

Implementing Clinical Outcomes Assessments in Collegiate Athletics

Michael Moll MEd., LAT

I, Michael Moll, do not have a financial interest/arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation.

“I am an Administrator and Clinician not a researcher.”

Objectives

- Discuss models of patient clinical outcomes assessment.
- Discuss the role of patient outcomes in determining effective athletic training treatments and prevention programs as part of an evidence based athletic training practice.
- Discuss the utilization outcomes assessments to assess the quality of athletic training services and patient quality of life.
- Discuss patient based outcomes in comparison to clinician based outcomes.
- Discuss practical applications of outcomes assessments and how they can be implemented into a collegiate athletic training setting.

Why should we move forward with patient reported outcomes?

Journal of Athletic Training 2008;43(4):428–436
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www.nata.org/jat

literature review

Using Disablement Models and Clinical Outcomes Assessment to Enable Evidence-Based Athletic Training Practice, Part I: Disablement Models

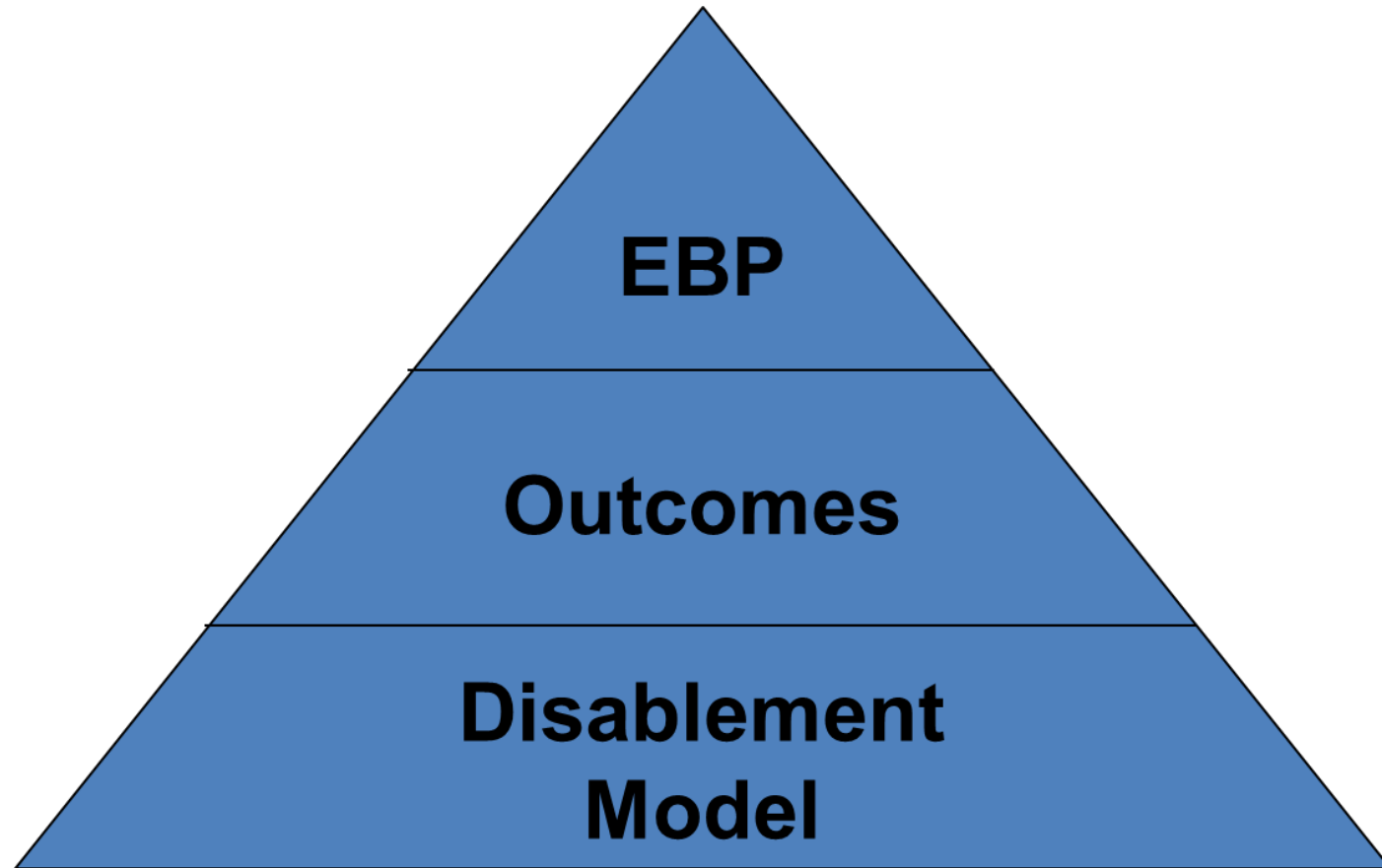
Alison R. Snyder, PhD, ATC*; John T. Parsons, MS, ATC*;
Tamara C. Valovich McLeod, PhD, ATC, CSCS*; R. Curtis Bay, PhD*;
Lori A. Michener, PhD, PT, ATC, SCS†; Eric L. Sauers, PhD, ATC, CSCS*

*A. T. Still University, Mesa, AZ; †Virginia Commonwealth University, Richmond, VA

Objective: To present and discuss disablement models and the benefits of using these models as a framework to assess clinical outcomes in athletic training.

zation. Disablement models need to be understood, used, and studied by certified athletic trainers to promote patient-centered care and clinical outcomes assessment for the development of

Whole Person Health Pyramid



Evidence Based Practice

EBP based on clinical outcomes assessment as a provision of patient-centered care are core competencies for all healthcare professions.

Institute of Medicine (2003)

PEW Foundation (1995)

Evidence Based Practice?

“EBP is the “conscientious, explicit, and judicious use of current best evidence” that incorporates clinical expertise, the patient’s values, and best available evidence when caring for patients. The incorporation of EBP into the athletic training profession, both in clinical and research settings, is imperative to facilitate the best care for our patients.”

Patient Outcomes in the Literature

- Search of Google Scholar looking at “Collegiate Athletics” and “Patient Outcomes” from 2015
 - Query resulted in 32 articles of which only 3 involved a true PROMs with collegiate athletes
- Search of Google Scholar looking at “College Athletes” and “Patient Outcomes” from 2015
 - Query resulted in 120 articles
- HRQoL, Concussion, Athlete perception of AT effecting patient outcomes.



WHY EBP?

1. Develop tools for communication among practitioners
2. Demonstration of effective patient care for Legislative and Reimbursement efforts
3. Validating benchmarks to improve care among practitioners

