Up
MU Objectives
Charges
Sign Visit
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Patient Station
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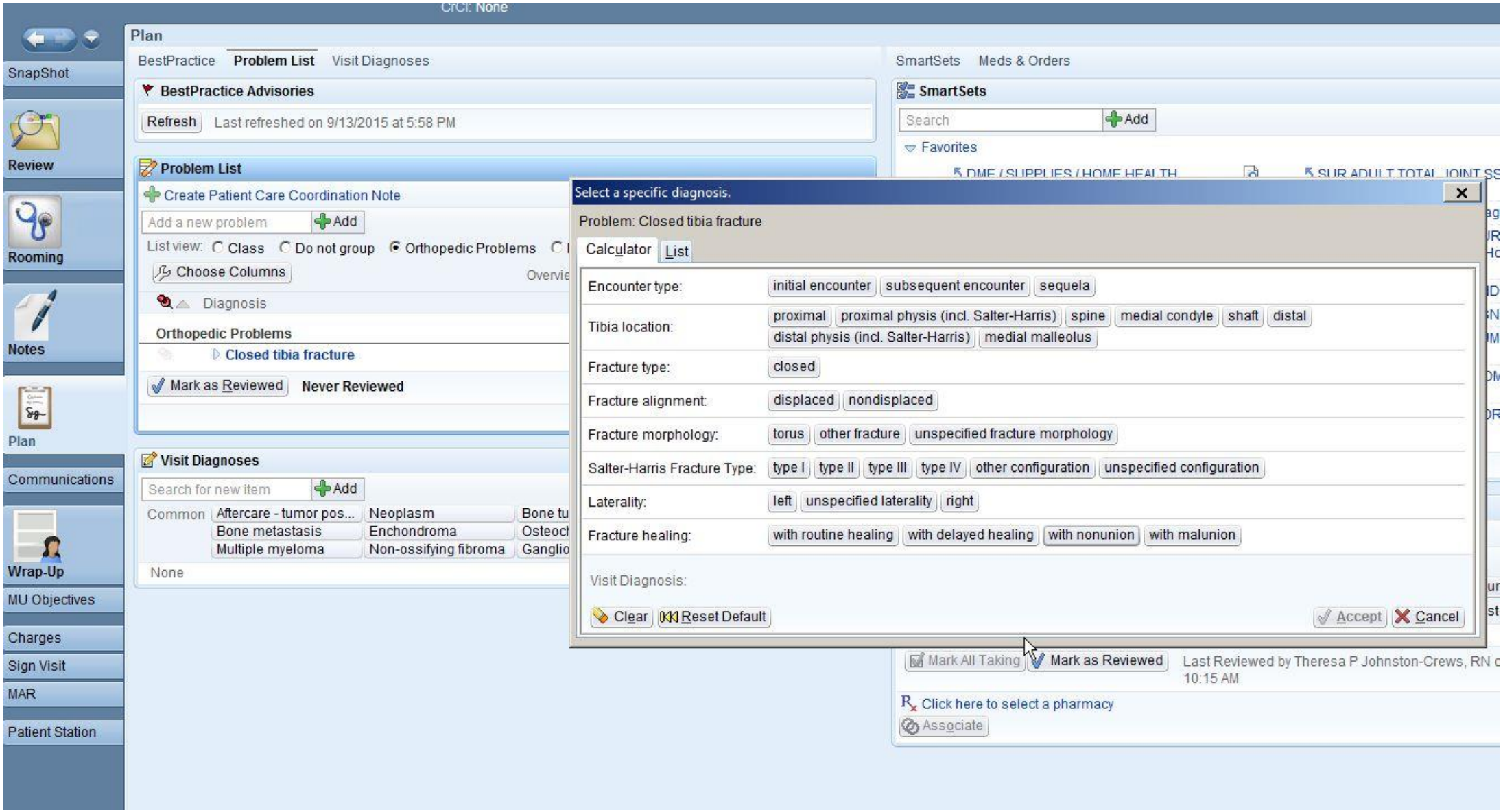
BestPractice
Problem List
Visit Diagnoses
BestPractice Advisories
Refresh
Last refreshed on 9/13/2015 at 5:58 PM
Problem List
Create Patient Care Coordination Note
Add a new problem
Add
Show: Past Problems
Options
List view: Class Do not group Orthopedic Problems Priority Status System
Choose Columns
Overview Preview: None
Show: Deleted
Diagnosis
Sort Priority
Visit
Orthopedic Problems
Closed tibia fracture
Unprioritized
Mark as Reviewed
Never Reviewed
More Detailed View
Visit Diagnoses
Search for new item
Add
Common
Aftercare - tumor pos...
Neoplasm
Bone tumor
Soft tissue sarcoma
Bone metastasis
Enchondroma
Osteochondroma
Lipoma
Multiple myeloma
Non-ossifying fibroma
Ganglion
More
None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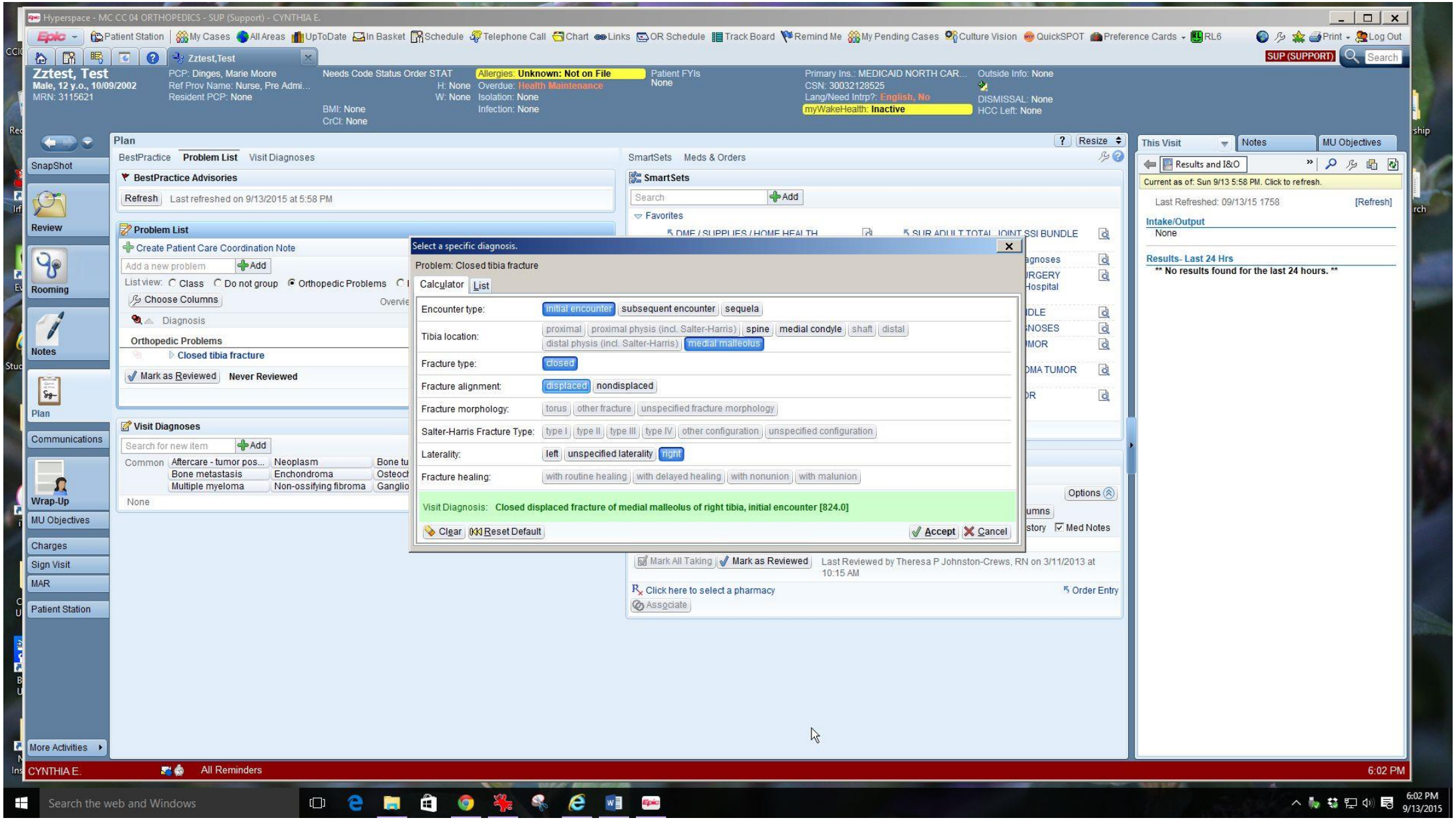
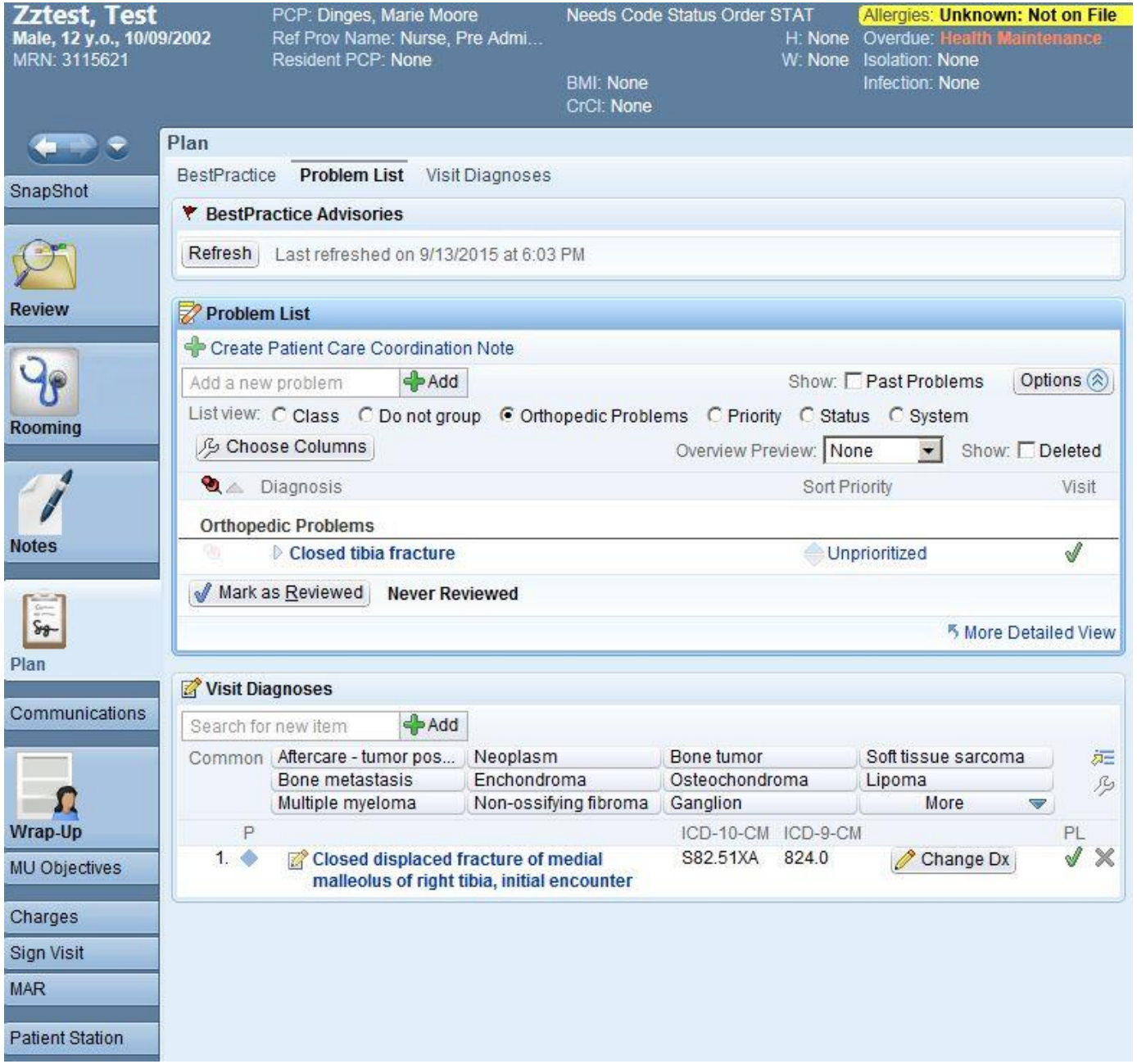
Meds & Orders
BestPractice Advisories
Refresh
Last refreshed on 9/13/2015 at 5:58 PM
Problem List
Create Patient Care Coordination Note
Add a new problem
Add
List view: Class Do not group Orthopedic Problems
Choose Columns
Diagnosis
Orthopedic Problems
Closed tibia fracture
Mark as Reviewed
Never Reviewed
Visit Diagnoses
Search for new item
Add
Common
Aftercare - tumor pos...
Neoplasm
Bone metastasis
Enchondroma
Multiple myeloma
Non-ossifying fibroma
None
SmartSets
Search
Add
Favorites
Select a specific diagnosis.
Problem: Closed tibia fracture
Calculator
List
Encounter type:
initial encounter
subsequent encounter
sequela
Tibia location:
proximal
proximal physis (incl. Salter-Harris)
spine
medial condyle
shaft
distal
distal physis (incl. Salter-Harris)
medial malleolus
Fracture type:
closed
Fracture alignment:
displaced
nondisplaced
Fracture morphology:
torus
other fracture
unspecified fracture morphology
Salter-Harris Fracture Type:
type I
type II
type III
type IV
other configuration
unspecified configuration
Laterality:
left
unspecified laterality
right
Fracture healing:
with routine healing
with delayed healing
with nonunion
with malunion
Visit Diagnosis:
Clear
Reset Default
Accept
Cancel
Mark All Taking
Mark as Reviewed
Last Reviewed by Theresa P Johnston-Crews, RN
10:15 AM
Click here to select a pharmacy
Associate


Hyperspace - MC CC 04 ORTHOPEDICS - SUP (Support) - CYNTHIA E.
Zztest, Test
Male, 12 y.o., 10/09/2002
MRN: 3115621
Plan
Problem List
Visit Diagnoses
Select a specific diagnosis.
Problem: Closed tibia fracture
Calculator
List
Encounter type: initial encounter | subsequent encounter | sequela
Tibia location: proximal | proximal physis (incl. Salter-Harris) | spine | medial condyle | shaft | distal | distal physis (incl. Salter-Harris) | medial malleolus
Fracture type: closed
Fracture alignment: displaced | nondisplaced
Fracture morphology: torus | other fracture | unspecified fracture morphology
Salter-Harris Fracture Type: type I | type II | type III | type IV | other configuration | unspecified configuration
Laterality: left | unspecified laterality | right
Fracture healing: with routine healing | with delayed healing | with nonunion | with malunion
Visit Diagnosis: Closed displaced fracture of medial malleolus of right tibia, initial encounter [824.0]
Clear
Reset Default
Accept
Cancel
SmartSets
Meds & Orders
This Visit
Notes
MU Objectives
Results- Last 24 Hrs
** No results found for the last 24 hours. **
Intake/Output
None
Mark as Reviewed
Never Reviewed
Last Reviewed by Theresa P Johnston-Crews, RN on 3/11/2013 at 10:15 AM
Click here to select a pharmacy
Order Entry
CYNTHIA E.
All Reminders
6:02 PM
9/13/2015


Zztest, Test
Male, 12 y.o., 10/09/2002
MRN: 3115621
PCP: Dinges, Marie Moore
Ref Prov Name: Nurse, Pre Admi...
Resident PCP: None
Needs Code Status Order STAT
BMI: None
CrCl: None
H: None
W: None
Allergies: Unknown: Not on File
Overdue: Health Maintenance
Isolation: None
Infection: None
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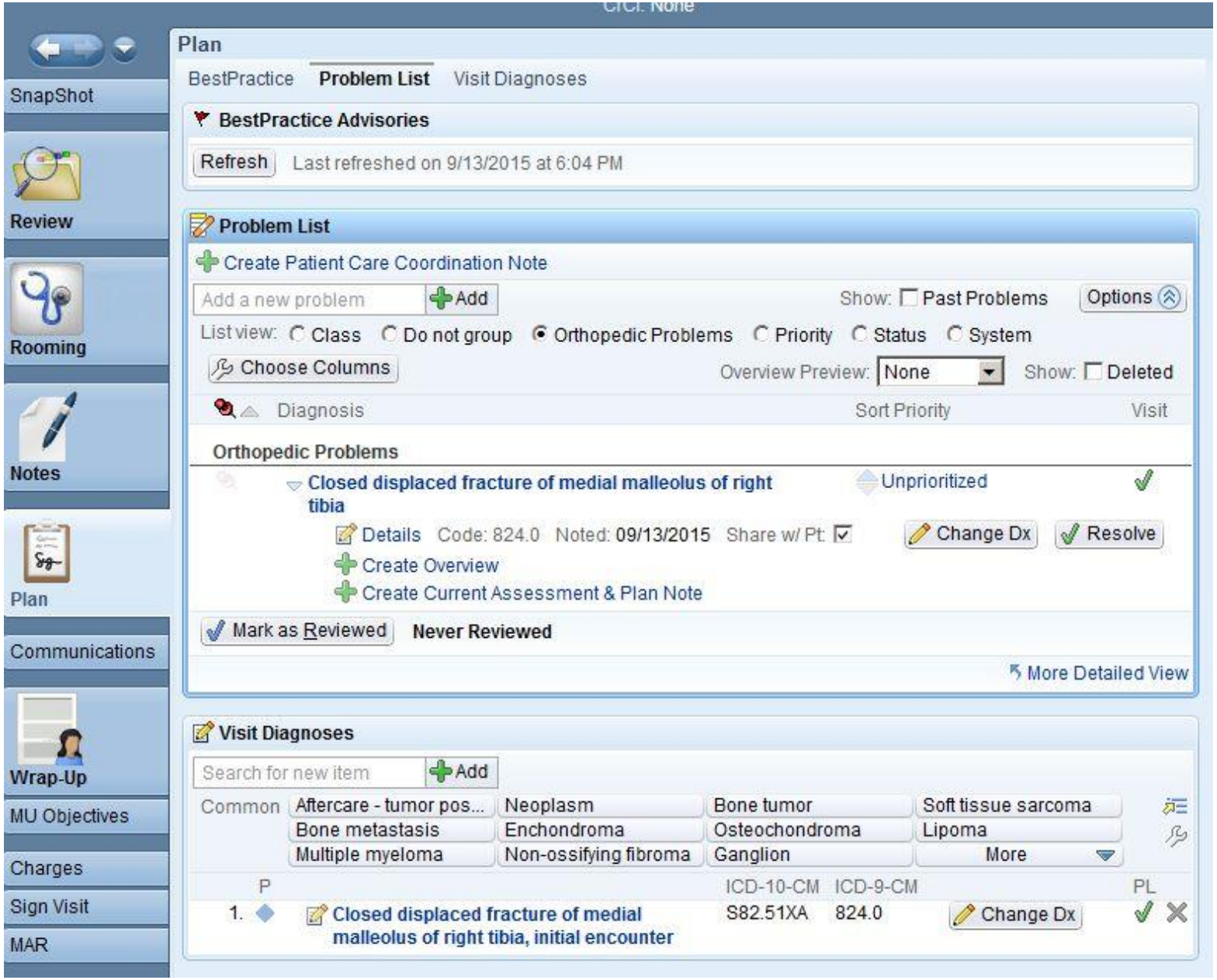
Problem List
Visit Diagnoses
BestPractice Advisories
Refresh
Last refreshed on 9/13/2015 at 6:03 PM
Problem List
Create Patient Care Coordination Note
Add a new problem
Add
Show: Past Problems
Options
List view: Class Do not group Orthopedic Problems Priority Status System
Choose Columns
Overview Preview: None
Show: Deleted
Diagnosis
Sort Priority
Visit
Orthopedic Problems
Closed tibia fracture
Unprioritized
Mark as Reviewed
Never Reviewed
More Detailed View
Visit Diagnoses
Search for new item
Add
Common
Aftercare - tumor pos...
Neoplasm
Bone tumor
Soft tissue sarcoma
Bone metastasis
Enchondroma
Osteochondroma
Lipoma
Multiple myeloma
Non-ossifying fibroma
Ganglion
More
P
ICD-10-CM
ICD-9-CM
PL
1.
Closed displaced fracture of medial malleolus of right tibia, initial encounter
S82.51XA
824.0
Change Dx