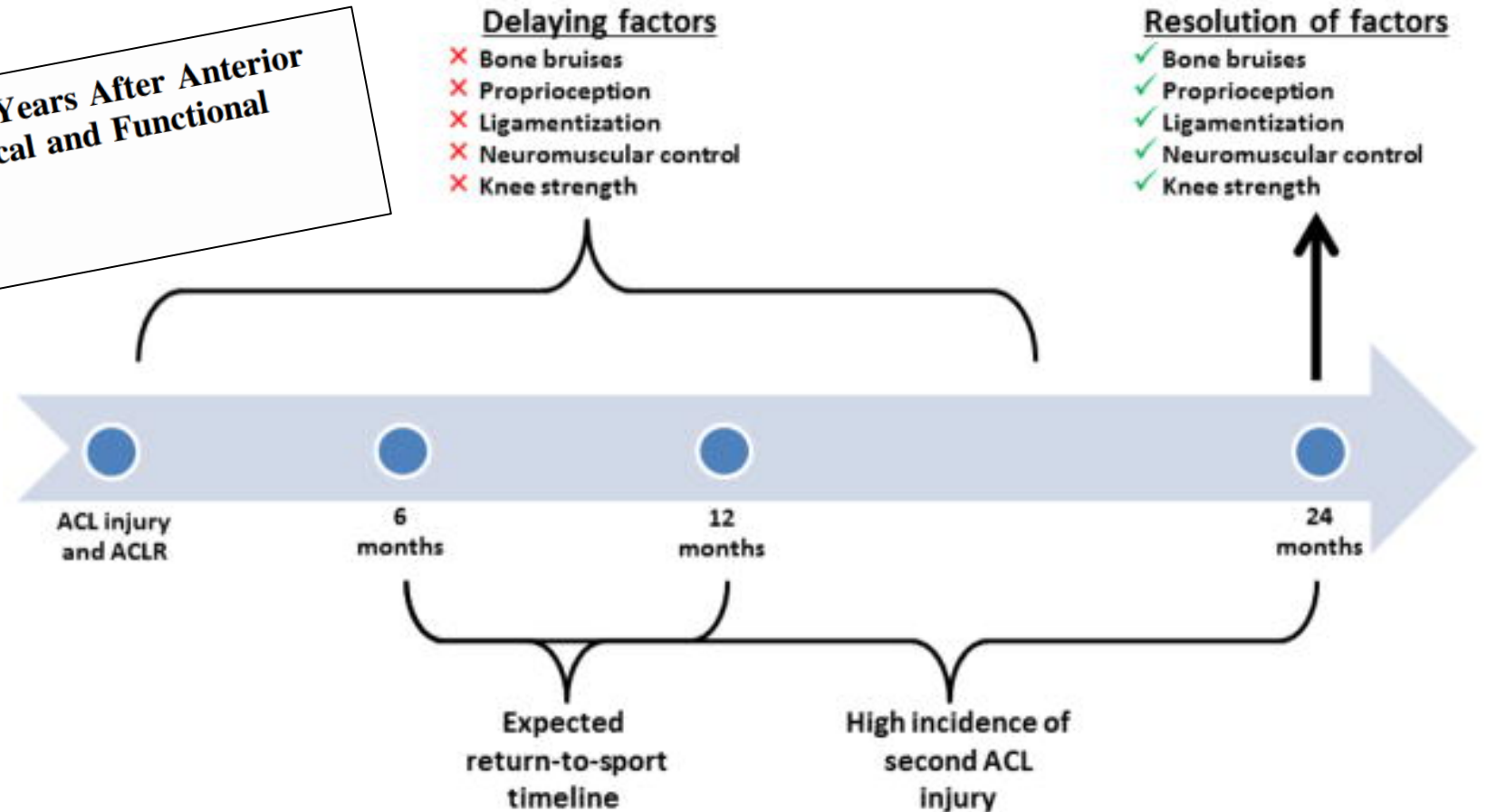


Snyder AR, Parsons JT, Valovich McLeod TC, Bay RC, Michener LA, Sauers EL. Using disablement models and clinical outcomes assessment to enable evidence based athletic training practice, part I: disablement models. *J Athl Train*. 2008;43(4):428–436.

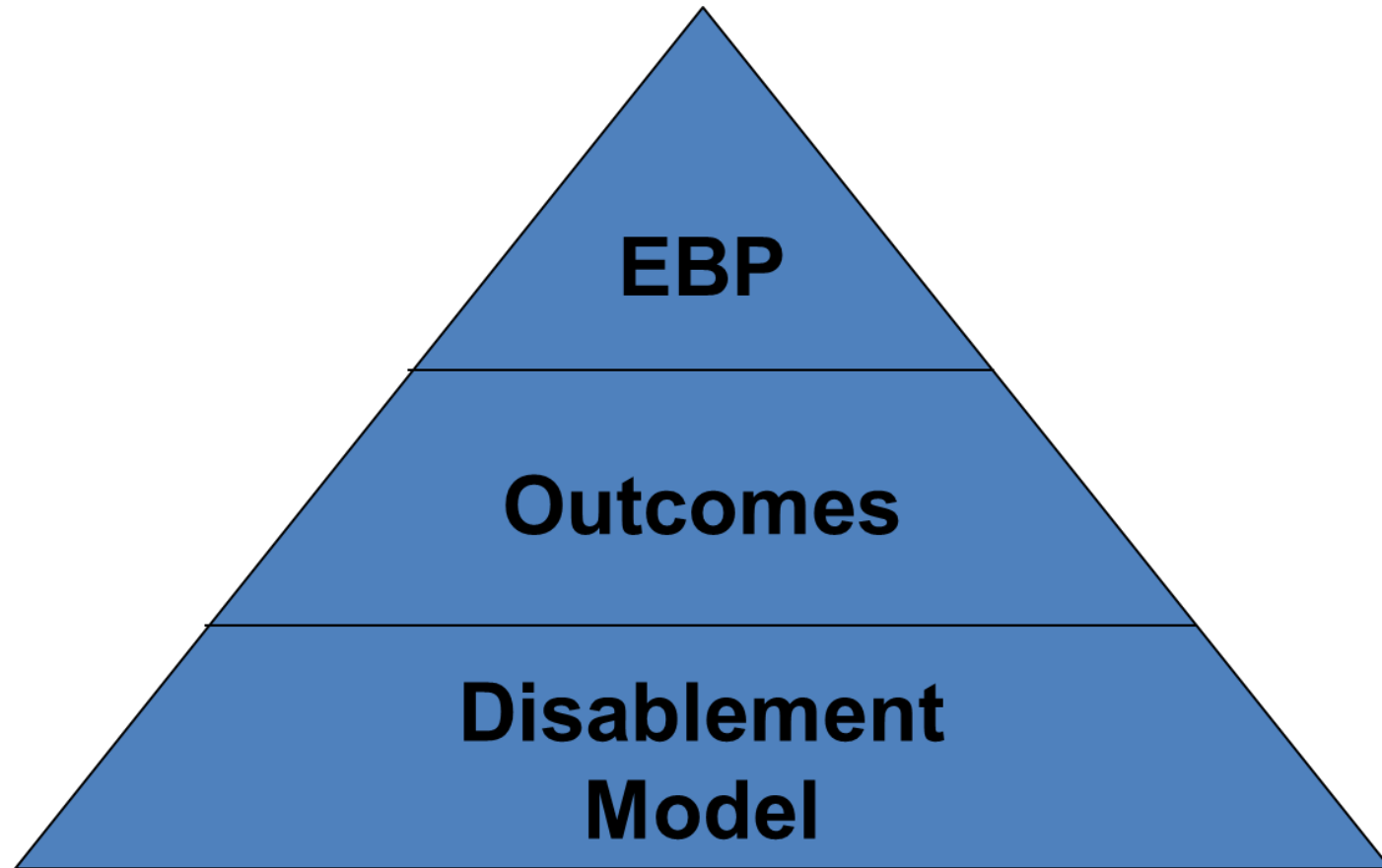
Impact of EBP

Should Return to Sport be Delayed Until 2 Years After Anterior Cruciate Ligament Reconstruction? Biological and Functional Considerations

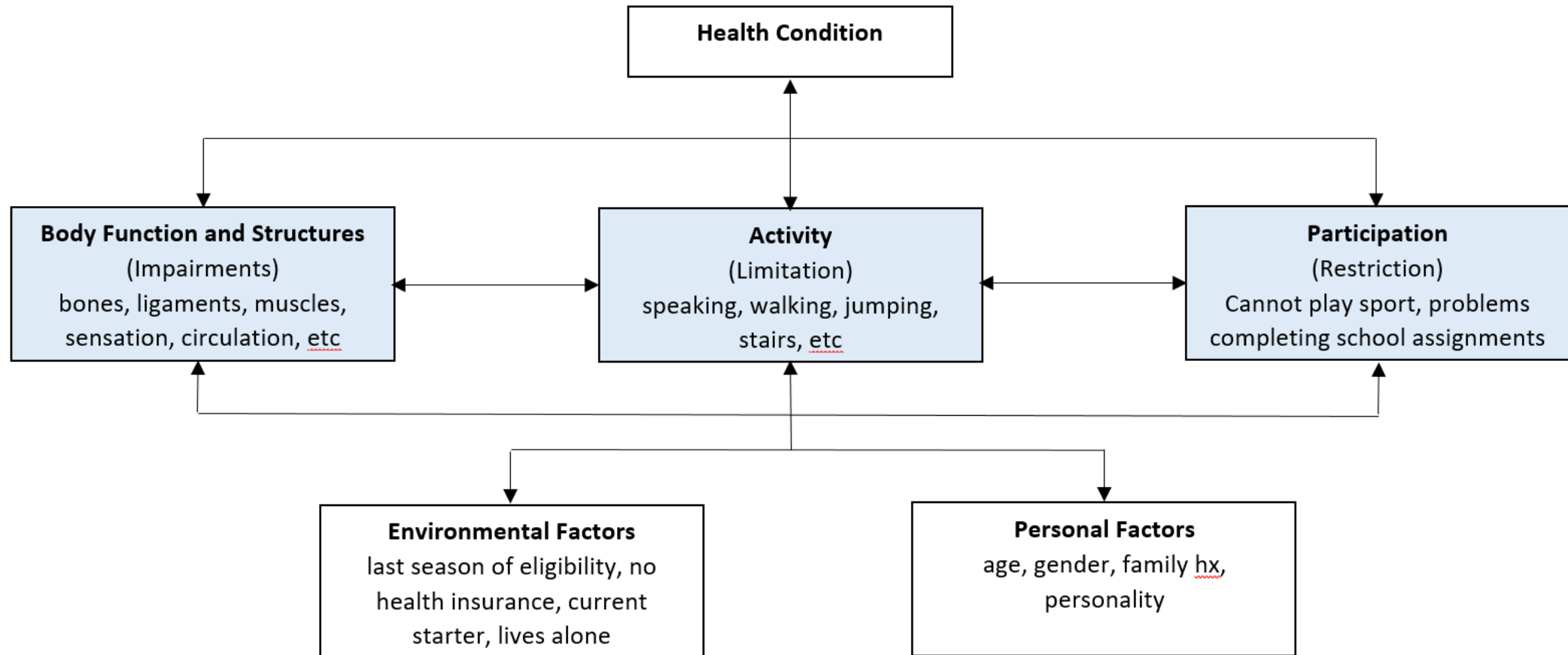
Christopher V. Nagelli^{1,2,4,5} · Timothy E. Hewett^{1,2,3,4,5}