CrCl: None
SnapShot
Review
Rooming
Notes
Plan
Communications
Wrap-Up
MU Objectives
Charges
Sign Visit
MAR
Plan
BestPractice
Problem List
Visit Diagnoses
BestPractice Advisories
Refresh
Last refreshed on 9/13/2015 at 6:04 PM
Problem List
Create Patient Care Coordination Note
Add a new problem
Add
Show: Past Problems
Options
List view: Class Do not group Orthopedic Problems Priority Status System
Choose Columns
Overview Preview: None
Show: Deleted
Diagnosis
Sort Priority
Visit
Orthopedic Problems
Closed displaced fracture of medial malleolus of right tibia
Unprioritized
Details
Code: 824.0
Noted: 09/13/2015
Share w/ Pt:
Change Dx
Resolve
Create Overview
Create Current Assessment & Plan Note
Mark as Reviewed
Never Reviewed
More Detailed View
Visit Diagnoses
Search for new item
Add
Common
Aftercare - tumor pos...
Neoplasm
Bone tumor
Soft tissue sarcoma
Bone metastasis
Enchondroma
Osteochondroma
Lipoma
Multiple myeloma
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More
P
ICD-10-CM
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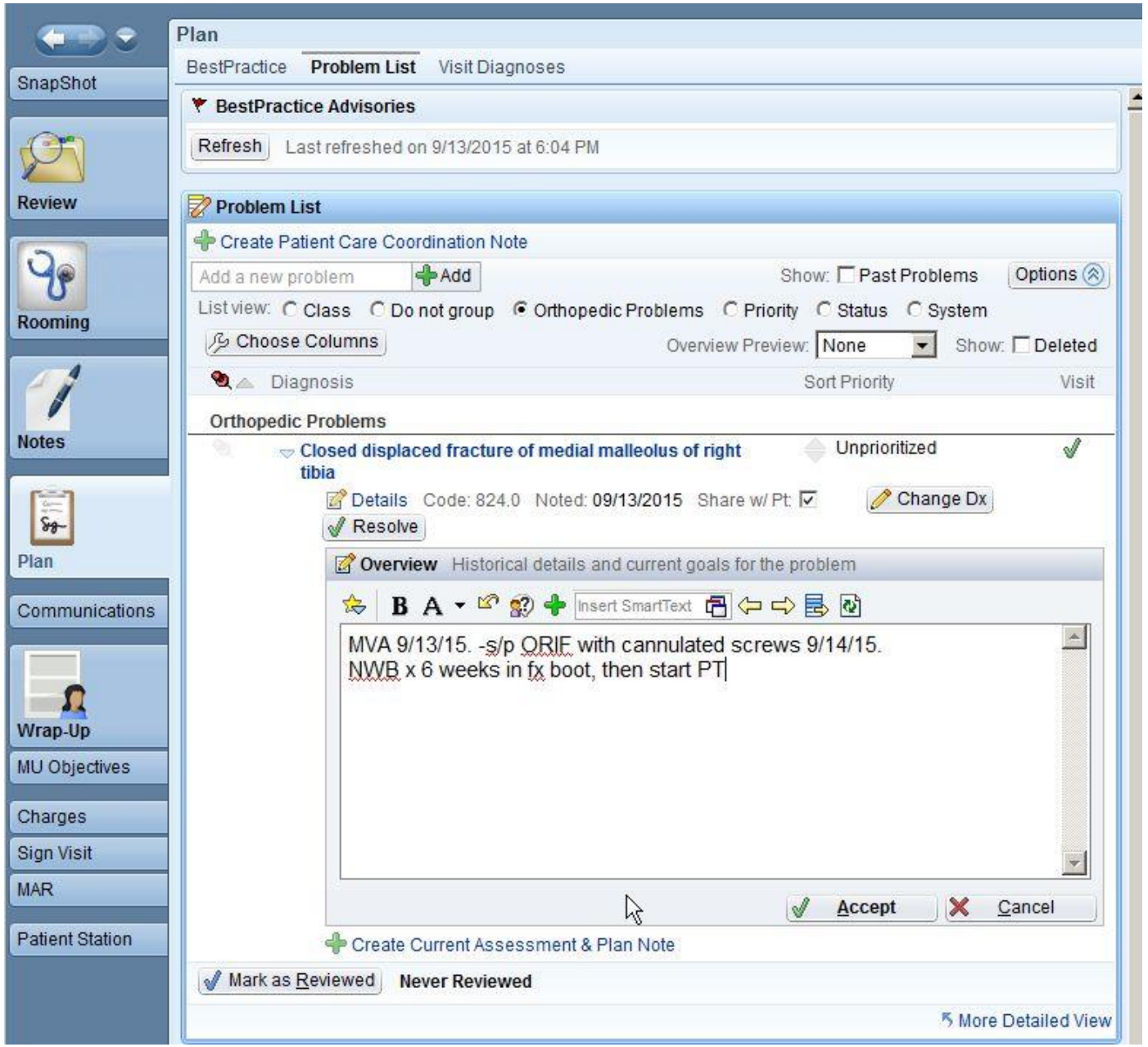
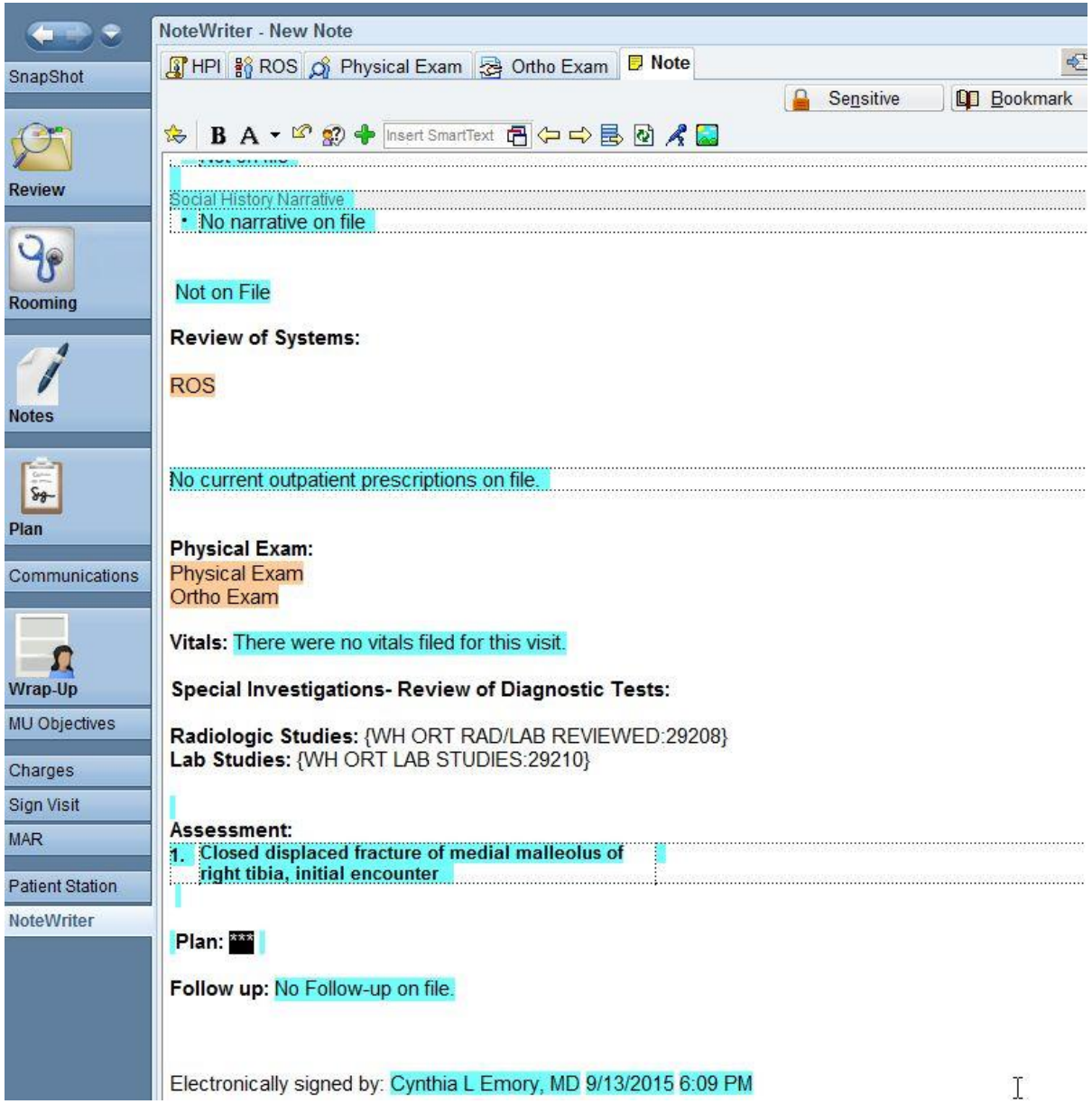
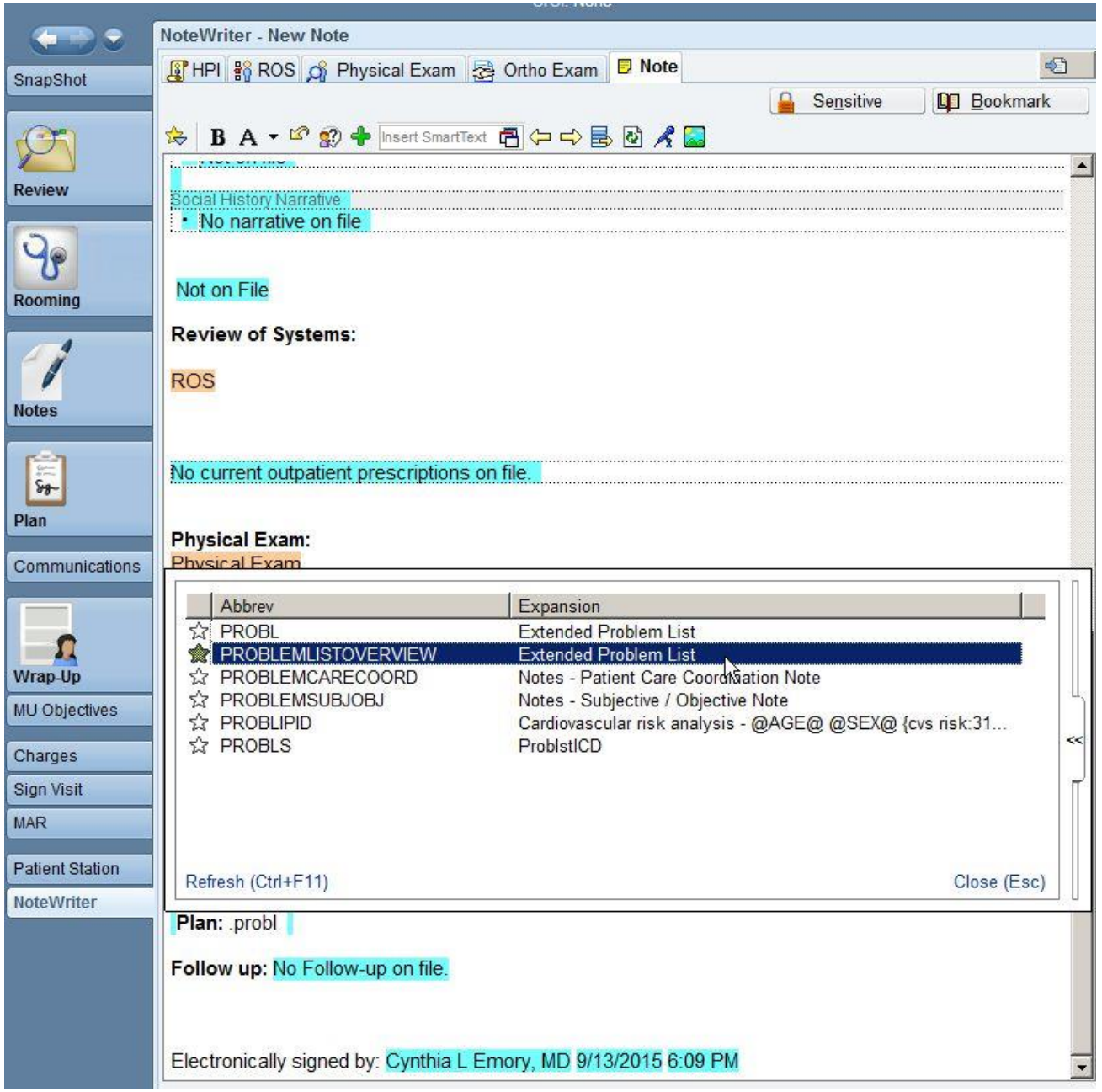
Closed displaced fracture of medial malleolus of right tibia, initial encounter
S82.51XA
824.0
Change Dx



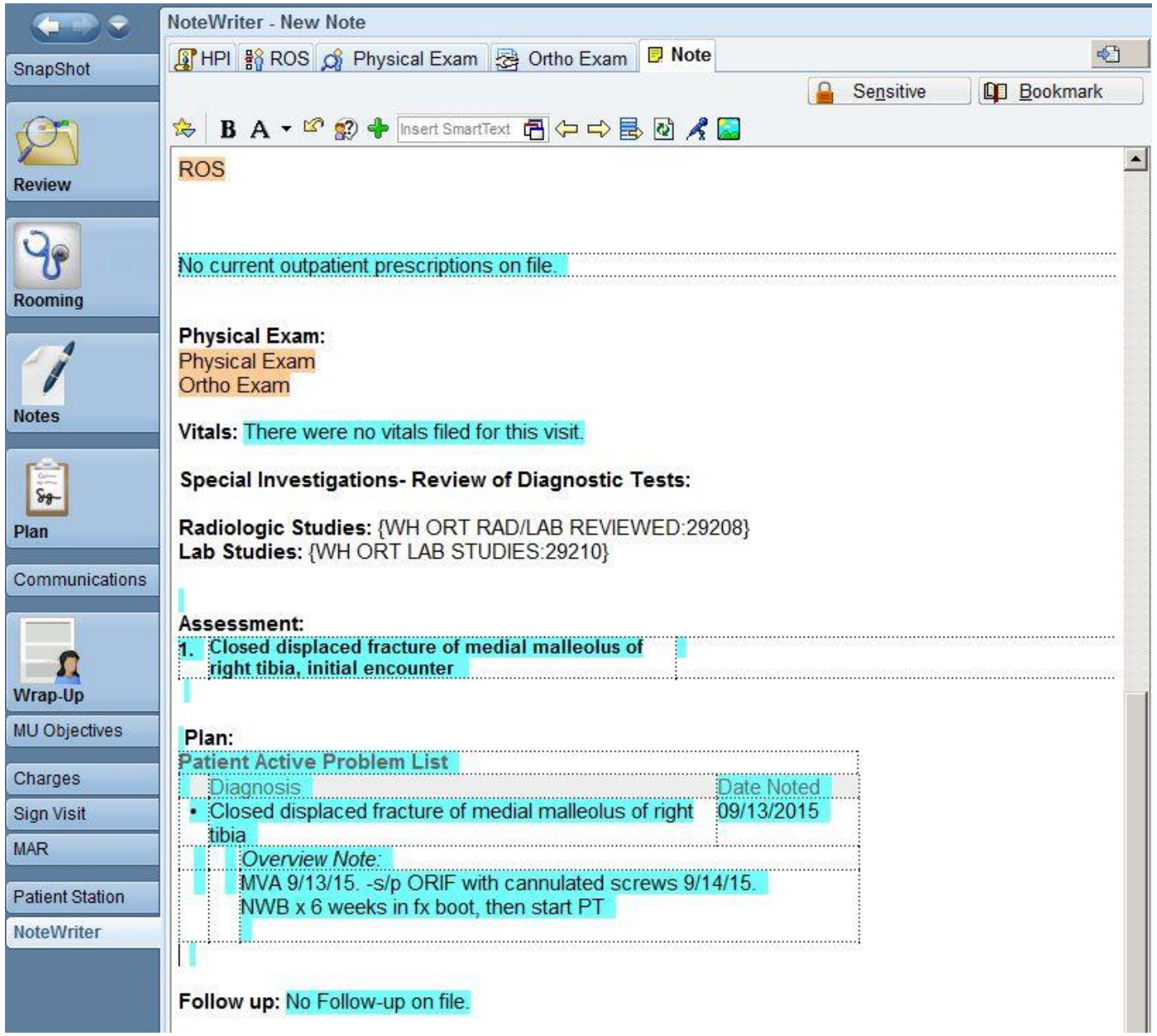
Problem List - Overview

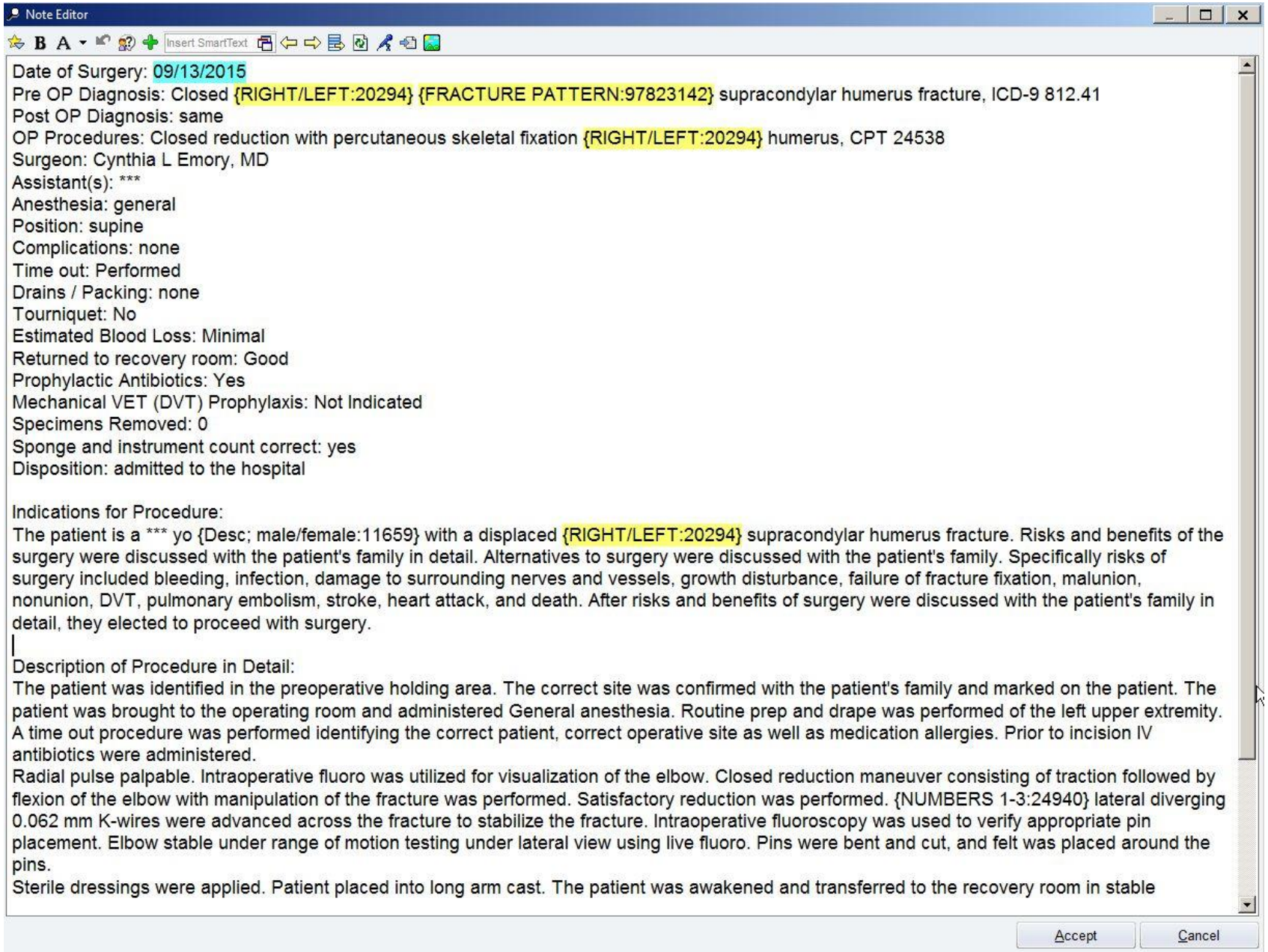


Insert text from overview into plan

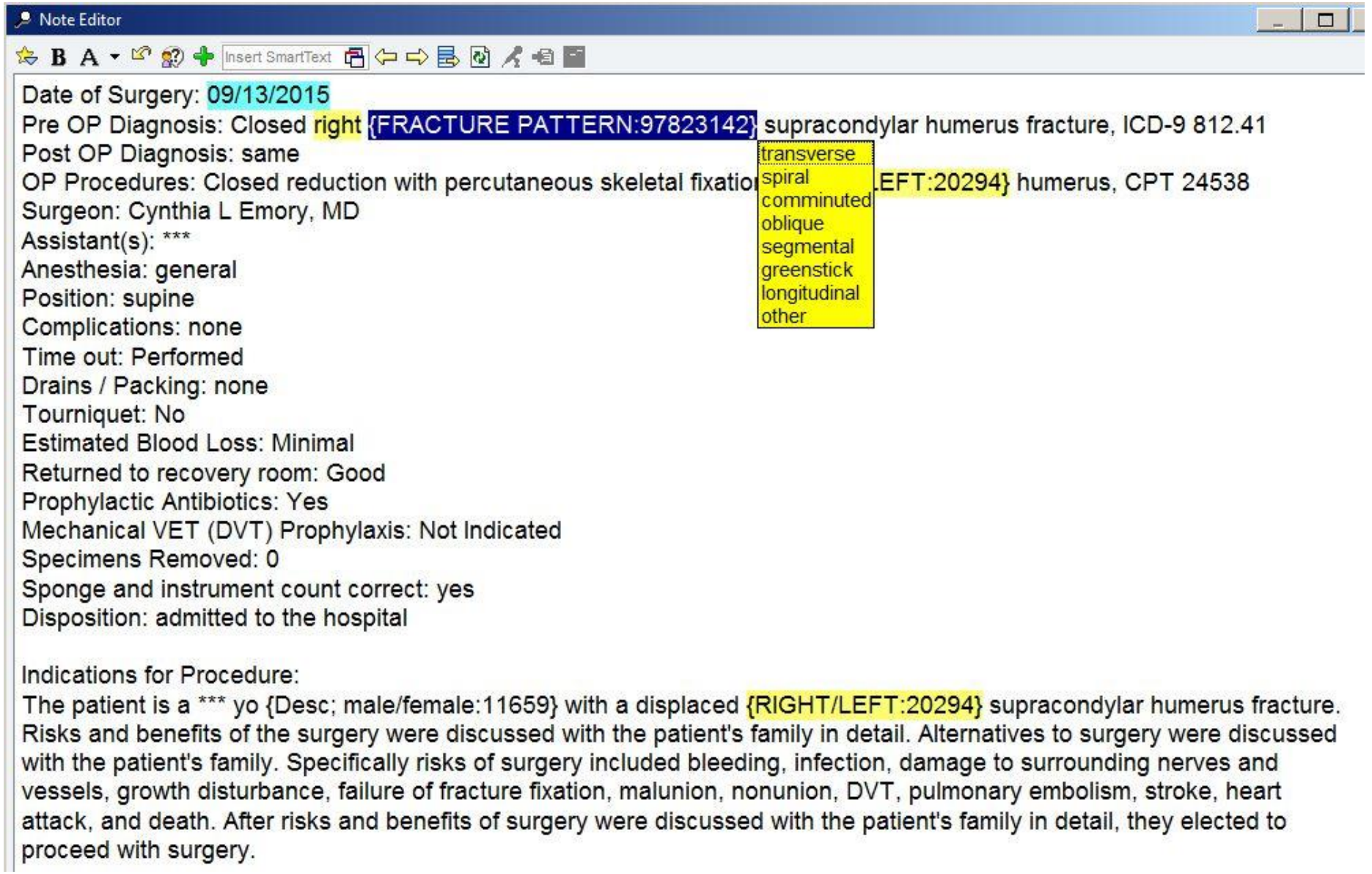


Insert text from overview into plan

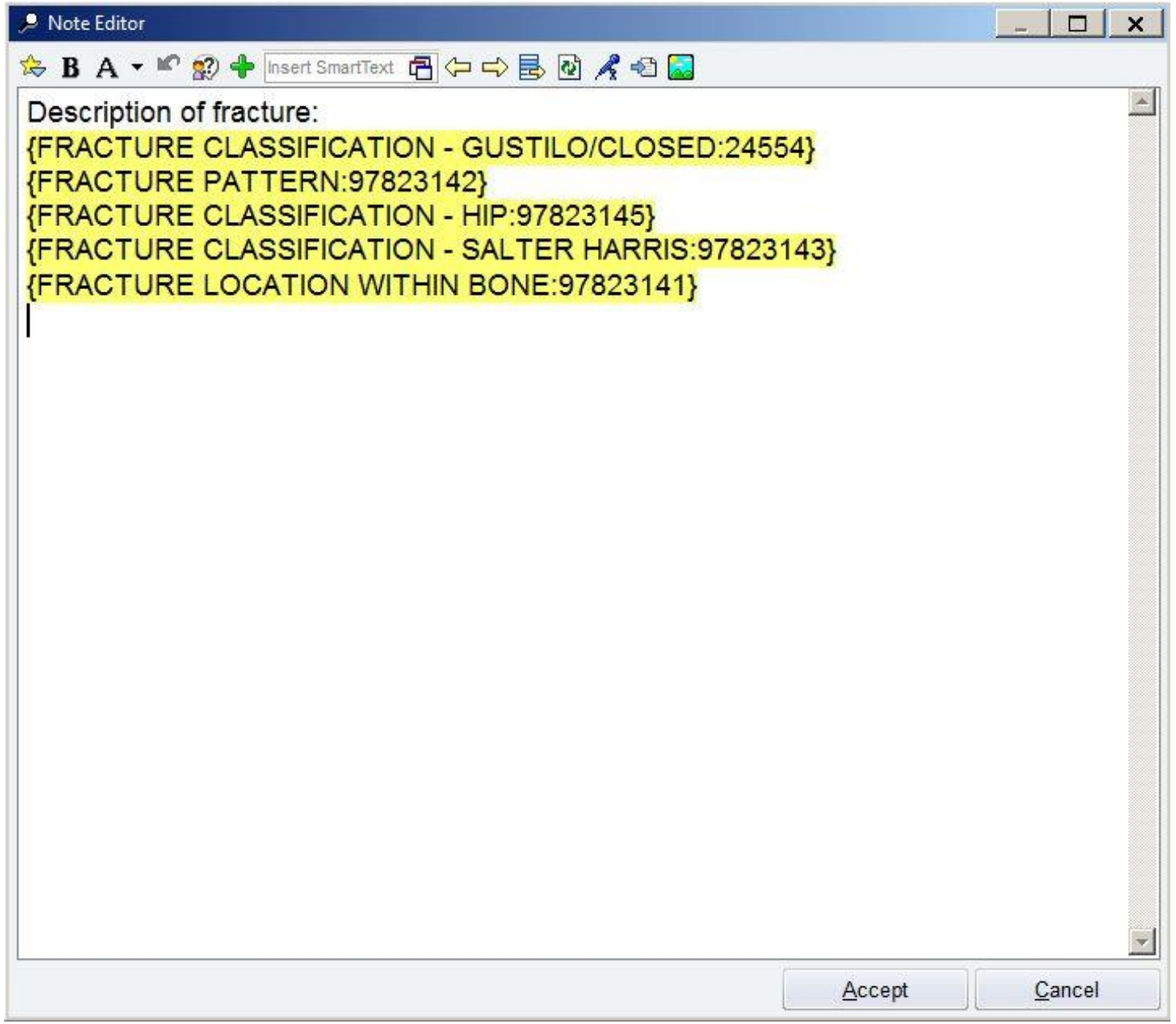

NoteWriter - New Note
HPI
ROS
Physical Exam
Ortho Exam
Note
Sensitive
Bookmark
Insert SmartText
SnapShot
Review
Rooming
Notes
Plan
Communications
Wrap-Up
MU Objectives
Charges
Sign Visit
MAR
Patient Station
NoteWriter
ROS
No current outpatient prescriptions on file.
Physical Exam:
Physical Exam
Ortho Exam
Vitals: There were no vitals filed for this visit.
Special Investigations- Review of Diagnostic Tests:
Radiologic Studies: {WH ORT RAD/LAB REVIEWED:29208}
Lab Studies: {WH ORT LAB STUDIES:29210}
Assessment:
1. Closed displaced fracture of medial malleolus of right tibia, initial encounter
Plan:
Patient Active Problem List
Diagnosis
Date Noted
Closed displaced fracture of medial malleolus of right tibia
09/13/2015
Overview Note:
MVA 9/13/15. -s/p ORIF with cannulated screws 9/14/15.
NWB x 6 weeks in fx boot, then start PT
Follow up: No Follow-up on file.


Note Editor
Insert SmartText
Date of Surgery: 09/13/2015
Pre OP Diagnosis: Closed {RIGHT/LEFT:20294} {FRACTURE PATTERN:97823142} supracondylar humerus fracture, ICD-9 812.41
Post OP Diagnosis: same
OP Procedures: Closed reduction with percutaneous skeletal fixation {RIGHT/LEFT:20294} humerus, CPT 24538
Surgeon: Cynthia L Emory, MD
Assistant(s): ***
Anesthesia: general
Position: supine
Complications: none
Time out: Performed
Drains / Packing: none
Tourniquet: No
Estimated Blood Loss: Minimal
Returned to recovery room: Good
Prophylactic Antibiotics: Yes
Mechanical VET (DVT) Prophylaxis: Not Indicated
Specimens Removed: 0
Sponge and instrument count correct: yes
Disposition: admitted to the hospital
Indications for Procedure:
The patient is a *** yo {Desc; male/female:11659} with a displaced {RIGHT/LEFT:20294} supracondylar humerus fracture. Risks and benefits of the surgery were discussed with the patient's family in detail. Alternatives to surgery were discussed with the patient's family. Specifically risks of surgery included bleeding, infection, damage to surrounding nerves and vessels, growth disturbance, failure of fracture fixation, malunion, nonunion, DVT, pulmonary embolism, stroke, heart attack, and death. After risks and benefits of surgery were discussed with the patient's family in detail, they elected to proceed with surgery.
Description of Procedure in Detail:
The patient was identified in the preoperative holding area. The correct site was confirmed with the patient's family and marked on the patient. The patient was brought to the operating room and administered General anesthesia. Routine prep and drape was performed of the left upper extremity. A time out procedure was performed identifying the correct patient, correct operative site as well as medication allergies. Prior to incision IV antibiotics were administered.
Radial pulse palpable. Intraoperative fluoro was utilized for visualization of the elbow. Closed reduction maneuver consisting of traction followed by flexion of the elbow with manipulation of the fracture was performed. Satisfactory reduction was performed. {NUMBERS 1-3:24940} lateral diverging 0.062 mm K-wires were advanced across the fracture to stabilize the fracture. Intraoperative fluoroscopy was used to verify appropriate pin placement. Elbow stable under range of motion testing under lateral view using live fluoro. Pins were bent and cut, and felt was placed around the pins.
Sterile dressings were applied. Patient placed into long arm cast. The patient was awakened and transferred to the recovery room in stable
Accept
Cancel