Whole Person Health Pyramid



Disablement Models – ICF Framework



Disablement Model



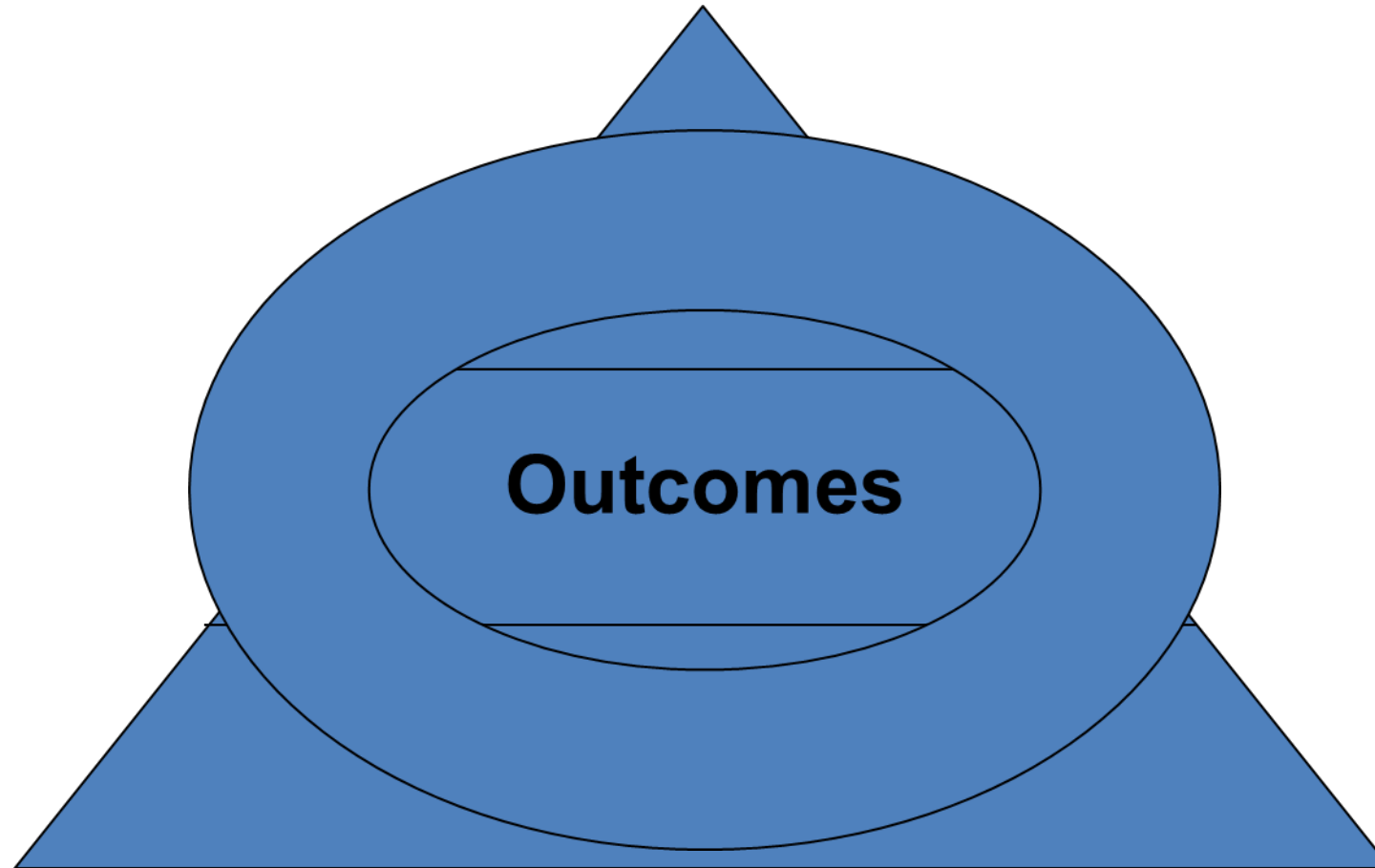
Body Function and
Structures



Activity

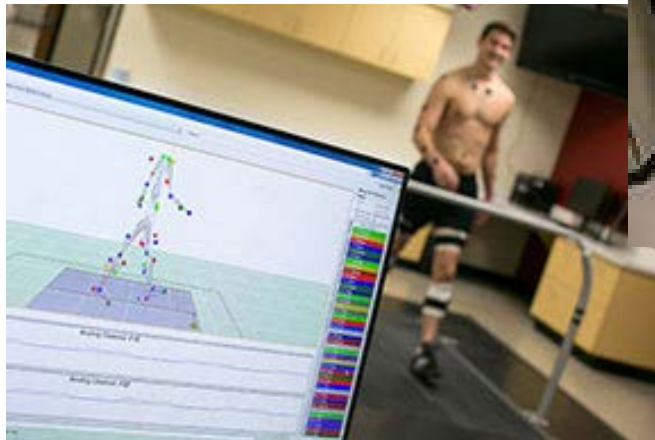
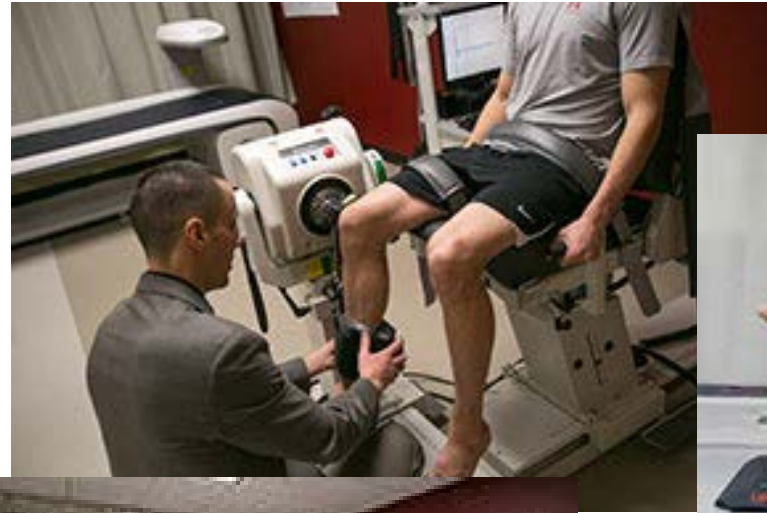
Participation





Types of Measures

- Clinician Oriented Measures
 - Range of Motion
 - Girth Measurements
 - Strength
 - Functional Measures



Types of Measures



- Patient Reported Outcome Measures (PROM)
 - General Health
 - Condition Specific
 - Pain
 - Function

Selecting Patient Measures

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COLUMN:
EDUCATIONAL TECHNIQUE

Beyond the Basics of Clinical Outcomes Assessment: Selecting Appropriate Patient-Rated Outcomes Instruments for Patient Care

Alison R. Valier, PhD, ATC; Kenneth C. Lam, ScD, ATC
Interdisciplinary Health Sciences, A.T. Still University, Mesa, AZ

The fifth edition of the *Athletic Training Education Competencies* emphasizes the concepts of clinical outcomes assessment. In athletic training, clinical outcomes assessment, especially as it relates to patient-rated outcomes (PRO) instruments, is new, which produces uncertainty with regard to how to integrate PROs into athletic training education. Our goal was to review the concepts associated with selecting PRO instruments and to provide a teaching strategy for implementing these concepts into education programs. When selecting a PRO instrument, clinicians should follow a systematic process that evaluates a variety

Consider before implementing PROMs

1. Identifying the goals for collecting PROs in clinical practice
2. Selecting the patients, setting, and timing of assessments
3. Determining which questionnaire(s) to use
4. Choosing a mode for administering and scoring the questionnaire
5. Designing processes for reporting results
6. Identifying aids to facilitate score interpretation
7. Developing strategies for responding to issues identified by the questionnaires
8. Evaluating the impact of the PRO intervention on the practice

- Snyder, C. F., Aaronson, N. K., Choucair, A. K., Elliott, T. E., Greenhalgh, J., Halyard, M. Y., et al. (2011). Implementing patient-reported outcomes assessment in clinical practice: A review of the options and considerations. *Quality of Life Research*,. doi: 10.1007/s11136-011-0054-x.

Selecting Patient Measures



Table 1. Criteria for Selecting Patient-Rated Outcomes (PRO) Instruments

Classification	Component
Essential elements	Instrument development Reliability Validity Responsiveness and interpretability
Clinical utility	Precision Acceptability Feasibility Appropriateness

- Valier AR, Lam KC. Beyond the basics of clinical outcomes assessment: selecting appropriate patient-rated outcomes instruments for patient care. *Athl Train Educ J*. 2015;10(1):91–100.

PROMIS



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MEASURES

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PROMIS on Twitter

PROMIS® (Patient-Reported Outcomes Measurement Information System) is a set of person-centered measures that evaluates and monitors physical, mental, and social health in adults and children. It can be used with the general population and with individuals living with chronic conditions.

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- <http://www.healthmeasures.net/explore-measurement-systems/promis/intro-to-promis>

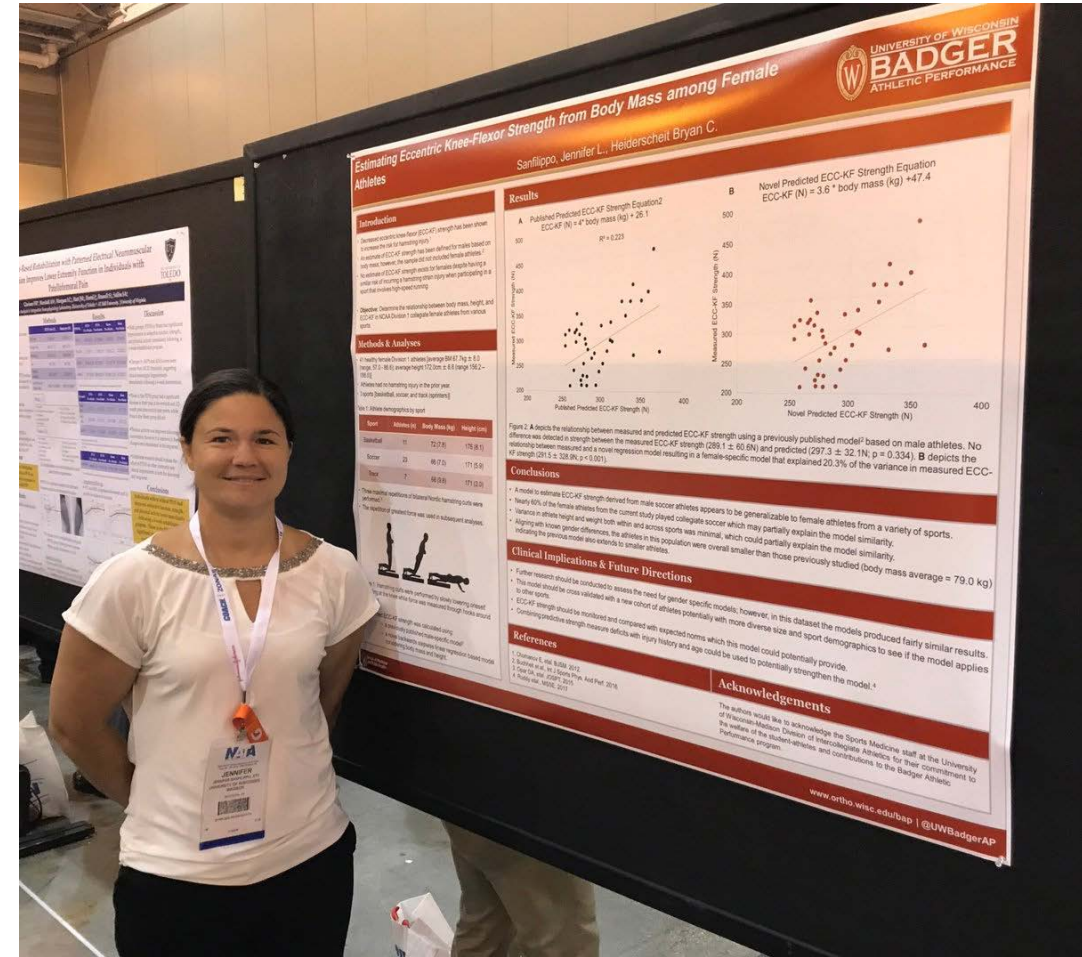


Patient Reported Outcome Measures

- VR-12 = Veterans Rand-12
- PHQ-9 = Patient Health Questionnaire-9
- GAD-7 = Generalized Anxiety Disorder-7
- SWLS = Satisfaction with Life Scale
- Stop Bang = Screen for Sleep Apnea
- SANE = Single Assessment Numerical Evaluation
- IKDC-2000 = International Knee Documentation Committee
- quickDASH = Disabilities of the Arm, Shoulder, Hand
- FAAM = Foot and Ankle Ability Measure
- HAGOS = Copenhagen Hip and Groin Outcomes Score
- FAST = Functional Arm Scale for Throwers
- TSK-11 = Tampa Scale for Kinesiophobia

How have we implemented measures at UW

- Baseline Collection
 - VR-12, Sport Specific Ortho
- At Pre-Participation Exam
 - PHQ-9 and GAD-7
- General Health Monitoring
 - VR-12, Sleep/Stop Bang
- Injury, Pre and Post Surgery
 - SANE, Knee, Hip, Shoulder, Ankle
- Concussion Management
 - CARE Study - SWLS



EMR vs. EHR



Utilization of EHR – Baselines

Template Note

https://uwma.medicatconnect.com/note.aspx?formid=13411&id=20

Locations and Hours

Michael Testpatient

UNIVERSITY OF WISCONSIN
BADGER
SPORTS MEDICINE

Home Immunizations Insurance Required Forms Messages Upload

Functional Wellness

In general, would you say your health is:

▼

The following questions are about activities you might do during a typical day.

Does your health now limit you in these activities? If so, how much?

Moderate activities such as moving a table, pushing a vacuum cleaner, bowling, or playing golf?

▼

Climbing several flights of stairs?

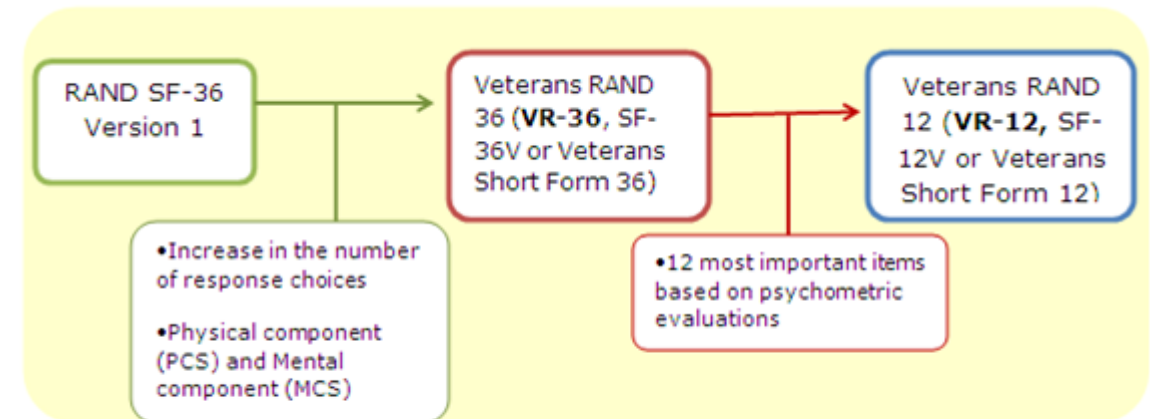
▼

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities...