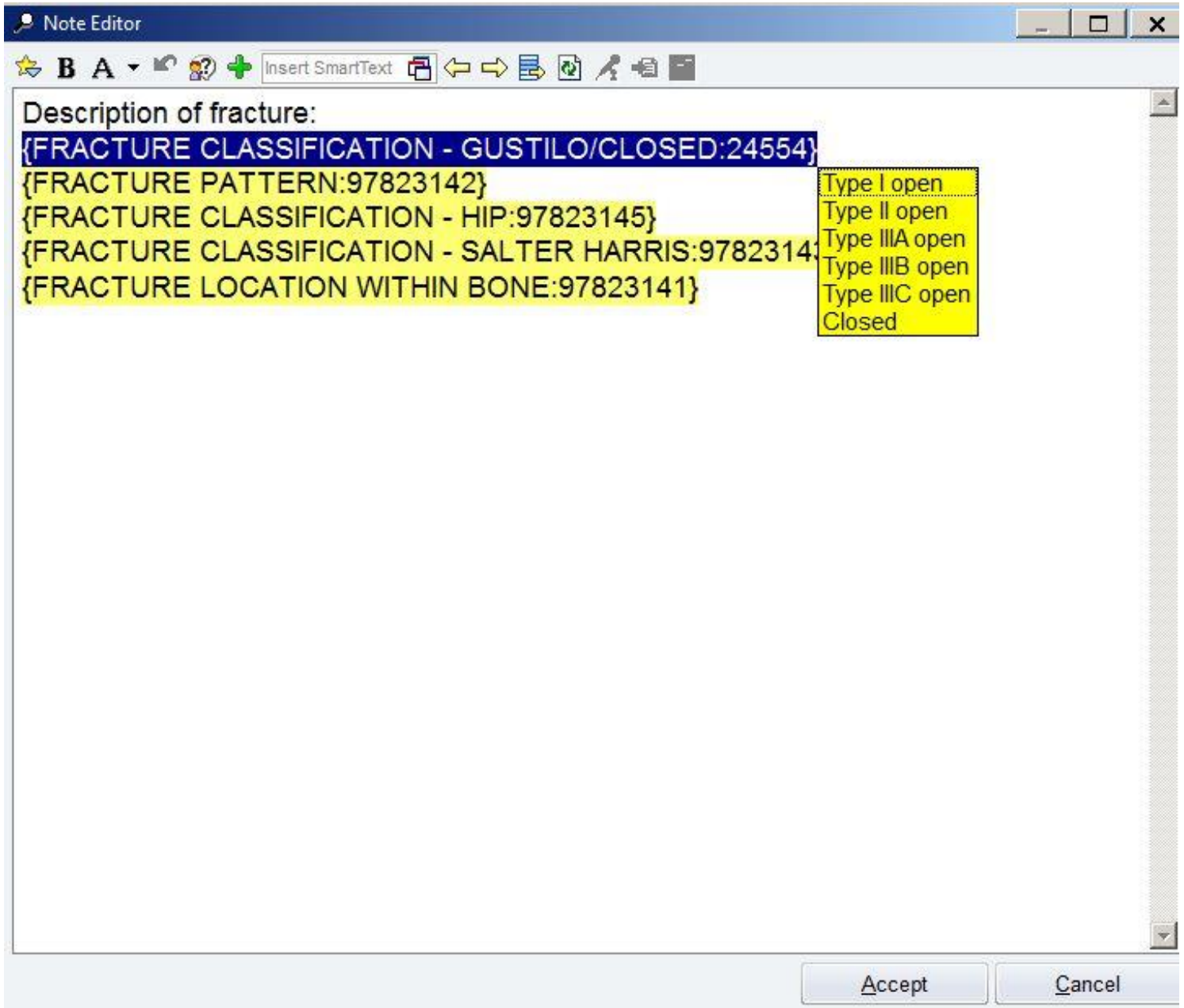
Op Notes



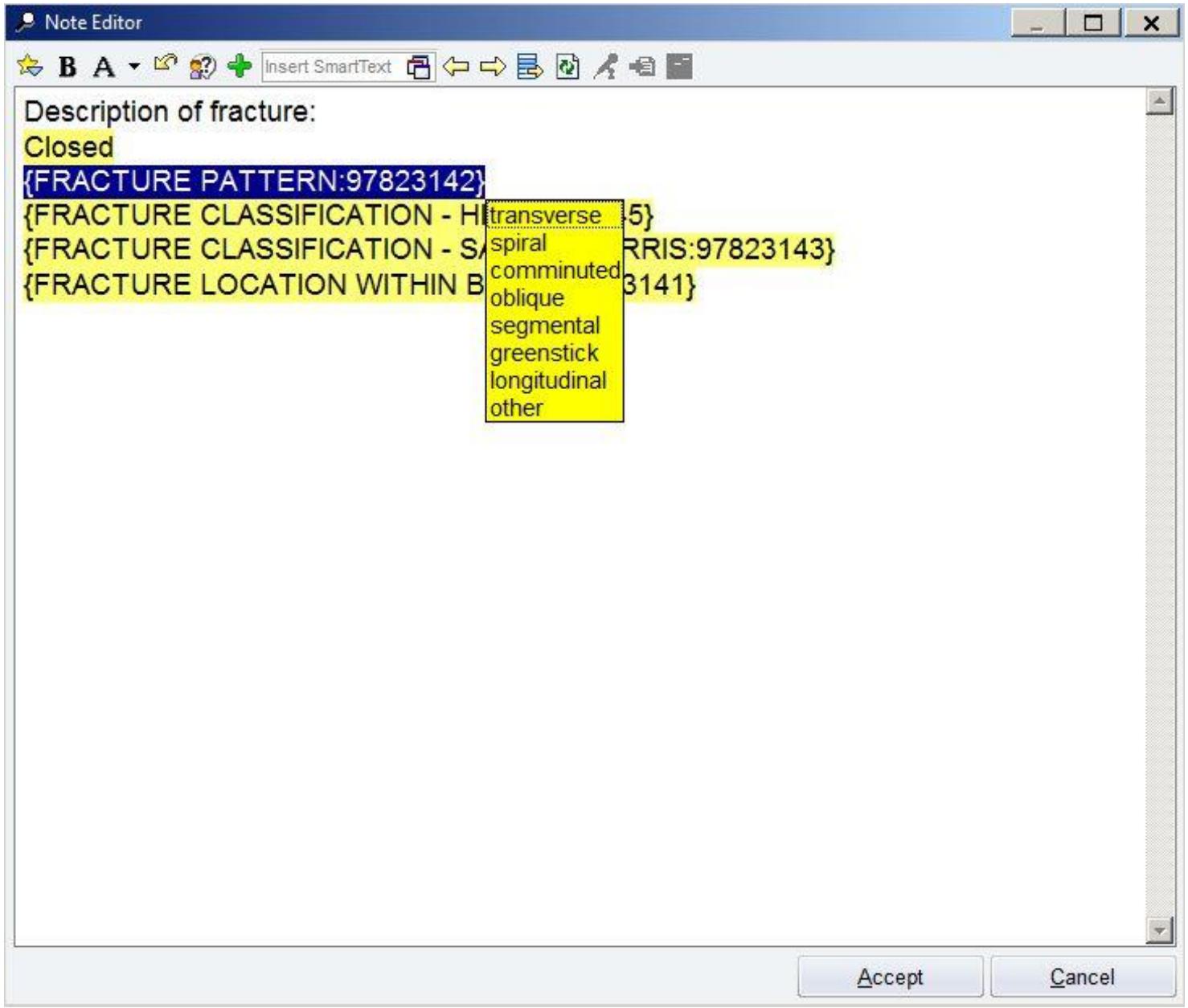
Op Notes and ICD-10



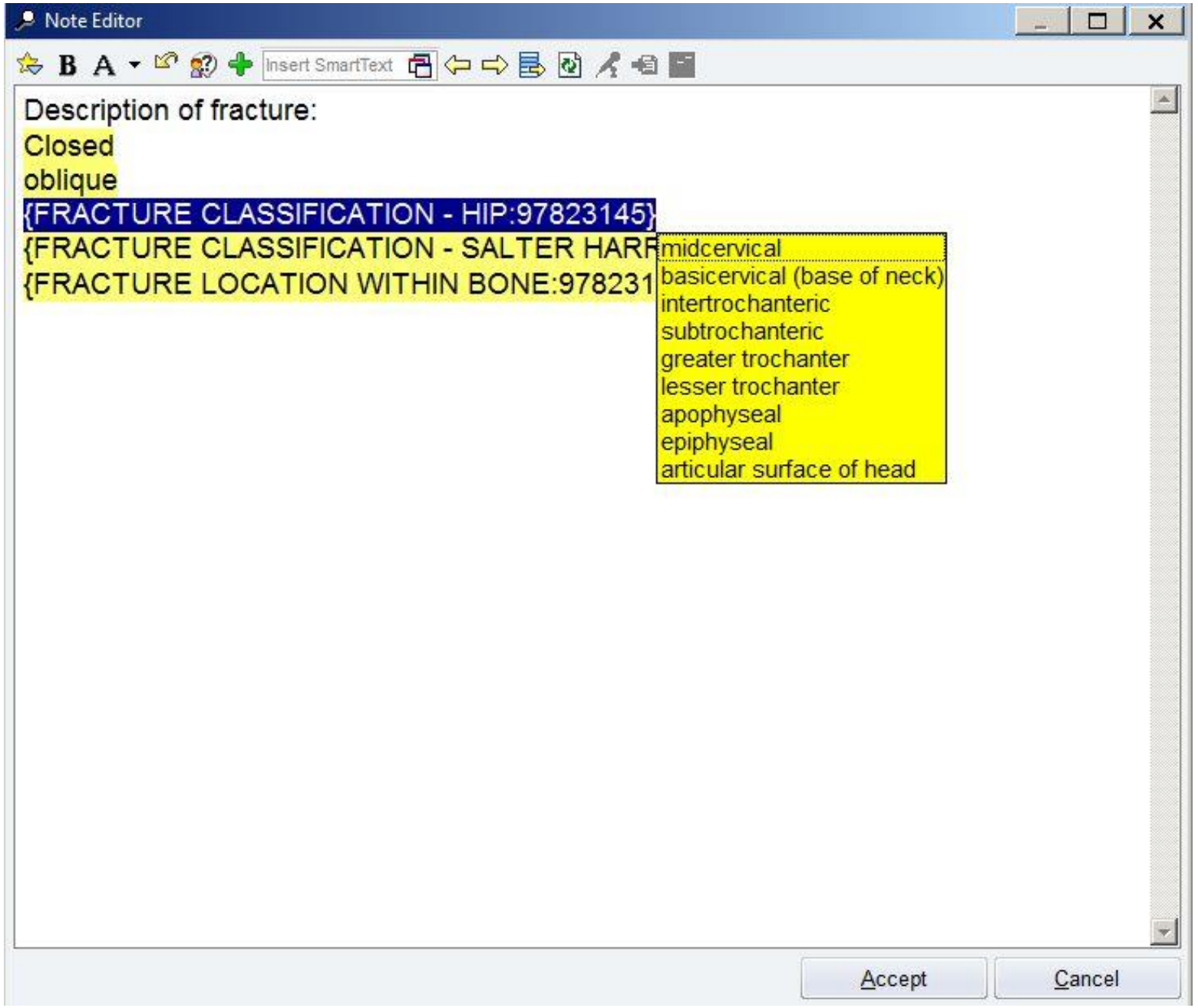
Fracture Classifications and ICD-10



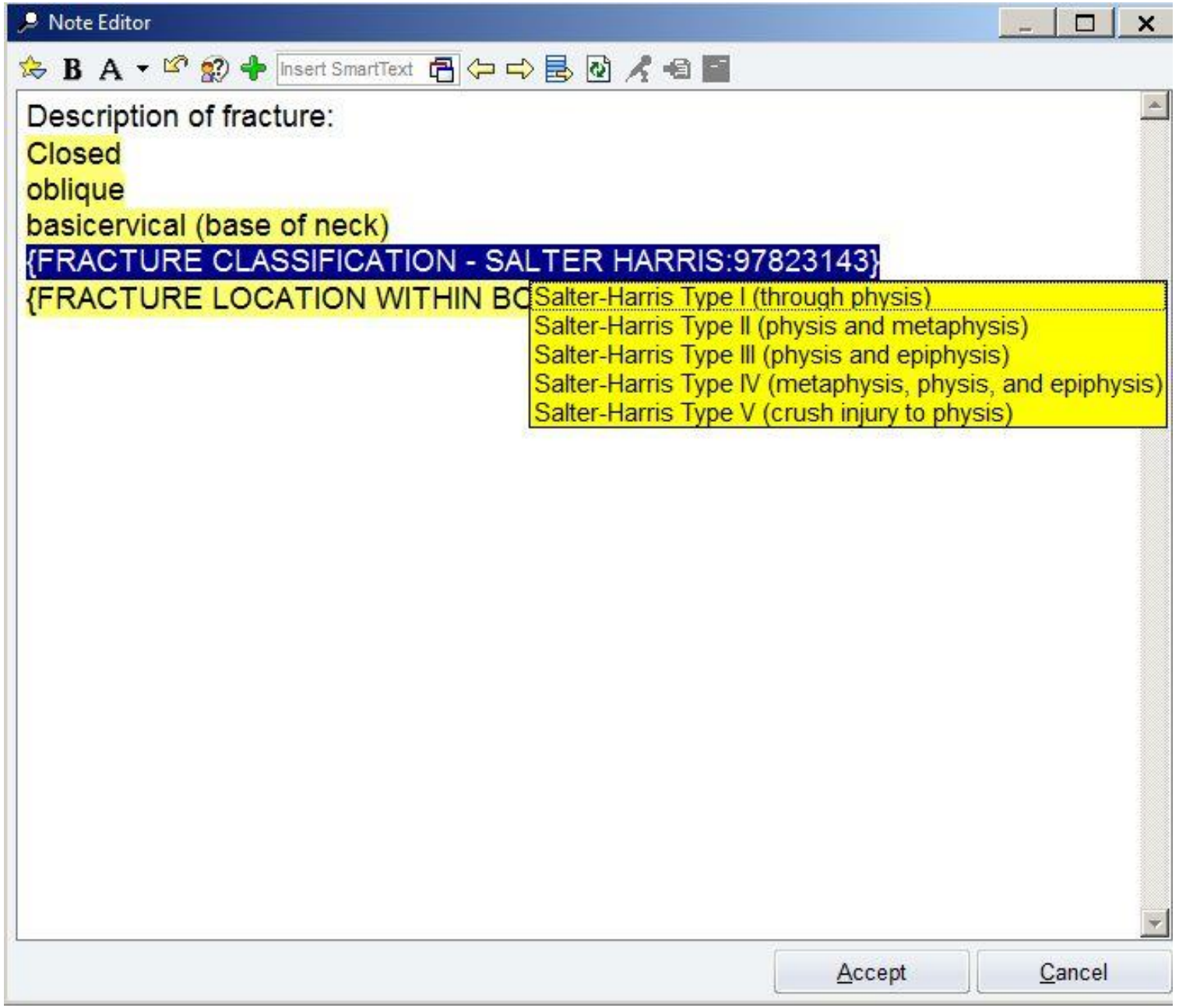
Gustilo classification



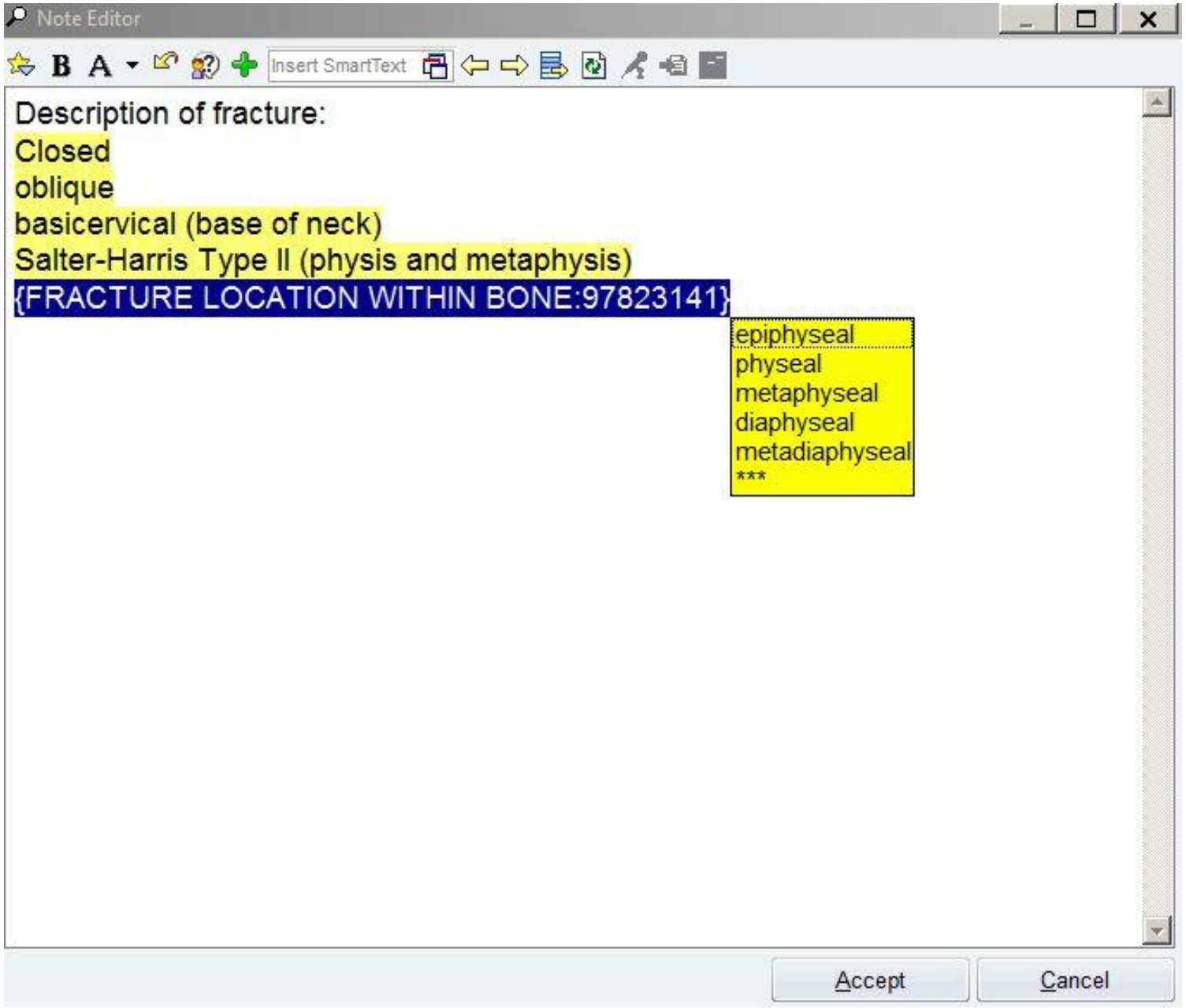
Fracture pattern



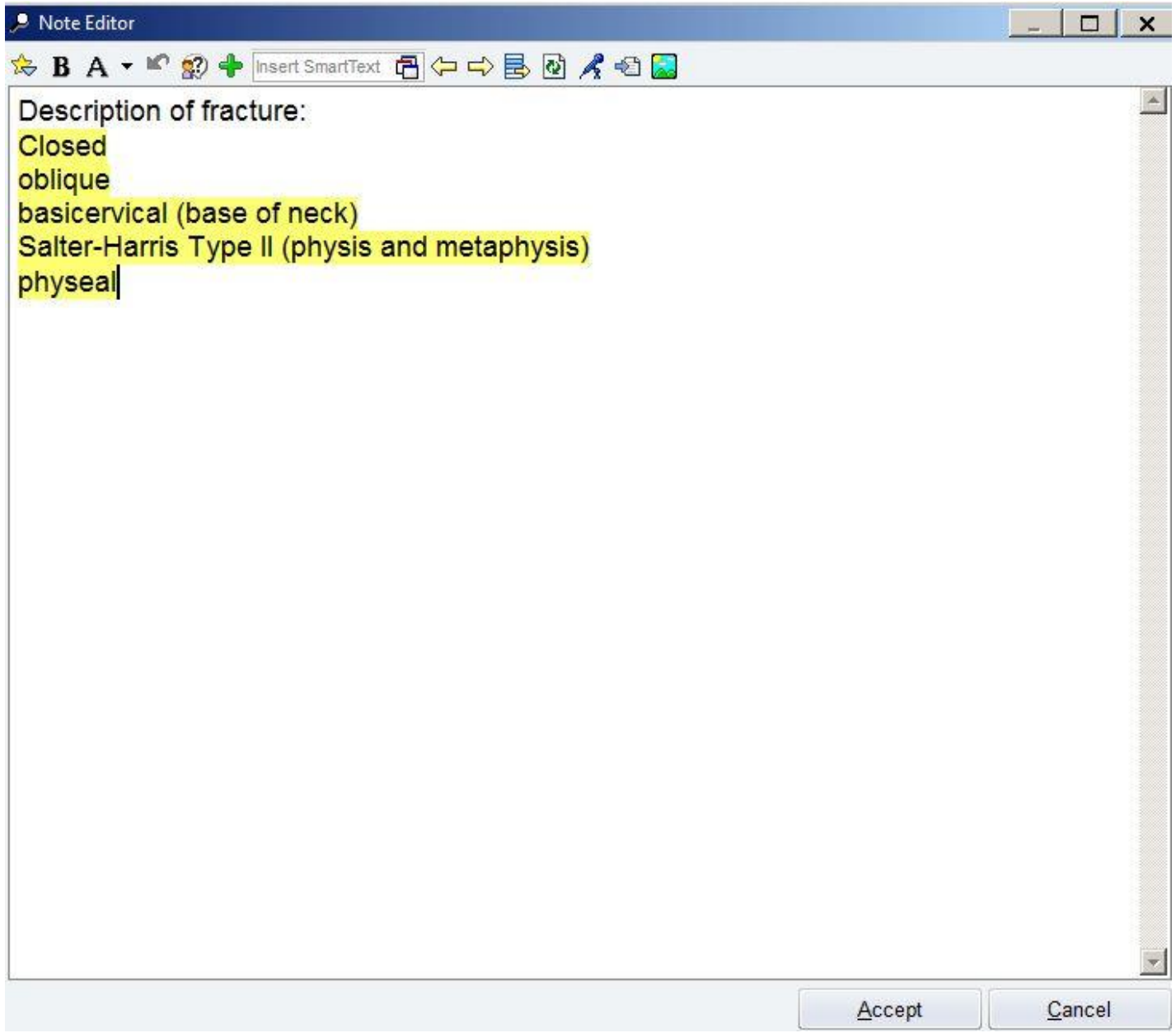
Hip fracture specifics



Salter-Harris classification



Location within bone


Note Editor
Insert SmartText
Description of fracture:
Closed
oblique
basicervical (base of neck)
Salter-Harris Type II (physis and metaphysis)
physeal
Accept
Cancel

Meaningful Use – Patient Portal Tips

- Set up login & password in the office
- Send follow up message that day or next day
- Use distribution list to send blast to multiple patients
  - Ex: bone health evaluation for all patients age ≥ 50

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EMR Efficiency

Oxymoron or Unicorn?