10:15 AM
Wednesday
1/30/2019

General Health Measures (HRQoL)

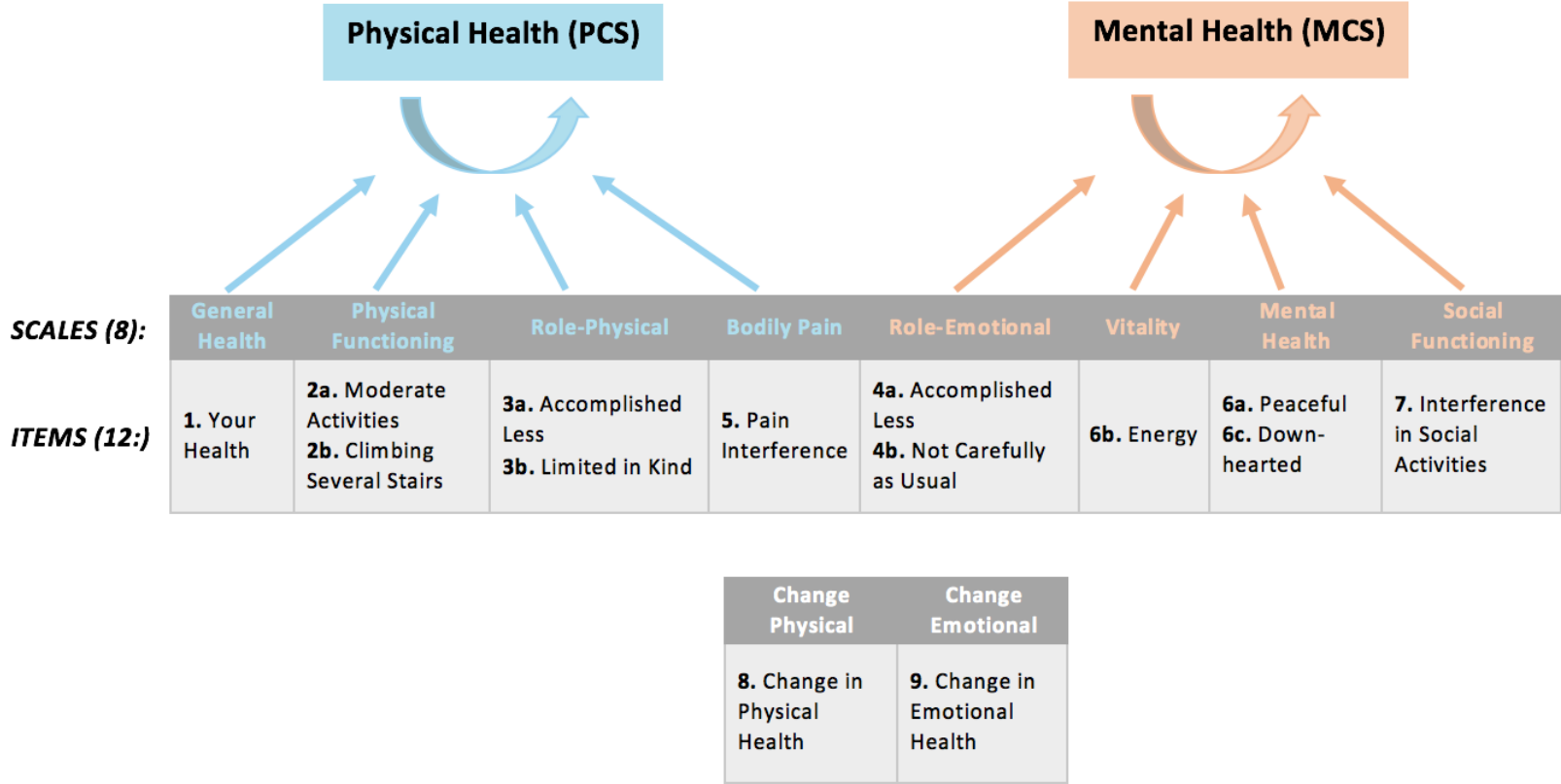
- Veterans RAND 12 (VR-12)
 - Developed by BU School of Public Health
 - Validated measure of HRQoL
 - Public domain and free to use with permission
 - Scores can be reported as a raw score or as a Z-score



Note: The official instruments are now called VR-12 and VR-36.

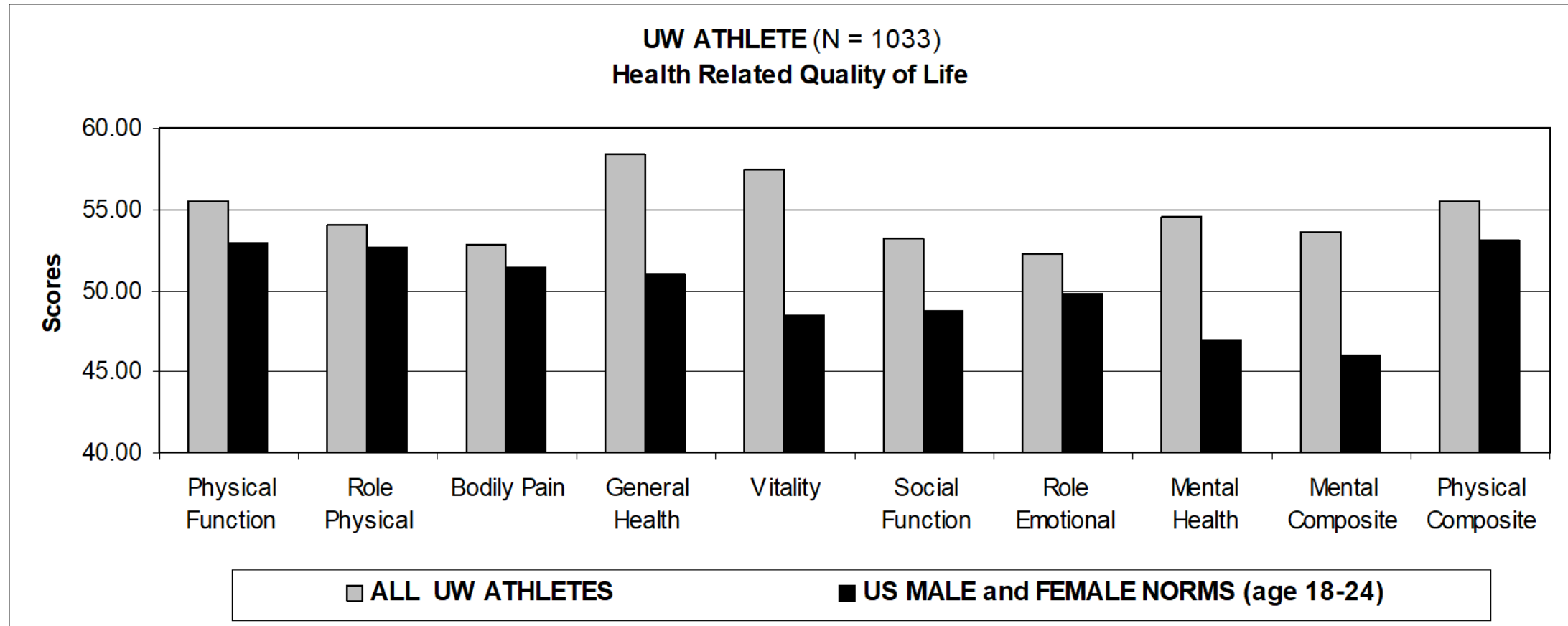
- [https://www.aaos.org/uploadedFiles/PreProduction/Quality/Measures/Veterans%20RAND%2012%20\(VR-12\).pdf](https://www.aaos.org/uploadedFiles/PreProduction/Quality/Measures/Veterans%20RAND%2012%20(VR-12).pdf)
- Usman Iqbal, S., W. Rogers, A. Selim, S.X. Qian, A. Lee, X. Xinhua, J. Rothendler, D. Miller, L. Kazis. "The Veterans Rand 12 Item Health Survey (Vr-12): What It Is and How It Is Used".