Joe T. Minchew, MD

Associate Professor
Department of Orthopaedic Surgery
Duke University Health System

Disclosures

- EPIC
  - Chairman, Adult Orthopaedic Steering Board
  - Advisory, non-financial

Well…….

- Yes
- Yes
- Maybe not
  - Put in time and effort prior to implementation
    - You can pay me now or pay me a lot later
  - Try to identify places where you can leverage software
  - 80-20 or 90-10 scenarios
    - Follow up patients
    - Postop patients
    - Procedure reports

EMR Efficiency

- Prior to Implementation
  - Identify pertinent available content
  - Identify content deficiencies that must be addressed
    - Who is committing the resources to rectify
  - Exam existing workflows and assess potential impact/changes
  - Establish concept that everyone must work/function up to the highest level of their abilities/scope of practice
    - Can’t (or won’t) do it- Is it system “model” or local decision
    - Design workflows, forms, etc. to incorporate this concept.
    - “Make me author”

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EMR Efficiency

SmartPhrases for MINCHEW, JOE T [MINCH002]

Name	Short Description	ID	Owner
ACDF3RDPOSTOPPLAN	Plan for postop ACDF 3rd visit	131595	MINCHEW, JOE T
COCCYXINJJTM	Coccygeal injection note	126159	MINCHEW, JOE T
COMPEXAMCSPINEJTM	Comprehensive cervical exam	126198	MINCHEW, JOE T
COMPEXAMCTLSPINEJTM	Comprehensive C-T-L spine physcial examination	292832	MINCHEW, JOE T
COMPEXAMTLSPINEJTM	Comprehensive thoracolumbar exam	126196	MINCHEW, JOE T
CSPINEANTPLANJTM	Preop plan for anterior cervical surgery	125571	MINCHEW, JOE T
CSPINEFUHPI	History for follow up cervical patient	125442	MINCHEW, JOE T
CSPINEFUHPIV2JTM	History for follow up cervical patient (temporary)	128933	MINCHEW, JOE T
CSPINEFUSIONPOSTOPJTM	History and examination for cervical postop fusion	122309	MINCHEW, JOE T
CSPINEFUVISITJTM	Follow up history and physical for cervical patient	127133	MINCHEW, JOE T
CSPINEMICROPOSTOPJTM	History and examination for cervical postop posterior foraminotomy	122337	MINCHEW, JOE T
CSPINENPHPIATRUAMATICJTM	HPI for new cervical patient atraumatic onset	124833	MINCHEW, JOE T
CSPINENPHPITRAUMAJTM	HPI for new cervical patient traumatic onset	124779	MINCHEW, JOE T
CSPINENPVISITJTM	History and examiation for cervical new patient	122268	MINCHEW, JOE T
CSPINEPREOPHPJTM	Cervical preoperative history and physical	134083	MINCHEW, JOE T
CSPINEPSTDECPLANJTM	Preop plan for posterior cervical foraminotomy	125579	MINCHEW, JOE T
CSPINEPSTFUSIONPLANJTM	Preop plan for posterior cervical fusion	125578	MINCHEW, JOE T
CUSTEXAMCTLSPINEJTM	Custom exam C-T-L spine	127116	MINCHEW, JOE T
DASCLSPINEFACETINJBILMULT.	Davis operative note for bilateral, multilevel intra-articular facet injections	214543	MINCHEW, JOE T
DCSUMMARYDRAFT	Draft Discharge Summary	194020	MINCHEW, JOE T
FACETINJPLANJTM	Preop plan for facet joint injection	125562	MINCHEW, JOE T
FACETRFPLANJTM	Preop plan for medial branch radiofrequency ablation	125563	MINCHEW, JOE T
FOCEXAMCTLSPINEJTM	Focused examination C-T-L spine	127108	MINCHEW, JOE T
HEMIOPNOTE	Operative Technique for Hemiarthroplasty for Hip Fx	185614	MINCHEW, JOE T
HIPPINNINOPTECH	Hip Pinning Technique for Hip Fracture	185615	MINCHEW, JOE T
ILESIPLANJTM	Preop plan for interlaminar epidural injection	125558	MINCHEW, JOE T
IMECHARTNOTE	Chart note for IME patients	311772	MINCHEW, JOE T
IMNTIBIAFX	Operative technique for IM nailing of tibia	279194	MINCHEW, JOE T
INJCTSSKM	Procedure: Carpal Tunnel Corticosteroid Injection	123754	MITHANI, SUHAIL K
INJPOSTINGJTM	Template for posting injections	130983	MINCHEW, JOE T
INTHXJTM	Interim History Patient Form JTM	125863	MINCHEW, JOE T
JTMBILMDECOPNOTE	Bilateral lumbar microdecompression operative note	225098	MINCHEW, JOE T
JTMCSPINECORPECTOMYOPN	Operative Note for Anterior Cervical Corpectomy and Fusion	254469	MINCHEW, JOE T
JTMDRHOPNOTEBASE	DRH Operative Note Base	221439	MINCHEW, JOE T
JTMINJDASCOPNOTEBASE	Davis Injection Op Note Base	219593	MINCHEW, JOE T

Maestro Workflow Responsibilities

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Competency Definition	Clinical staff	Provider
Enters reason(s) for visit.	x	
Enters vital signs (BP, height, weight, pain score and Mark as Reviewed.	x	
Update Allergies and Mark as Reviewed.	x	
Completes Med Reconciliation and Mark as Reviewed.	x	
Verifies/updates Pharmacy Information.	x	
Updates Past medical history, past surgical history, past family history and social history and Mark as Reviewed.	x	
Documents Falls Risk.	x	
Documents Tobacco Use and Mark as Reviewed.	x	
Review of Systems: Documents a patient-reported ROS.	x	
Enters order (if applicable), including but not limited to: • Referrals (PT, OT, Pain clinic etc) • CT/MRI/XR orders • Injection orders and documents on MAR (protocols shared to staff) • Labs • Medications (favorites/protocols should be shared to clinic staff)	x	

Maestro Workflow Responsibilities

Duke Orthopaedic Surgery

Enters patient instructions from ExitCare or via SmartPhrase. (if provider shares the necessary information- Smart Phrases or preferred Exit Care info)	x	
Enters Follow-Up information	x	
Prints AVS and discharges patient from room	x	
Completes Refill Encounters (based on phone calls) PRN	x	
Completes Telephone Encounters PRN	x	
Medication Reconciliation – press Mark as Reviewed		x
Enters Problem on the Problem List (and pushes the Problem to Diagnosis section) and Mark as Reviewed		x
Completes all sections of Progress Note.		x
Enters LOS and Charge Capture for visit- to be revisited within 90 days		x
Closes the Encounter (at the end of the AM and PM sessions- after all documentation above has been completed)		x

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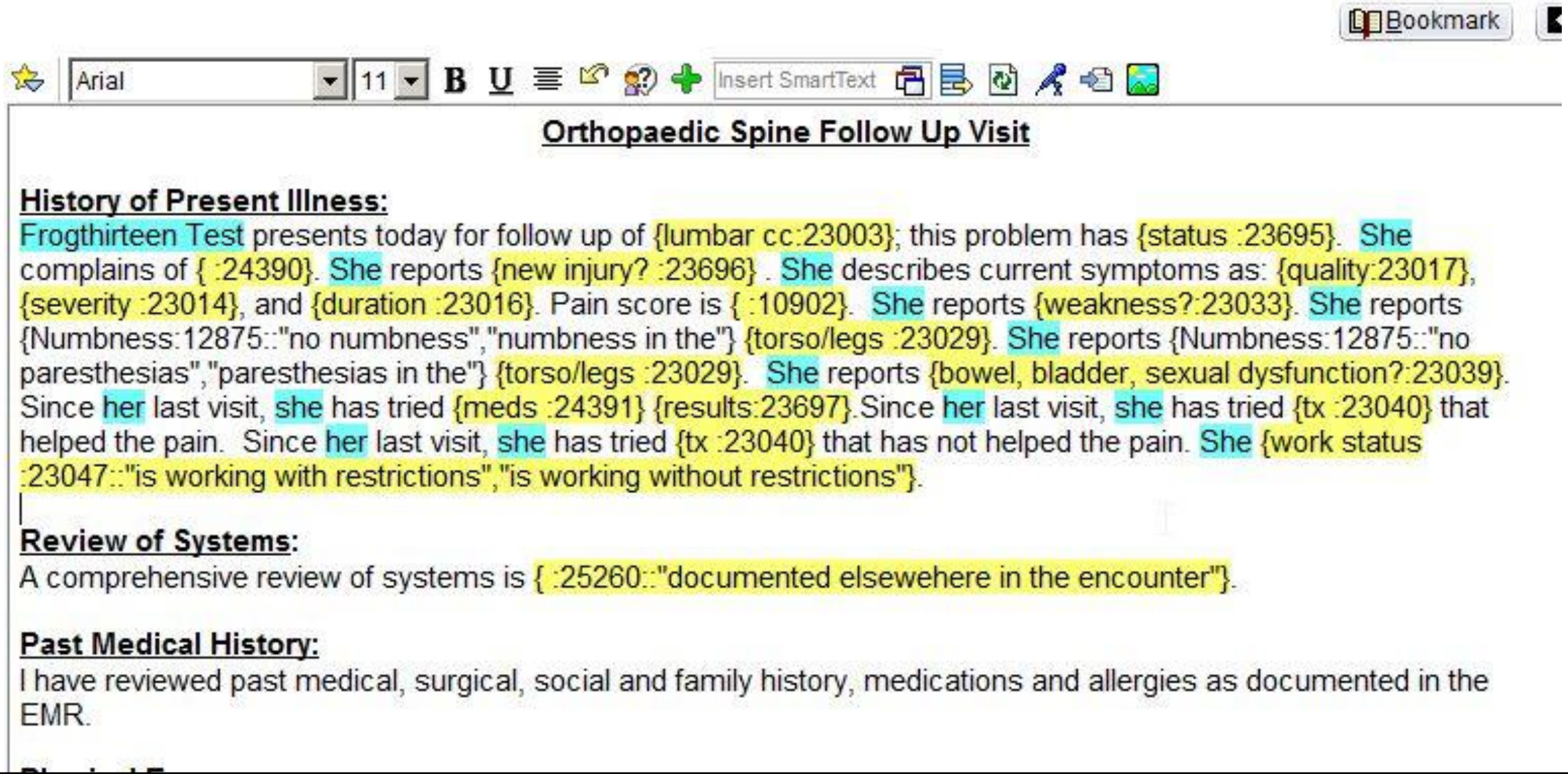
EMR Efficiency



Orthopaedic Spine Follow Up Visit

History of Present Illness:
Frogthirteen Test presents today for follow up of {lumbar cc:23003}; this problem has {status :23695}. She complains of { :24390}. She reports {new injury? :23696} . She describes current symptoms as: {quality:23017}, {severity :23014}, and {duration :23016}. Pain score is { :10902}. She reports {weakness?:23033}. She reports {Numbness:12875::"no numbness","numbness in the"} {torso/legs :23029}. She reports {Numbness:12875::"no paresthesias","paresthesias in the"} {torso/legs :23029}. She reports {bowel, bladder, sexual dysfunction?:23039}. Since her last visit, she has tried {meds :24391} {results:23697}.Since her last visit, she has tried {tx :23040} that helped the pain. Since her last visit, she has tried {tx :23040} that has not helped the pain. She {work status :23047::"is working with restrictions","is working without restrictions"}.

Review of Systems:
A comprehensive review of systems is { :25260::"documented elsewehere in the encounter"}.

Past Medical History:
I have reviewed past medical, surgical, social and family history, medications and allergies as documented in the EMR.

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EMR Efficiency

Patient Name: _____ MRN:_____ DOS:_____

L-Spine Follow-Up or **T-Spine Follow-up**

WHAT IS YOUR MAIN COMPLAINT?

Involved Area (Check only one)

- Back
- Left leg pain (Check Laterality)
- Right leg pain
- Pain in both legs

SINCE YOU LAST VISIT:

1.) Has this problem (Check One)

- Resolved
- Mildly improved
- Moderately improved
- Significantly improved
- Remained the Same
- Mildly worsened
- Moderately worsened
- Severely worsened

Is this still your main problem (Circle One)? (Yes) (No).

Duke Orthopaedic Surgery

EMR Efficiency

History of Present Illness:

Frogthirteen Test presents today for follow up of left leg pain; this problem has {status :23695}. She complains of { :24390}. She reports {new injury? :23696} . She describes current symptoms as: {quality:230 and {duration :23016}. Pain score is { :10902}. She reports {weakness?:23033}. She reports numbness","numbness in the"} {torso/legs :23029}. She reports {Numbness:12875::"no pares in the"} {torso/legs :23029}. She reports {bowel, bladder, sexual dysfunction?:23039}. Since h tried {meds :24391} {results:23697}.Since her last visit, she has tried {tx :23040} that helped th visit, she has tried {tx :23040} that has not helped the pain. She {work status :23047::"is workin working without restrictions"}.

- resolved
- mildly improved
- moderately improved
- significantly improved
- remained the same
- mildly worsened
- moderately worsened
- severely worsened
- ***

Review of Systems:

A comprehensive review of systems is { :25260::"documented elsewehere in the encounter"}.

Duke Orthopaedic Surgery

EMR Efficiency

2.) Do you have any related symptoms or pain (Check all that apply):

No Associated Symptoms (skip to question # 4.)
Neck Pain: _____(where?)
Shoulder Pain: (Left) (Right) (Both)
Arm Pain: (Left) (Right) (Both)
Shoulder Blade: (Left) (Right) (Both)
Pain between the neck and shoulder (Left) (Right) (Both)
Back Pain _____(where?)
Leg Pain: (Left) (Right) (Both)
Other_____

3.) Have these symptoms (Check One)?:

Resolved
Mildly Improved
Moderately Improved
Significantly Improved
Remained the Same
Mildly Worsened
Moderately Worsened
Severely Worsened

Duke Orthopaedic Surgery

EMR Efficiency

History of Present Illness:

Frogthirteen Test presents today for follow up of left leg pain; this problem has {status :23695}. She complains of {
:24390}. She reports {new injury? :23696} . She describes current symptoms as: {quality:23017}, {severity :23014},
and {du
numbne
in the"}
tried {m
visit, she has tried {tx :23040} that has not helped the pain. She {work status :23047::"is working with restrictions","is
working without restrictions"}.

no associated symptoms or pain
associated {cervical pain :23707}; this problem has { :23695}
associated {TL pain :23004}; this problem has { :23695}
***

s?:23033}. She reports {Numbness:12875::"no
nbness:12875::"no paresthesias","paresthesias
unction?:23039}. Since her last visit, she has
{tx :23040} that helped the pain. Since her last

EMR Efficiency

DESCRIBE YOUR SYMPTOMS:

Quality (Check All That Apply):
- Aching
- Cramping
- Dull
- Electrical
- Radiating
- Sharp
- Superficial (skin)
- Squeezing (pressure)
- Other:_____

Severity (Check One)
- Mild
- Moderate
- Severe
- Intense
- Unremitting
- Mild to Moderate
- Mild to Severe
- Moderate to Severe
- Other _____

Duration (Check One)
- Constant
- Intermittent
- Occasional
- Improving
- Worsening
- Constant w/ intermittent worsening
- Unchanged
- Other _____

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EMR Efficiency

History of Present Illness:
Frogthirteen Test presents today for follow up of left leg pain; this problem has {status :23695}. She complains of { :24390}. She reports {new injury? :23696} . She describes current symptoms as: {quality:23017}, {severity :23014}, and {duration :23016}. Pain score is { :10902}. She reports {weakness?:23033}. She reports {Nu
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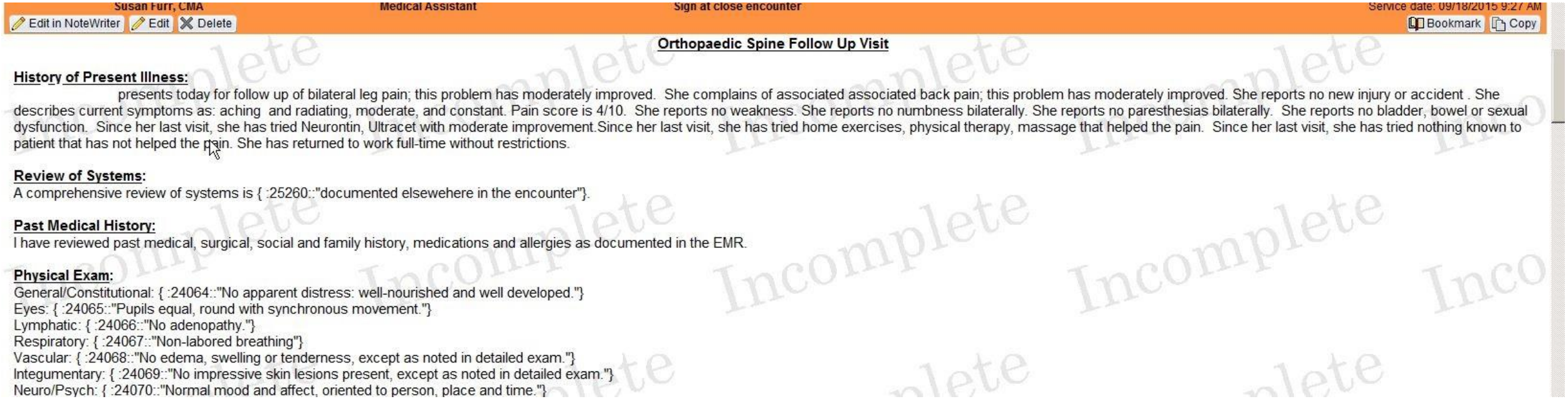
tried {meds :24391} {results:23697}.Since her last visit, she has tried {tx :23040} that helped the
visit, she has tried {tx :23040} that has not helped the pain. She {work status :23047::"is working
working without restrictions"}.

aching
cramping
dull
electrical
radiating
sharp
superficial (skin)
squeezing (pressure)
***

Review of Systems:
A comprehensive review of systems is { :25260::"documented elsewehere in the encounter"}.

Duke Orthopaedic Surgery

EMR Efficiency


Susan Furr, CMA Medical Assistant Sign at close encounter Service date: 09/18/2015 9:27 AM

Edit in NoteWriter | Edit | Delete | Bookmark | Copy

Orthopaedic Spine Follow Up Visit

History of Present Illness:

presents today for follow up of bilateral leg pain; this problem has moderately improved. She complains of associated associated back pain; this problem has moderately improved. She reports no new injury or accident . She describes current symptoms as: aching and radiating, moderate, and constant. Pain score is 4/10. She reports no weakness. She reports no numbness bilaterally. She reports no paresthesias bilaterally. She reports no bladder, bowel or sexual dysfunction. Since her last visit, she has tried Neurontin, Ultracet with moderate improvement.Since her last visit, she has tried home exercises, physical therapy, massage that helped the pain. Since her last visit, she has tried nothing known to patient that has not helped the pain. She has returned to work full-time without restrictions.

Review of Systems:

A comprehensive review of systems is { :25260::"documented elsewehere in the encounter"}.

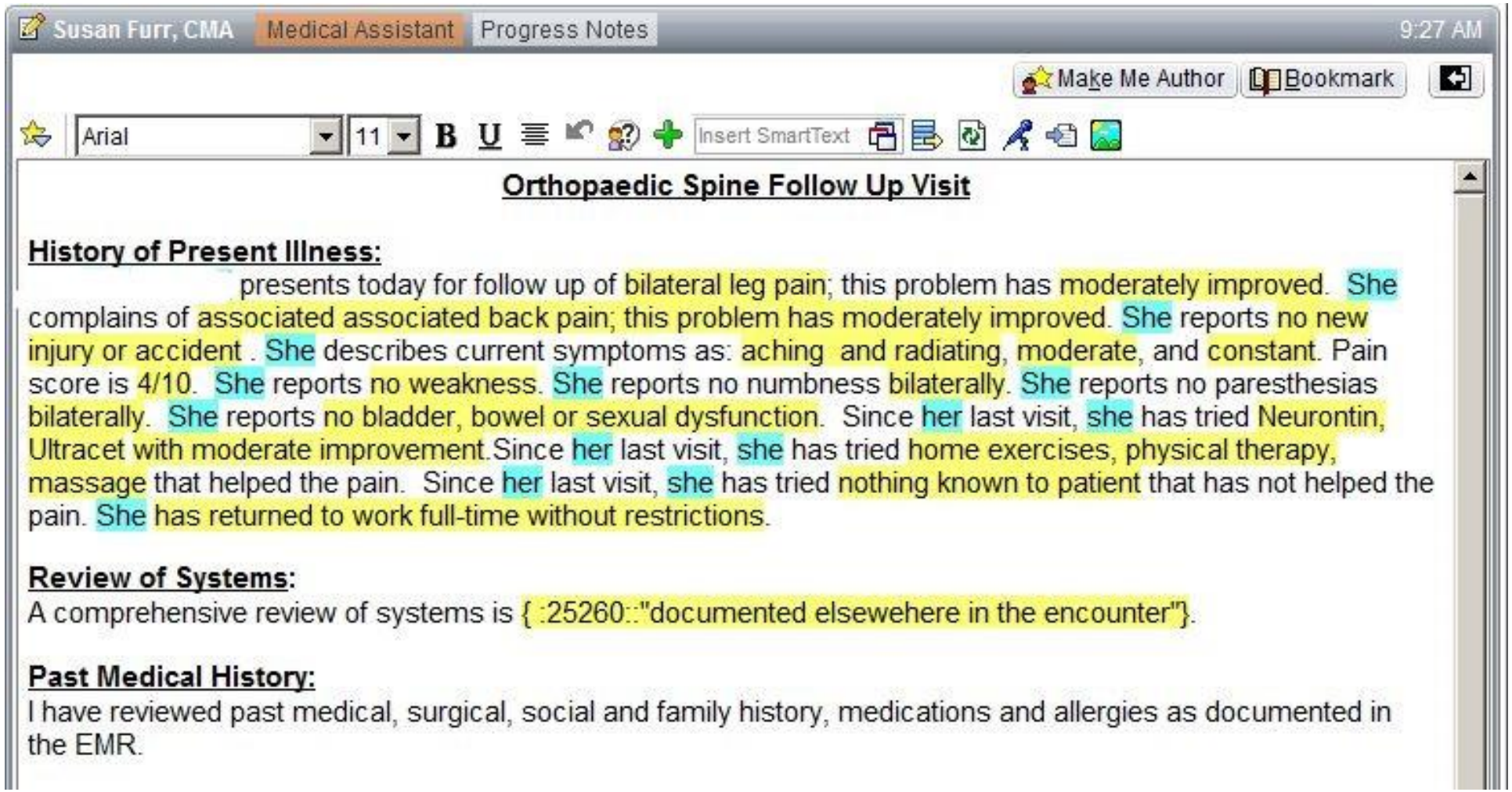
Past Medical History:

I have reviewed past medical, surgical, social and family history, medications and allergies as documented in the EMR.

Physical Exam:

General/Constitutional: { :24064::"No apparent distress: well-nourished and well developed."}
Eyes: { :24065::"Pupils equal, round with synchronous movement."}
Lymphatic: { :24066::"No adenopathy."}
Respiratory: { :24067::"Non-labored breathing"}
Vascular: { :24068::"No edema, swelling or tenderness, except as noted in detailed exam."}
Integumentary: { :24069::"No impressive skin lesions present, except as noted in detailed exam."}
Neuro/Psych: { :24070::"Normal mood and affect, oriented to person, place and time."}

EMR Efficiency



Orthopaedic Spine Follow Up Visit

History of Present Illness:

presents today for follow up of bilateral leg pain; this problem has moderately improved. She complains of associated associated back pain; this problem has moderately improved. She reports no new injury or accident . She describes current symptoms as: aching and radiating, moderate, and constant. Pain score is 4/10. She reports no weakness. She reports no numbness bilaterally. She reports no paresthesias bilaterally. She reports no bladder, bowel or sexual dysfunction. Since her last visit, she has tried Neurontin, Ultracet with moderate improvement.Since her last visit, she has tried home exercises, physical therapy, massage that helped the pain. Since her last visit, she has tried nothing known to patient that has not helped the pain. She has returned to work full-time without restrictions.

Review of Systems:

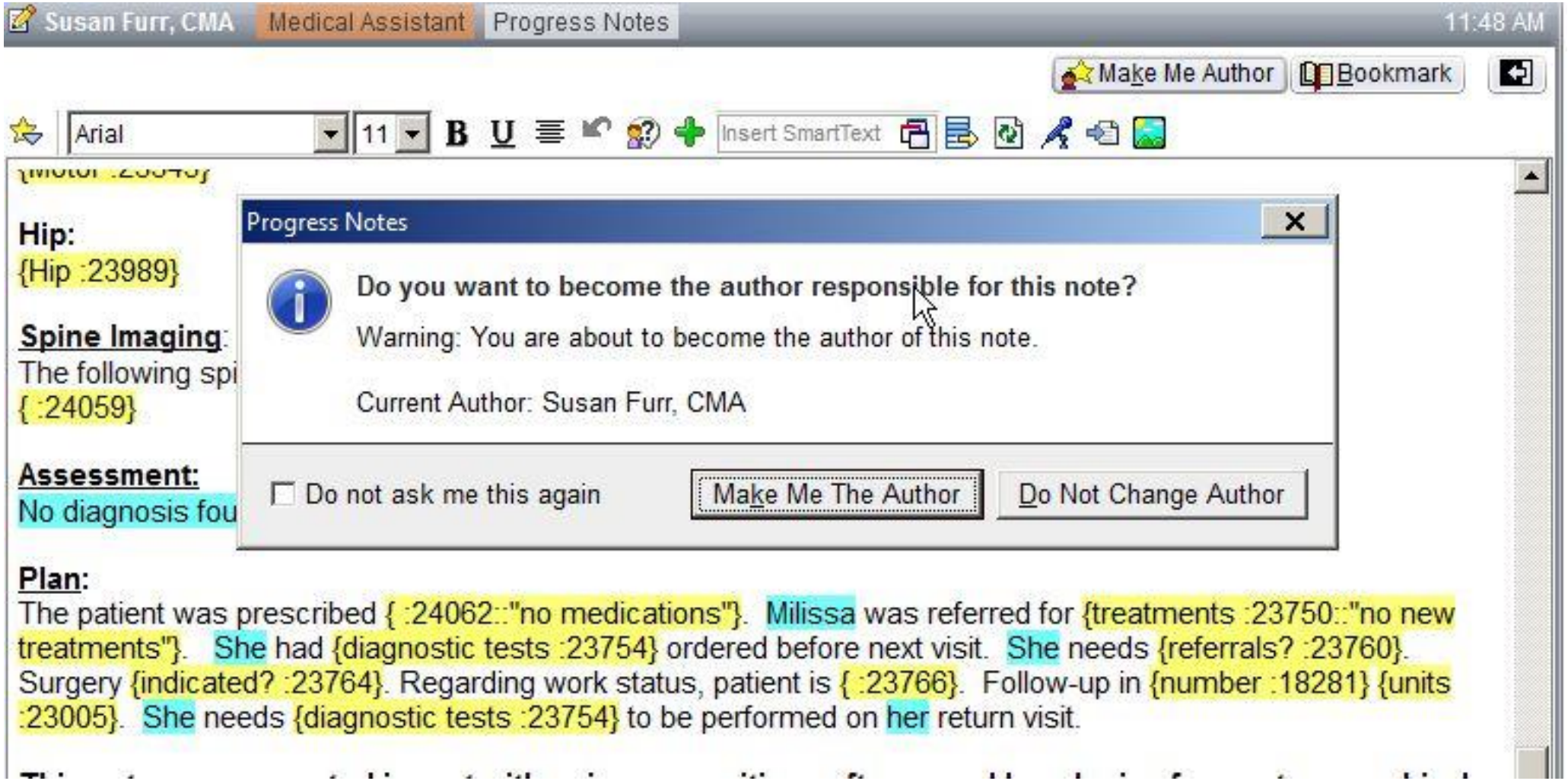
A comprehensive review of systems is { :25260::"documented elsewehere in the encounter"}.

Past Medical History:

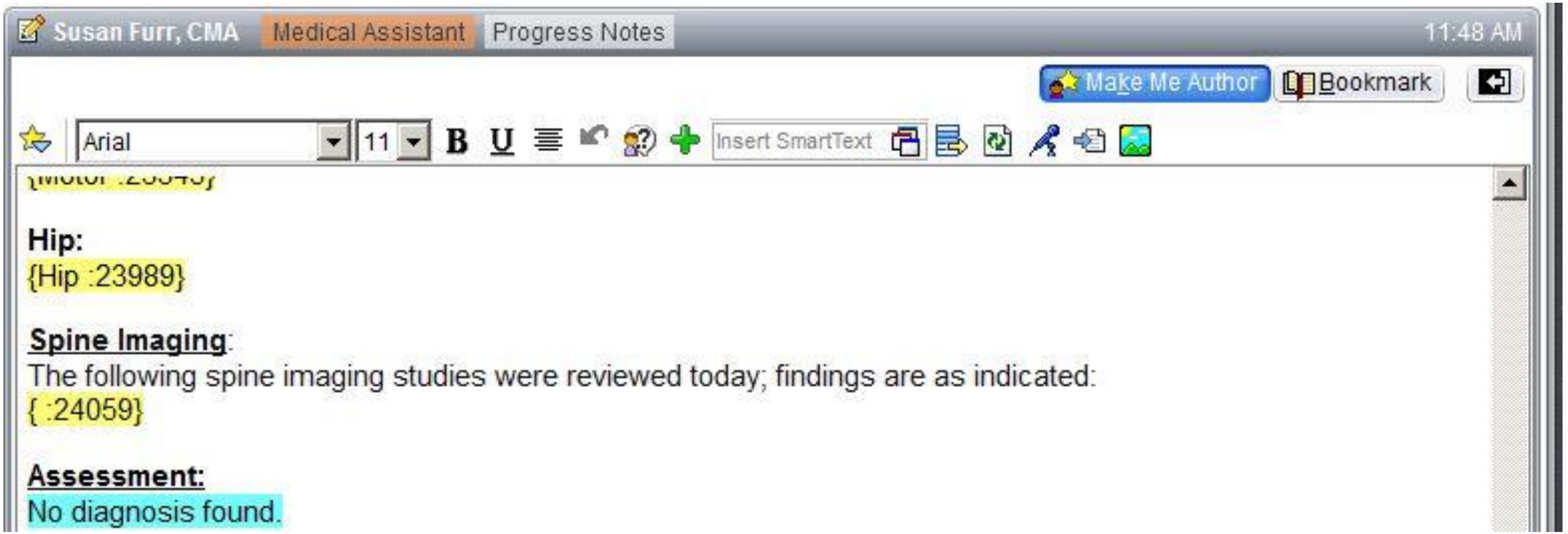
I have reviewed past medical, surgical, social and family history, medications and allergies as documented in the EMR.

Duke Orthopaedic Surgery

EMR Efficiency



EMR Efficiency



Duke Orthopaedic Surgery

EMR Efficiency

Joe Tommy Minchew, MD | Physician | Sign at close encounter | Service date: 09/18/2015 9:27 AM

Edit in NoteWriter | Edit | Delete | Bookmark | Copy

Orthopaedic Spine Follow Up Visit

History of Present Illness:

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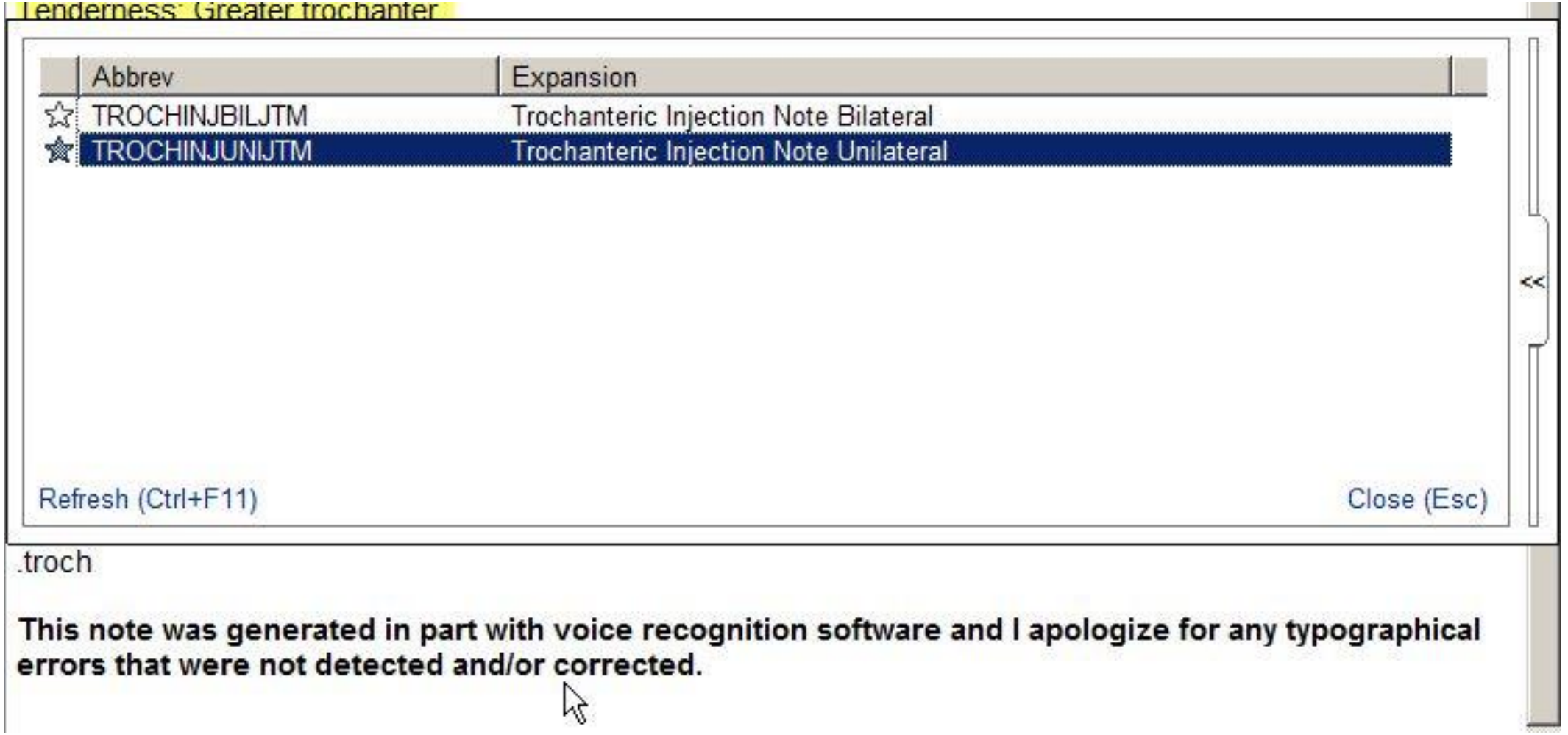

Duke Orthopaedic Surgery

EMR Efficiency

Procedure Note
Trochanteric Injection {:25644}

on the right
on the left
bilaterally
***

Indications
She has trochanteric bursitis pa been resistant to other conservative measures. The risks, benefits and alternatives of the propose ere discussed with her. She states they understand these and verbally consents to proceed.

Description of Procedure
The point of maximal tenderness over the trochanter was determined and marked. Her {Left/right:33004} greater trochanteric region was prepped with iodine. Topical skin anesthesia was obtained using ethyl chloride spray. Using aseptic technique 4.5 ml of 1% Lidocaine without epinephrine, 4.5 ml of 0.25% Bupivacaine without epinephrine and 1 ml of Depo Medrol 80 mg/ml was injected into the trochanteric bursa with a 22 gauge needle. She tolerated procedure well. She was counseled as to expected post injection course, including the possibility of temporary worsening of symptoms. She was instructed as to concerning symptoms or signs and instructed to contact the office if these should appear.

Duke Orthopaedic Surgery

EMR Efficiency

Orthopaedic Spine Postoperative Visit

History of Present Illness:
Date of Surgery: 06/18/15
Procedure: Microdecompression L4-L5 on the right , L5-S1 on the right

presents today for post-op follow-up. She reports doing poorly due to pain problems. The pre-op right leg pain has significantly improved. Her chief complaint at this point is low back pain. She reports no preop numbness/paresthesias. She reports no preop weakness. The wound has been healing without problems. She has been using Oxycodone intermittently. She is able to perform ADL's. She is retired.