The VR-12: 2 summary components, 8 scales, 12 items

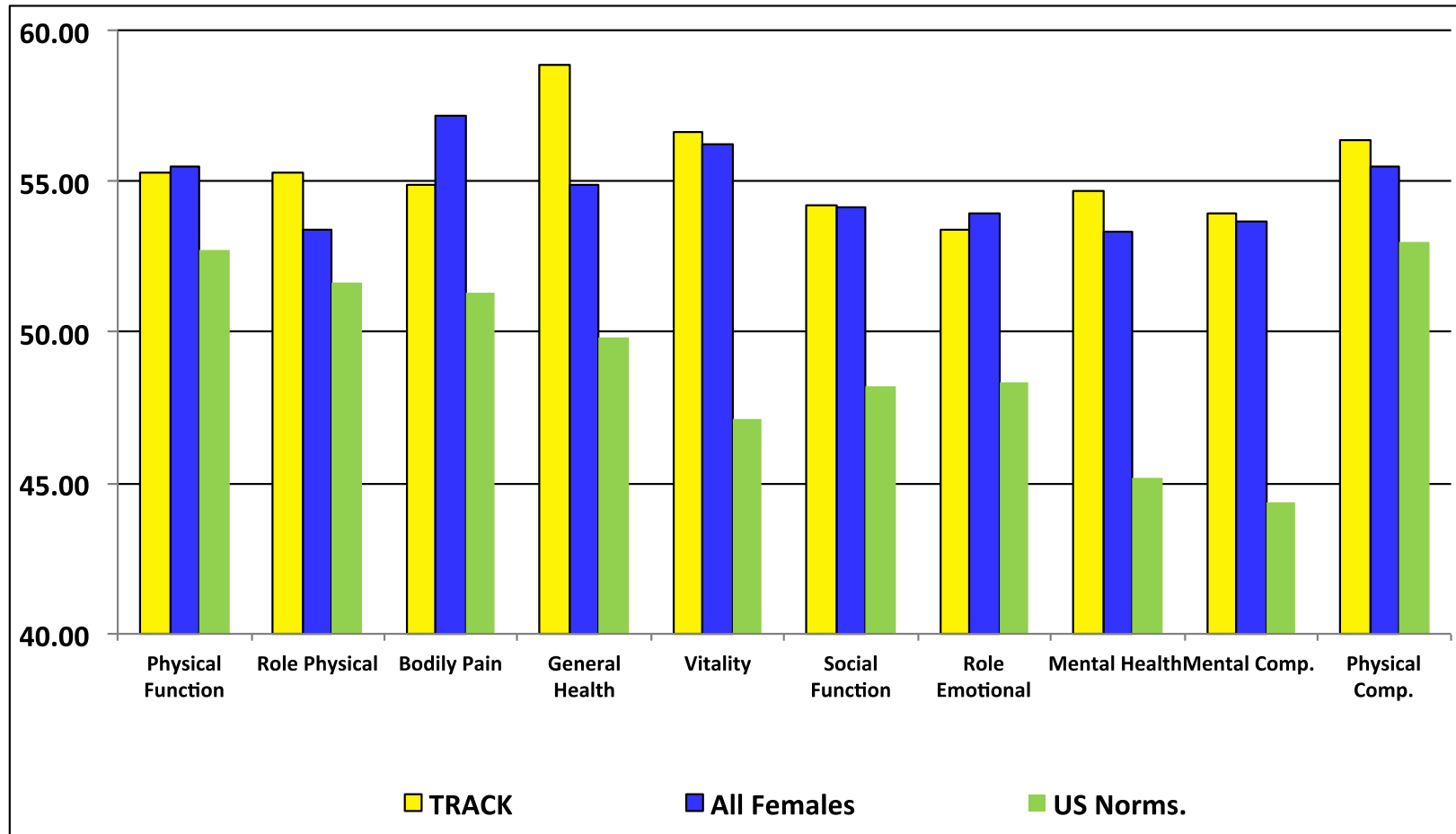


- Notes:**
- Items correspond with question numbers on VR-12 questionnaire
 - Change in physical and change in emotional scales are not used in the calculation of the PCS and MCS summary measures
 - All scales contribute to PCS and MCS; however, the arrows reflect greater contribution to PCS or MCS by selected scales

HRQoL Findings



HRQoL Findings UW Women's Track&Field (2014)



HRQoL – VR12



STUDENT ATHLETE PERFORMANCE CENTER

Table 1. Clinical and Demographic Information for Division I Student-Athletes and General Undergraduate Students.

Variable	Division I Athlete (n = 842)	General Undergraduate (n = 1322)	P Value
Age (years), mean (SD)	19.7 (1.3)	19.7 (1.6)	.72
Sex			<.001
Male	430 (51.1%)	392 (29.7%)	
Female	412 (48.9%)	930 (70.4%)	
Year in school			<.001
Freshman	349 (41.5%)	429 (32.5%)	
Sophomore	202 (24.0%)	307 (23.2%)	
Junior	163 (19.4%)	300 (22.7%)	
Senior	128 (15.2%)	286 (21.6%)	
Activity level			NA
DI athlete	842 (100%)	—	
Club athlete	—	122 (9.2%)	
Intramural player	—	193 (23.2%)	
Works out regularly	—	705 (53.3%)	
Physically inactive	—	302 (22.8%)	
Outcome scores, mean (SD)			
PCS score	55.02 (3.9)	55.49 (5.3)	.02
MCS score	55.58 (7.0)	43.26 (11.4)	<.001

Abbreviations: MCS, mental component score; PCS, physical component score; SD, standard deviation; NA, not applicable.

- Traci R. Snedden; John Scerpella; Stephanie A. Kliethermes; Rocío S. Norman; Liga Blyholder; Jen Sanfilippo; Timothy A. McGuine; Bryan Heiderscheit; *Am J Health Promot* Ahead of Print

SANE Score

SANE Score is one of the simplest measures that you can utilized to collect PROMs

Single numeric value reported by the patient rating how they feel on a 0-100 scale.

- Williams GN, Gangel TJ, Arciero RA, Uhorchak JM, Taylor DC. Comparison of the single assessment numeric evaluation method and two shoulder rating scales. Outcomes measures after shoulder surgery. Am J Sports Med. 1999;27:214-221.

SANE – Post Injury

Medical EHR 10.0 [User: Moll] [Provider: Moll] [Clinic: AthTrain] [Note: Michael Testpatient - 23 yr Male]

Search: 4

Michael Testpatient - 23 yr Male

Eligibility: Eligible Insurance: ADAC Other ID: 000004 Phone: (608) 225-6825 DOB: 7/28/95 Chart: Not Available Email: mnm@athletics.wisc.edu

Last Visit: 5/24/17 for Practice with WOP

UpToDate

Compliance: [01/29/19] SA V112

Note Date: [01/30/2019 10:21 AM] Route: MMoll Billing: MMoll Clinic: AthTrain Phone: (608) 225-6825 Assign Appt: Case: (None) Sticky Notes

Visit Reason: Progress Assessment Plan Summary Sync eRx My Favorites

Progress:

(Other)

- Exit Interview Form
- Returner Physical LAT Review
- SA Wellness Progress Note

Progress

- Concussion SCAT 3 Symptom EVA
- Rehab_Basic Today 10:21 AM
 - Rehab_Core/Spine
 - Rehab_Injury
 - Rehab_LowerBody
 - Pain and Function Scale
 - Rehab_Upperbody
 - Treatment Log

Pain and Function Scale:

- ☐ SANE ADL (0 - 100):
- ☐ SANE Activity (0 - 100):
- ☐ Pain ADL (0-10):
- ☐ Pain Activity (0-10):

Pre-Rehab Modalities:

- ☐ Warm Whirlpool
- ☐ Moist Hot Pack
- ☐ Ultrasound
- ☐ Laser
- ☐ H-Wave
- ☐ BioWave
- ☐ E-Stim
- ☐ Complex
- ☐ Iontophoresis
- ☐ Hivamat
- ☐ Other:

Soft Tissue:

- ☐ Active Release Technique (ART)
- ☐ Cupping Therapy
- ☐ Dry Needling
- ☐ Effluage Massage
- ☐ Foam Roller

Assessment

Set	Code	Description	Final ICD10-CM
A		Sprain of anterior cruciate ligament of left knee, nit	S82.512A

There are no items to show.

21 AM | Route: MMoll | Billing: MMoll | Clinic: AthTrain

Assessment Plan Summary Sync eRx My Favorites

Rehab_Basic Preview

Reason for visit:

Left shoulder

Pain and Function Scale:

- ☐ SANE ADL (0 - 100):
- ☐ SANE Activity (0 - 100):
- ☐ Pain ADL (0-10):
- ☐ Pain Activity (0-10):

Pre-Rehab Modalities:

- ☐ Warm Whirlpool
- ☐ Moist Hot Pack
- ☐ Ultrasound
- ☐ Laser
- ☐ H-Wave
- ☐ BioWave
- ☐ E-Stim
- ☐ Complex
- ☐ Iontophoresis
- ☐ Hivamat
- ☐ Other:

- Williams GN, Gangel TJ, Arciero RA, Uhorchak JM, Taylor DC. Comparison of the single assessment numeric evaluation method and two shoulder rating scales. Outcomes measures after shoulder surgery. Am J Sports Med. 1999;27:214-221.