Review of Systems:
A comprehensive review of systems is documented elsewehere in the encounter.

Past Medical History:
I have reviewed past medical, surgical, social and family history, medications and allergies as documented in the EMR.

Physical Exam:
General/Constitutional: No apparent distress: well-nourished and well developed.
Eyes: Pupils equal, round with synchronous movement.
Lymphatic: No palpable axillary adenopathy.
Respiratory: Non-labored breathing
Vascular: No edema, swelling or tenderness, except as noted in detailed exam.
Integumentary: No impressive skin lesions present, except as noted in detailed exam.
Neuro/Psych: Normal mood and affect, oriented to person, place and time.
Musculoskeletal: Normal, except as noted in detailed exam and in HPI.

Post-Op Exam

Post-Op	6 weeks
Pain	10/10.
Wound	has healed without problems
Swelling	none
Tenderness	moderate

Duke Orthopaedic Surgery

EMR Efficiency

History of Present Illness:
Date of Surgery: 06/18/15
Procedure: Microdecompression L4-L5 on the right , L5-S1 on the right

presents today for post-op follow-up. She reports being generally well.
The pre-op right leg pain has significantly improved. Her lower back pain has significantly improved. She reports no preop numbness/paresthesias. She reports no preop weakness. The wound has been healed. She has been using {Pain :23044} intermittently. She is able to perform ADL's. She is retired.

- Cymbalta
- Darvocet
- Duragesic
- Hydrocodone
- Lidoderm 5% ADH patch
- Lorcet
- Lyrica
- Methadone
- MS Contin
- Neurontin
- Oxycodone
- Oxycontin
- Percocet
- Tylenol
- Tylenol with codeine
- Ultracet
- Ultram
- Vicodin
- ***

Review of Systems:
A comprehensive review of sy sewehere in the encounter.

Past Medical History:
I have reviewed past medical, y history, medications and allergies as documented in the EMR.

Physical Exam:
General/Constitutional: No ap shed and well developed.
Eyes: Pupils equal, round witl .
Lymphatic: No palpable axillar
Respiratory: Non-labored brea
Vascular: No edema, swelling noted in detailed exam.
Integumentary: No impressive ept as noted in detailed exam.
Neuro/Psych: Normal mood a son, place and time.
Musculoskeletal: Normal, exc am and in HPI.

Post-Op Exam

Duke Orthopaedic Surgery

EMR Efficiency

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Neuro/Psych: Normal mood a on, place and time.
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Post-Op Exam

EMR Efficiency

- Future
  - Patient entered medical information
    - EMR Web Portal
      - MyChart, etc.
    - Welcome kiosk
    - Tablet
  - Patient entered outcomes data

Clinic Wait Time and Patient Satisfaction

Brendan M. Patterson

North Carolina Orthopaedic Association

October 2015

Disclosures

- None

Background

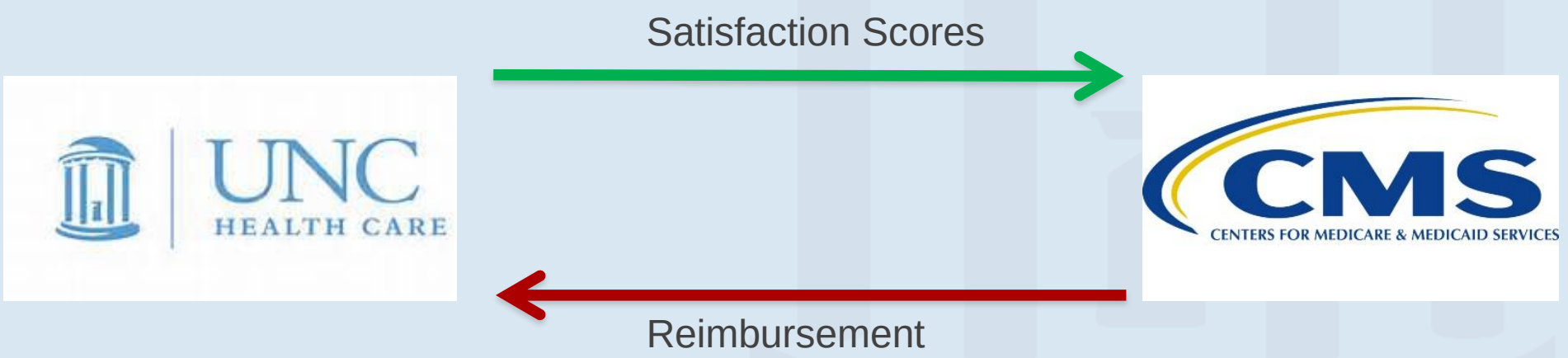
- Value based purchasing → quality of care
- Patient satisfaction → measure of quality of care
- Increased patient satisfaction has been linked to
  - » Increased referral rates
  - » Decreased mal-practice suits
  - » Increased compliance with treatment plans

Shirley et al. JBJS. 2013

Patient satisfaction → Reimbursement

Centers for Medicare and Medicaid Services (CMS)

- Require reporting of patient satisfaction scores
- 1-2% of reimbursement withheld if not reported



Satisfaction Score

- Consumer Assessment of Healthcare Providers and Systems
  - » “CAHPS” Survey
  - » Federally developed and validated patient satisfaction survey
  - » 37 items, 15 pertain to the patients most recent visit.

- Measures of patient experience of care:
  - » Wait-time
  - » Providers communication
  - » Qualities of ancillary staff
  - » Rating of the Provider

CAHPS

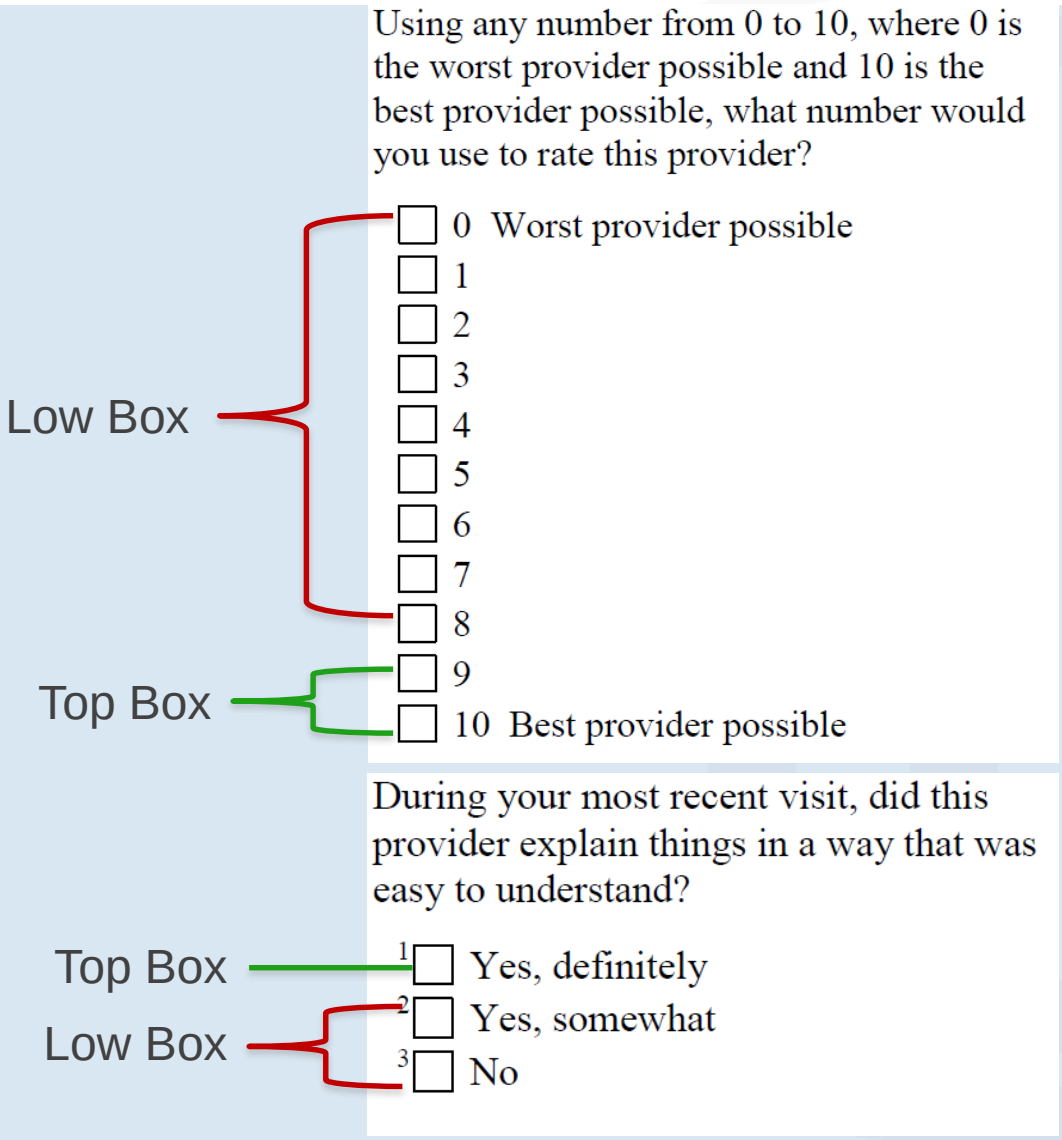
Using any number from 0 to 10, where 0 is the worst provider possible and 10 is the best provider possible, what number would you use to rate this provider?

- ☐ 0 Worst provider possible
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10 Best provider possible

During your most recent visit, did this provider explain things in a way that was easy to understand?

- [1] ☐ Yes, definitely
- [2] ☐ Yes, somewhat
- [3] ☐ No

CAHPS


Using any number from 0 to 10, where 0 is the worst provider possible and 10 is the best provider possible, what number would you use to rate this provider?
0 Worst provider possible
1
2
3
4
5
6
7
8
9
10 Best provider possible
Low Box
Top Box
During your most recent visit, did this provider explain things in a way that was easy to understand?
1 Yes, definitely
2 Yes, somewhat
3 No
Top Box
Low Box

Functional Outcome

- Patient Reported Outcomes Measurement Information System
  - » “PROMIS”
- Patient reported questionnaire to assess physical function, pain and depression
- Valid, reliable, and comparable results
- Patient score compared to
  - » General population based on age and gender

Hung et al. JOR. 2011

Functional Outcome

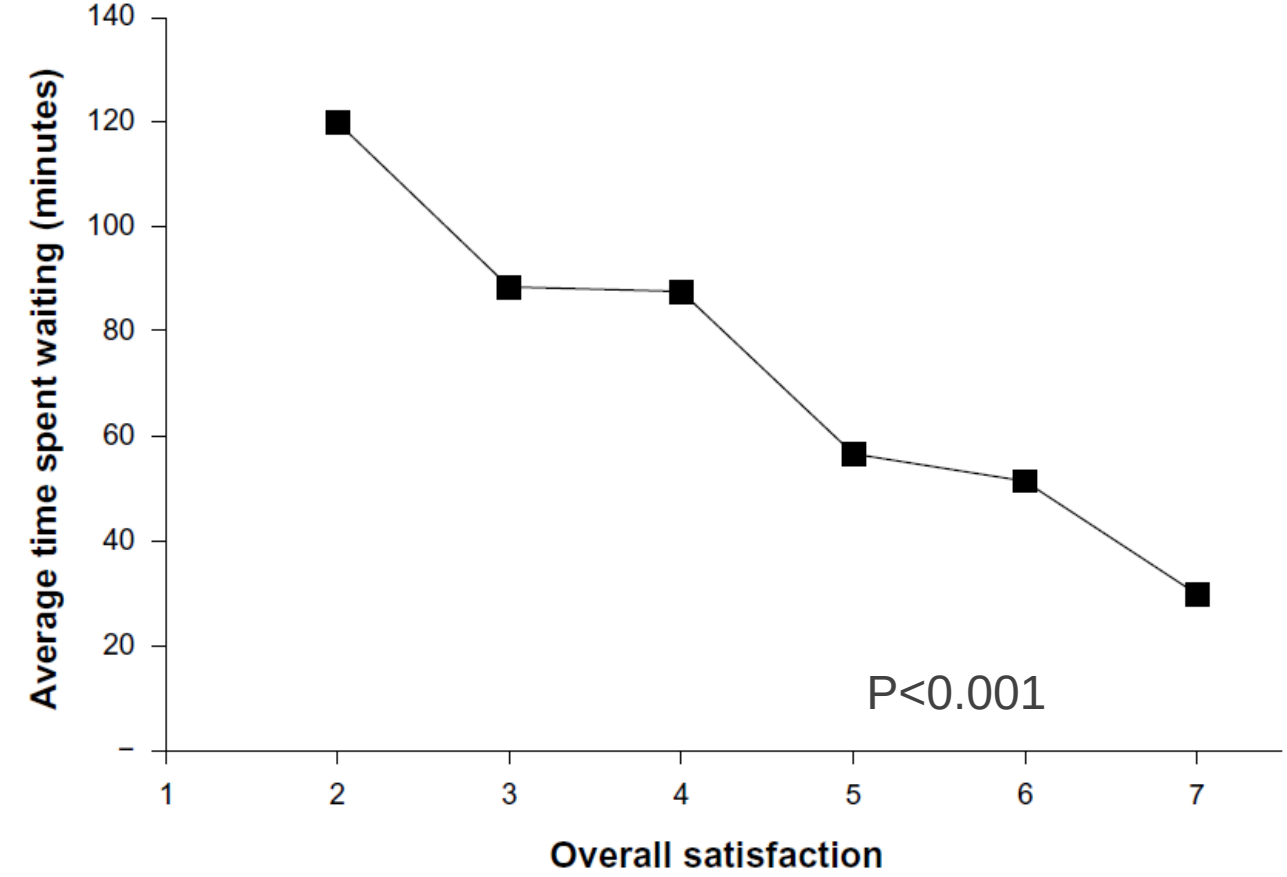
- PROMIS computerized adaptive tests (CATs)

		Without any difficulty	With a little difficulty	With some difficulty	With much difficulty	Unable to do
PFA11 1	Are you able to do chores such as vacuuming or yard work?	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
PFA21 2	Are you able to go up and down stairs at a normal pace?	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
PFA23 3	Are you able to go for a walk of at least 15 minutes?	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
PFA53 4	Are you able to run errands and shop?	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
		Not at all	**Very little**	**Somewhat**	**Quite a lot**	**Cannot do**
PFC12 5	Does your health now limit you in doing two hours of physical labor?	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
PFB1 6	Does your health now limit you in doing moderate work around the house like vacuuming, sweeping floors or carrying in groceries?	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
PFA5 7	Does your health now limit you in lifting or carrying groceries?	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
PFA4 8	Does your health now limit you in doing heavy work around the house like scrubbing floors, or lifting or moving heavy furniture?	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1

Hays et al. APMR. 2013

Clinic wait time and patient satisfaction

- 104 patients
- Outpatient ophthalmology clinic



McMullen et al. Clinical Ophthalmology. 2013

Clinic wait time and patient satisfaction

- Prospective study of 81 orthopaedic patients.
- Decreased clinic wait time → Increased patient satisfaction
- Time spent with provider ≠ Increased patient satisfaction

Teunis et al. CORR. 2013

Purpose

Lower extremity orthopaedic patients

- Patient satisfaction
  - Clinic wait time
  - Time with provider
- Wait time: Actual vs Perceived
- CAHPS and PROMIS scores

Methods

- 182 consecutive patients enrolled (5 declined) from UNC foot and ankle and adult reconstruction clinics.

- Inclusion criteria:
  - » New and return patients
  - » ≥ 18 years of age
  - » Lower extremity complaint

- Exclusion criteria:
  - » Non-English speaking
  - » Illiterate
  - » Pediatric patients
  - » Upper extremity complaint

Variables and Outcome Measures

- Wait time = check in → seen by attending surgeon
- Provider time = total time with attending surgeon
- Patient satisfaction
  - » Provider rating (CAHPS)
- Function, Pain, and Depression
  - » PROMIS

Statistical analysis

- Power analysis:
  - Teunis et al, CORR 2013:
    - Wait time = 32 minutes
    - Clinic wait time and patient satisfaction (Correlation coefficient -0.3)

- UNC Sample size:
    - Power = 0.80
    - Alpha = 0.05
    - 84 patients required to prevent reporting type 2 error

Statistical analysis

- Patients grouped by “Top Box” and “Low Box” provider rating
- Outcome variables compared between both “Top Box” and “Low Box” patient groups
- Student’s test-t and chi-squared analysis used to compare continuous and dichotomous variables respectively.

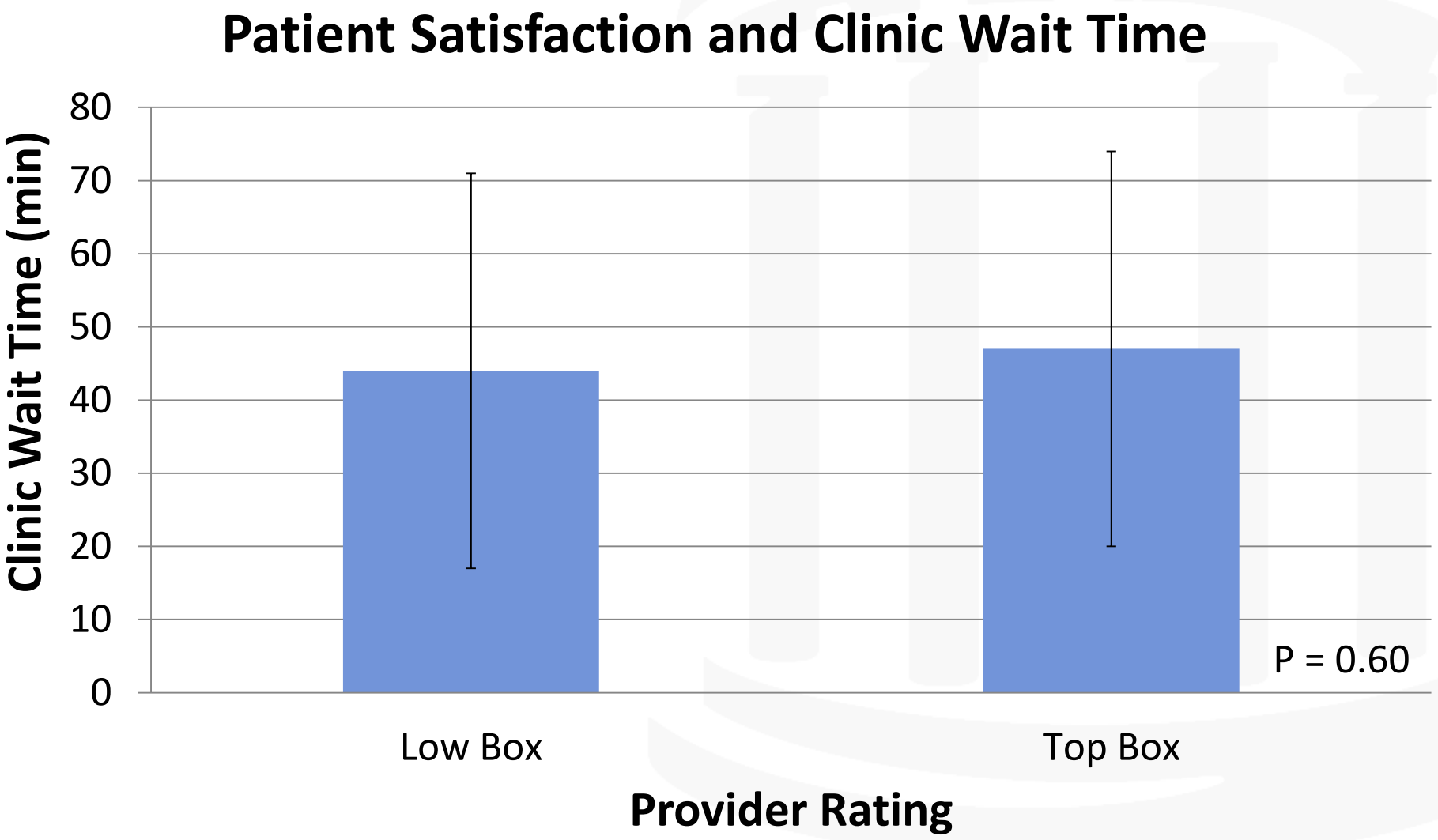
Results

PROMIS Survey	Low Box	Top Box	P-value
Depression			
Pain			
Physical Function			

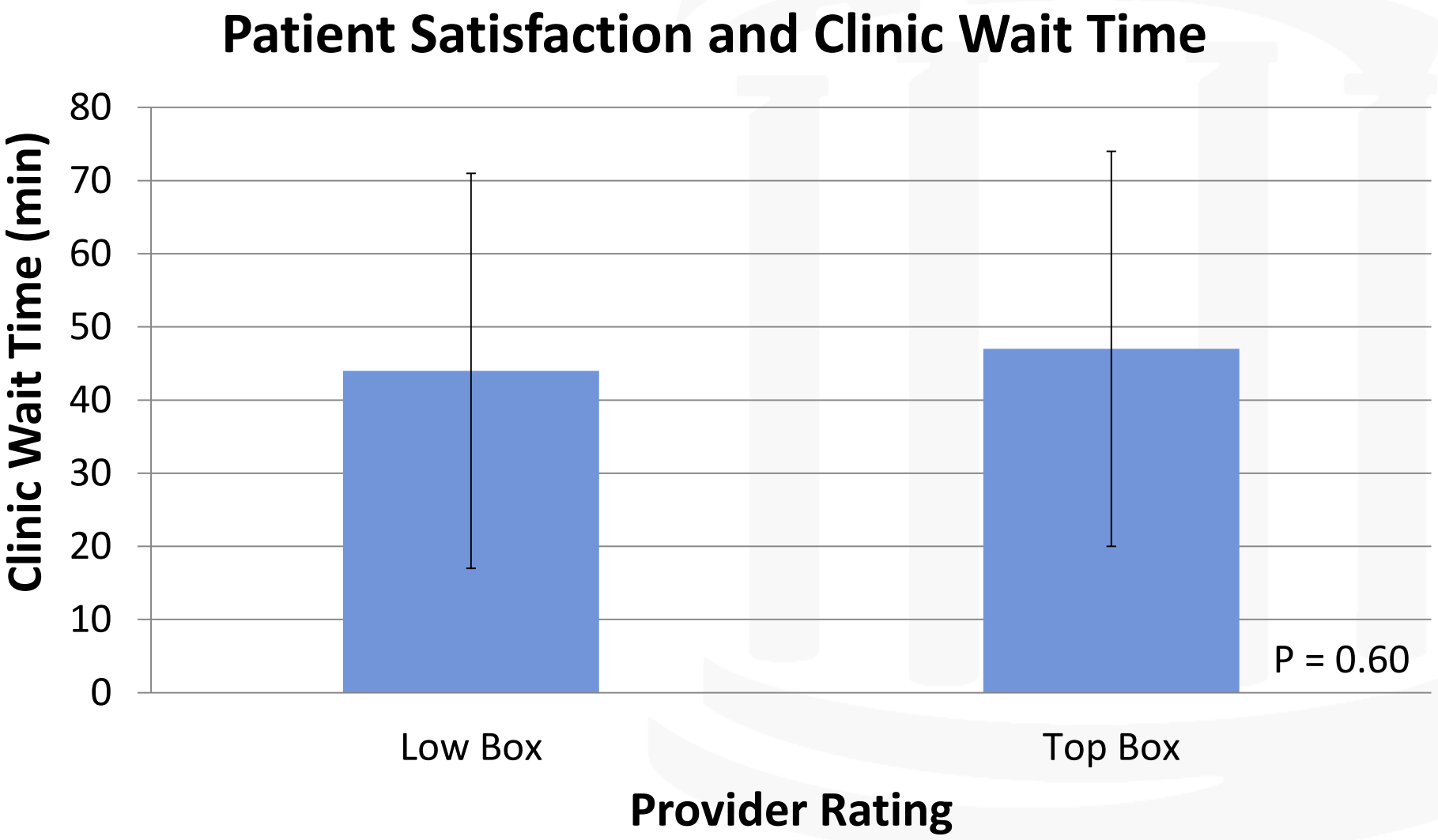
Results

PROMIS Survey	Low Box	Top Box	P-value
Depression	53.38 ± 7.7	50.84 ± 9.5	0.242
Pain	60.71 ± 8.7	61.24 ± 8.1	0.785
Physical Function	36.86 ± 10.2	37.17 ± 8.9	0.881

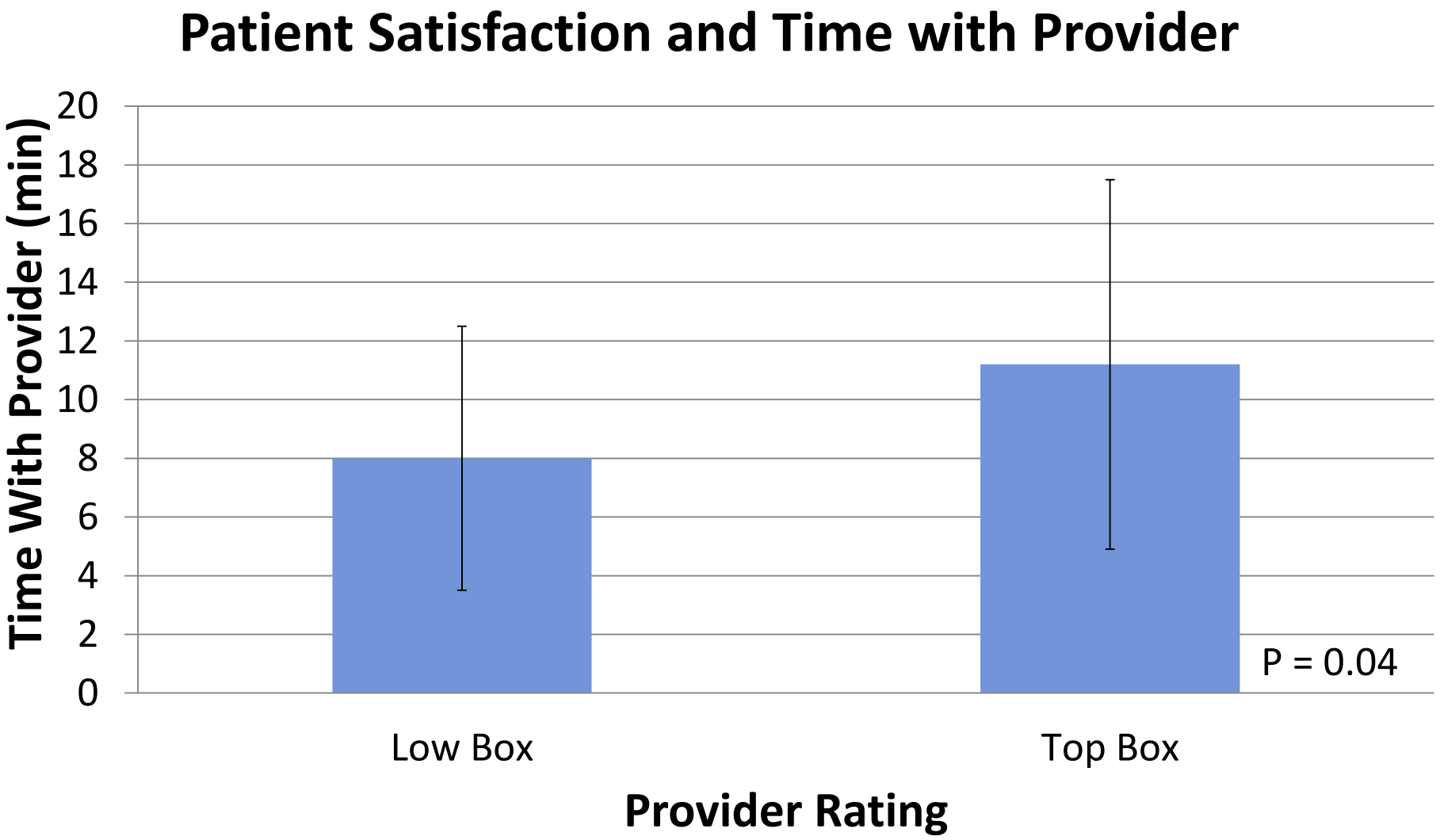
Results


Patient Satisfaction and Clinic Wait Time
Clinic Wait Time (min)
80
70
60
50
40
30
20
10
0
P = 0.60
Low Box
Top Box
Provider Rating

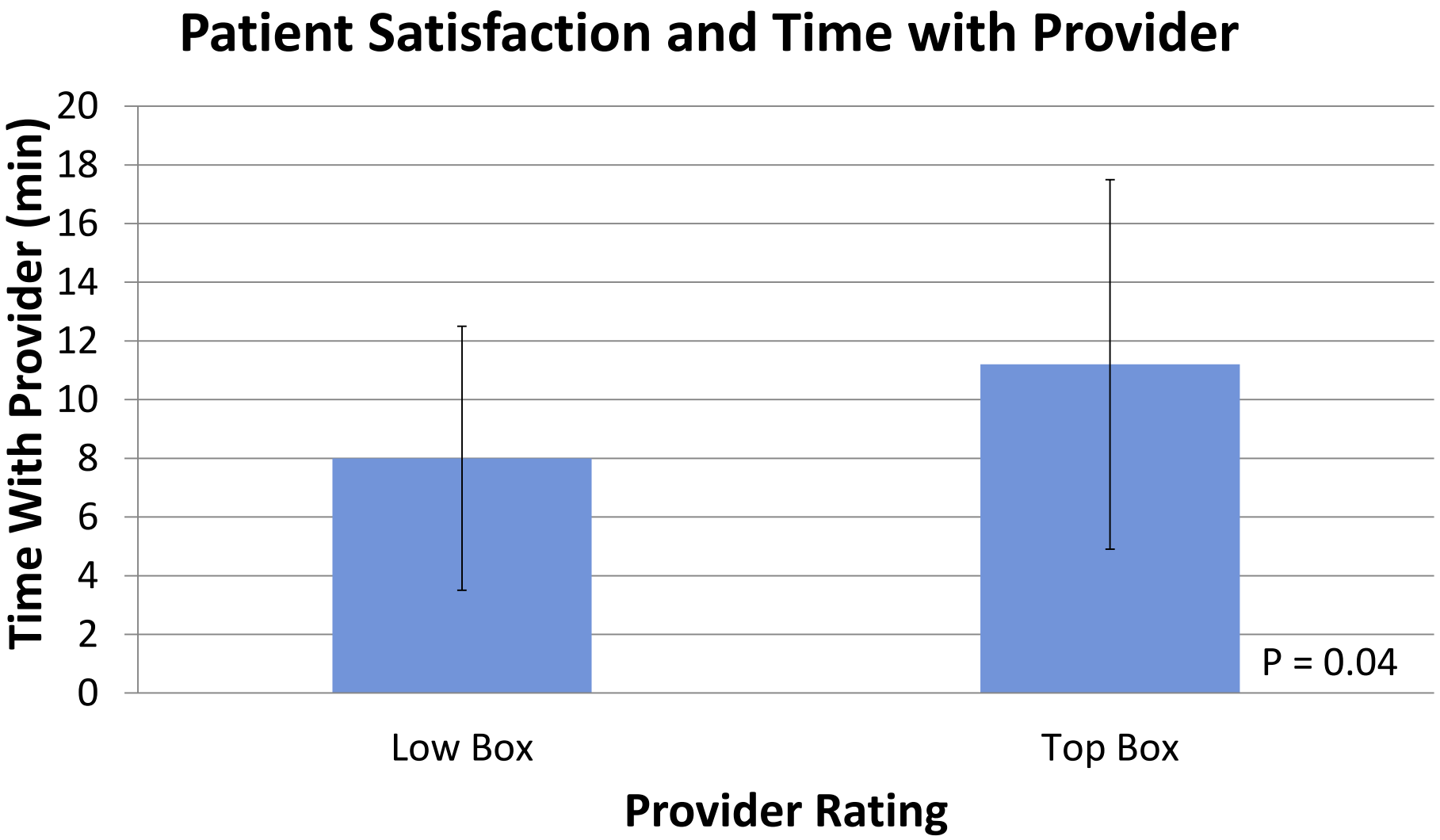
Results


Patient Satisfaction and Clinic Wait Time
Clinic Wait Time (min)
80
70
60
50
40
30
20
10
0
P = 0.60
Low Box
Top Box
Provider Rating

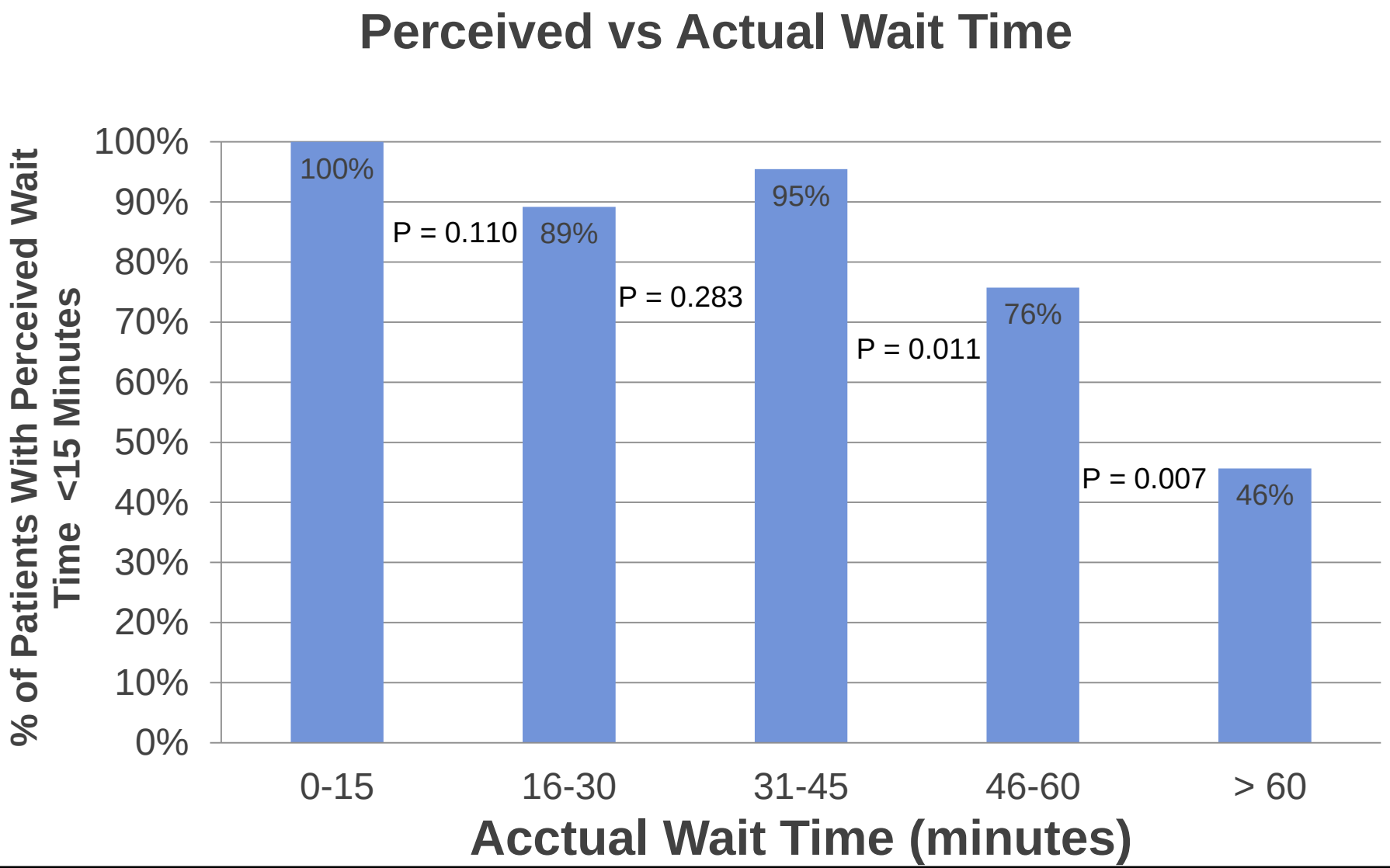
Results


Patient Satisfaction and Time with Provider
Time With Provider (min)
20
18
16
14
12
10
8
6
4
2
0
P = 0.04
Low Box
Top Box
Provider Rating

Results


Patient Satisfaction and Time with Provider
Time With Provider (min)
20
18
16
14
12
10
8
6
4
2
0
P = 0.04
Low Box
Top Box
Provider Rating

Results


Perceived vs Actual Wait Time
% of Patients With Perceived Wait Time <15 Minutes
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
100%
P = 0.110
89%
P = 0.283
95%
P = 0.011
76%
P = 0.007
46%
0-15
16-30
31-45
46-60
> 60
Acctual Wait Time (minutes)

Conclusions

- Time-with-surgeon is associated with patient satisfaction in orthopaedic clinics, and wait time is not.
- Patients do not have an accurate gauge of actual wait time, with many patients underestimating the time they wait to see a provider.
- One strategy for improving patient satisfaction may be to spend more time with each patient, even at the expense of increased wait time.

UNC ORTHOPAEDICS

Thank you