SANE Score

[Athletic Training]



Comparison of IKDC and SANE Outcome Measures Following Knee Injury in Active Female Patients

Andrew P. Winterstein, PhD, ATC,*† Timothy A. McGuine, PhD, ATC,† Kathleen E. Carr, MD,† and Scott J. Hetzel, MS†

Table 2. Summary of International Knee Documentation Committee (IKDC) and Single Assessment Numerical Evaluation (SANE) measures over all time points^a

Time Point	IKDC	SANE	<i>r</i> (95% CI)	Difference	<i>P</i> Value ^b
Preinjury	92.8 (90.7, 94.5)	93.9 (91.8, 96.0)	0.80 (0.75, 0.84)	−1.1 (−3.7, 1.5)	0.41
Baseline	47.5 (45.4, 49.6)	51.2 (49.1, 53.3)	0.70 (0.63, 0.76)	−3.7 (−6.3, −1.1)	0.01
3 mo	65.5 (63.3, 67.8)	69.1 (66.9, 71.3)	0.83 (0.78, 0.87)	−3.6 (−6.3, −0.9)	0.01
6 mo	77.9 (75.7, 80.0)	80.1 (78.0, 82.3)	0.83 (0.79, 0.86)	−2.2 (−4.9, 0.5)	0.10
12 mo	83.9 (81.7, 86.0)	86.9 (84.7, 89.0)	0.65 (0.58, 0.72)	−3.0 (−5.7, −0.3)	0.03

^aReported as mean (95% CI) as estimated from repeated-measures ANOVA, except for correlation coefficient.

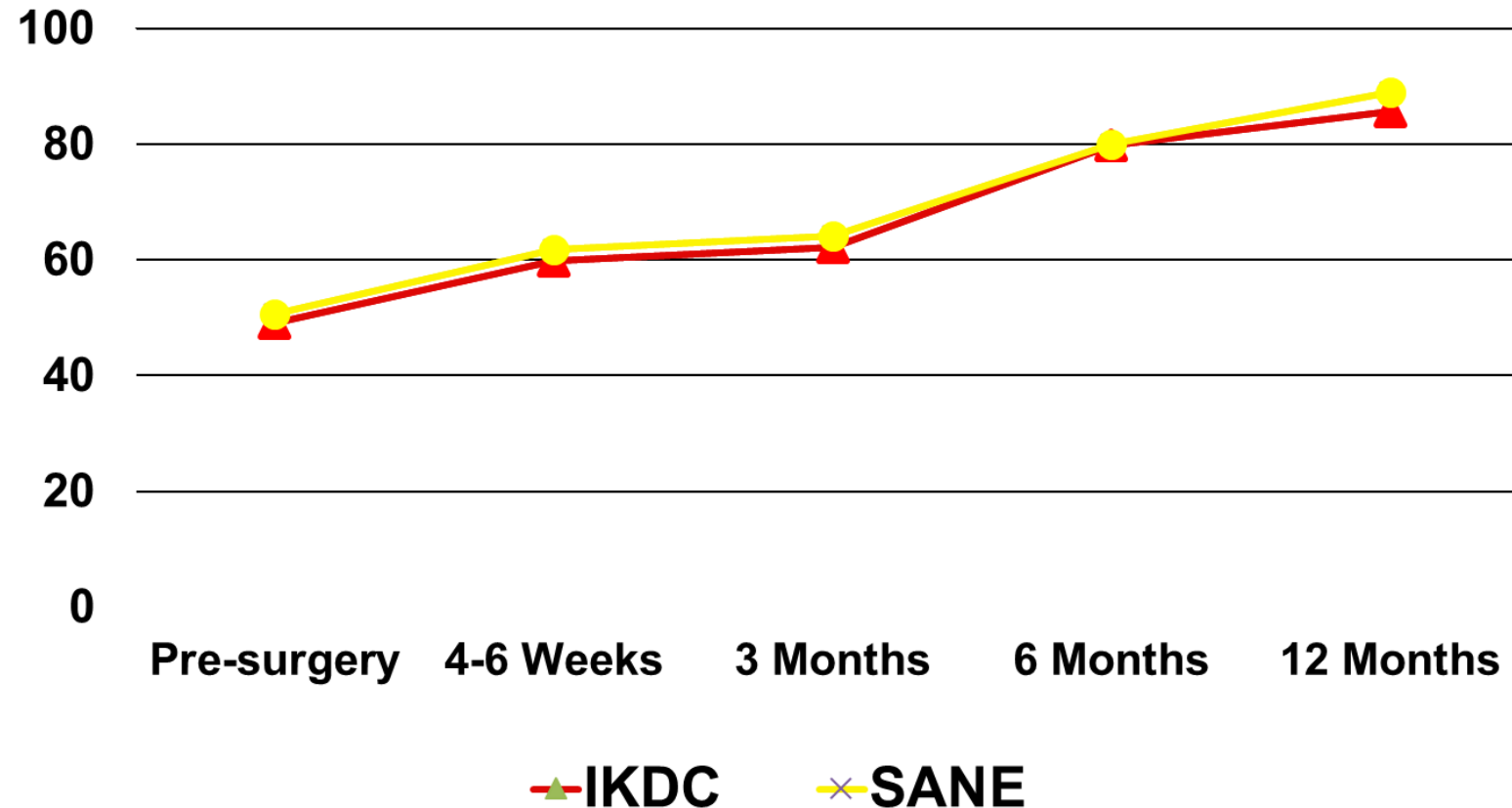
^b*P* value calculated from repeated-measures ANOVA for the difference.

nts remains a public health issue. Clinicians are called upon to the impact of these injuries. Little agreement exists on which to their use. Single Assessment Numerical Evaluation (SANE) the time burden associated with other patient-oriented

- Winterstein AP , McGuine TA , Carr KE , et al . Comparison of IKDC and SANE outcome measures following knee Injury in active female patients. Sports Health 2013;5:523–9.

SANE

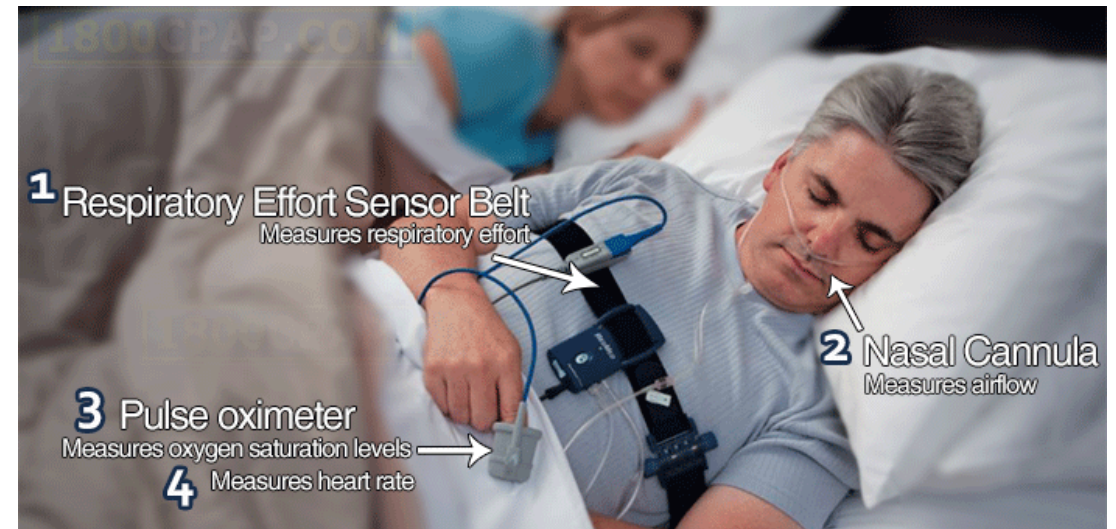
**SANE and 2000 IKDC Scores For Adolescent Athletes
Who Had Knee Surgery**



- Winterstein AP , McGuine TA , Carr KE , et al . Comparison of IKDC and SANE outcome measures following knee Injury in active female patients. Sports Health 2013;5:523–9.

Sleep Assessments

- Utilization of Stop Bang and formal sleep survey
- Implemented at different times of year based on sport
- + Stop Bang = more formal workup with take home evaluation or formal testing for sleep apnea



- <https://www.1800cpap.com/home-sleep-testing-for-sleep-apnea.aspx>

Sleep Assessments

- Stop Bang – 1 pt for each +
 - Snore
 - Feel tired, fatigue, sleepy in daytime
 - Observed stopped breathing while sleeping
 - Treated for HBP
 - BMI >35
 - Age >50
 - Neck circumference >40 cm
 - Male
- 2015 Tested 115 Football SAs
 - Score of 6 = 4
 - Score of 5 = 8
 - Score of 4 = 17
- Apnea Link with everyone scoring 4 and over
- 4 formal sleep assessments
- 2 DX with Sleep Apnea

Utilization of Ortho Measures

- Selection of condition specific measures
- Set of measures unique to team/sport
- Obtaining baselines with EHR
- Utilization during post injury performance testing at established time points



TSK 11

Psychometric properties of the TSK-11: A shortened version of the Tampa Scale for Kinesiophobia

Steve R. Woby^{a,b,*}, Neil K. Roach^c, Martin Urmston^{a,b}, Paul J. Watson^d

“suitable measures to employ when assessing changes in pain-related fear of movement”

Tampa Scale-11 (TSK-11)

Name:

Date:

This is a list of phrases which other patients have used to express how they view their condition. Please circle the number that best describes how you feel about each statement.

	Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree
1. I'm afraid I might injure myself if I exercise.	1	2	3	4
2. If I were to try to overcome it, my pain would increase.	1	2	3	4
3. My body is telling me I have something dangerously wrong.	1	2	3	4
4. People aren't taking my medical condition serious enough.	1	2	3	4
5. My accident/problem has put my body at risk for the rest of my life.	1	2	3	4
6. Pain always means I have injured my body.	1	2	3	4
7. Simply being careful that I do not make any unnecessary movements is the safest thing I can do to prevent my pain from worsening.	1	2	3	4
8. I wouldn't have this much pain if there wasn't something potentially dangerous going on in my body.	1	2	3	4
9. Pain lets me know when to stop exercising so that I don't injure myself.	1	2	3	4
10. I can't do all the things normal people do because it's too easy for me to get injured.	1	2	3	4
11. No one should have to exercise when he/she is in pain.	1	2	3	4

Badger Athletic Performance

ACL Post Surgical Assessment

Time Point	Recovery Surveys	Anatomical Measures	Functional Testing	3D Motion Analysis
Within 2wks prior to surgery and 1mo post-op	<ul style="list-style-type: none">- IKDC2000- TSK-11- VR-12	-	-----	-----
4 and 6mo post-op, RTP, and annually post-op anniversary while at UW	<ul style="list-style-type: none">- IKDC2000- TSK-11- VR-12	<p>DXA Body Composition Scan</p>	<ul style="list-style-type: none">- Jump<ul style="list-style-type: none">o Vertical Jumpo Hop Testing- Balance- Strength<ul style="list-style-type: none">o Biodexo Single-leg press	<ul style="list-style-type: none">- Walking/Running Gait- Muscle Activity

Specific UW Post Surgical Case

- Baseline Assessment
- Knee Injury at NCAA Meet in June
- Pre-surgical PROMs (IKDC, TSK 11, VR12)
- Standard Rehab Protocol, some noted difficulty with quad activation
- At 8 weeks: Hyrdroworx, Alter G
- At 12 weeks: landed based running progression
- 16 weeks Post Surgical Testing

Badger Athletic Performance

ACL Post Surgical Assessment

Time Point	Recovery Surveys	Anatomical Measures	Functional Testing	3D Motion Analysis
Within 2wks prior to surgery and 1mo post-op	<ul style="list-style-type: none">- IKDC2000- TSK-11- VR-12	-	-----	-----
4 and 6mo post-op, RTP, and annually post-op anniversary while at UW	<ul style="list-style-type: none">- IKDC2000- TSK-11- VR-12	DXA Body Composition Scan	<ul style="list-style-type: none">- Jump<ul style="list-style-type: none">o Vertical Jumpo Hop Testing- Balance- Strength<ul style="list-style-type: none">o Biodexo Single-leg press	<ul style="list-style-type: none">- Walking/Running Gait- Muscle Activity

Specific UW Post Surgical Case

- 73.5% deficit in peak quad strength
- Significant inability to recruit quadriceps muscle fibers due to voluntary activation failure and muscle atrophy
- Inability to recruit muscle was making traditional rehab exercises ineffective
- Significant deficits in gait causing asymmetry. Not flexing knee fully when absorbing force and left hip was dropping
- Recommendation that she stop running to address deficits before causing long term gait problems and potentially other injuries

Specific UW Post Surgical Case

- Cut back running workouts
- Focus on single leg power and strengthening exercises in weight room and at practice
- Add in neuromuscular retraining in rehab
- Complex strength mode with Biodex
- Neuromuscular retraining
- BAP Testing at 6 months post surgery showed overall improvement
- Reduced to 11.7% deficit in peak quad strength
- Improved burst of strength, but still having problems with sustaining force
- Still some asymmetry in gait, but nearing expected values

Specific UW Post Surgical Case

- Allowed to return to normal practice closely monitoring symptoms in knee or other areas
- Continued to work on strengthening exercises with a focus on sustained contraction of her quad concentrically and eccentrically
- Focused rehab more toward jumping exercises for power
 - Single leg take off to double leg landing
- Began introducing hurdle specific exercises starting with mini hurdles
- Returned for outdoor season at 8 months

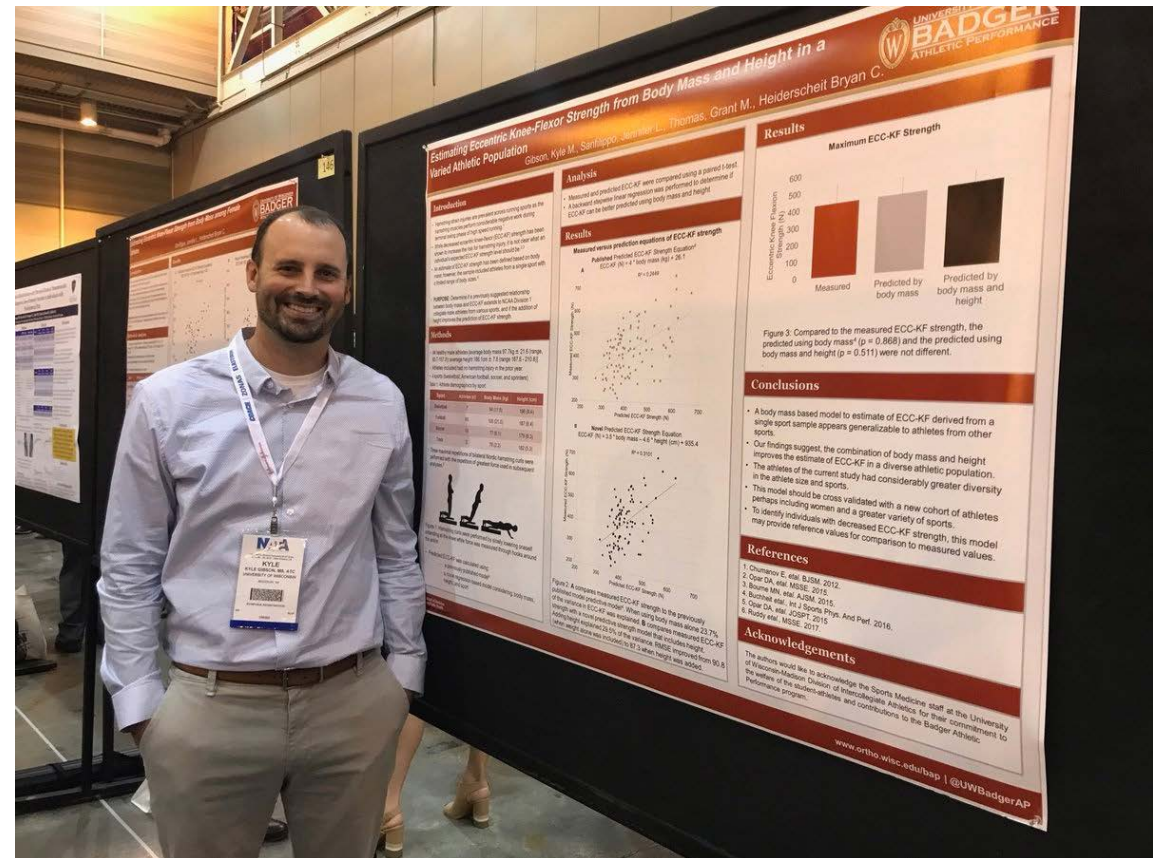
Concerns for implementing PROMs

- Time demands of patients
- Time demands of staff
- Usefulness in utilization
- Is it meaningful to the student-athlete
- Open Records Requests?



Why Should We Utilize Clinical and PROMs

1. Improved patient care
2. Addressing licensure and reimbursement
3. Perception of the care we provide



- Parsons JT, Valovich McLeod TC, Snyder AR, Sauers EL. Change is hard: adopting a disablement model for athletic training. J Athl Train. 2008;43(4):446–448.

Thank You

Jennifer Sanfilippo

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