7-2024

Preventing wounded warriors: Addressing gaps in education of joint protection strategies for the ROTC

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A Doctoral Experiential Capstone Project Final Report

Presented to the Faculty of Western New England University

In Partial Fulfillment of the Requirements for the

Entry-Level Doctorate

in

Occupational Therapy

By

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July 2024

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Abstract:

In the Reserve Officers' Training Corps (ROTC), injury during the first 9-weeks of training has the highest risk for injury (Sefton et al, 2016; Radzak et al, 2020; Wooldridge et al, 2022). Most injuries are musculoskeletal injuries (MSKI) and occur most of the time within the joint or supporting structures (Chiaramonte, 2019; Radzak et al, 2020). The cadets often do not fully understand the consequences to occupational domains from injuries, and fewer than half are confident to prevent injury (Wooldridge et al, 2022). Education of ergonomics in cadet-specific domains and non-specific domains is a barrier to cadets being independent of being able to prevent injuries in themselves and others. Specific domains are in reference to activities that a cadet would be expected to participate in as part of an ROTC program, where a nonspecific domain would be any other activity that any individual would participate in daily. The Preventing Wounded Warriors program was created as part of the 2024 Doctoral Experiential (DEx) capstone project to address the gaps in education for joint protection strategies for ROTC cadets. Over 14 weeks, the program gathered data from surveys and tests in a quasi-experimental format before four one-hour classes educational interventions in ergonomics were applied once per week for the participants ($n = 6$). At the conclusion of a participant group's four weeks, post-survey (Appendix C) and test (Appendix D) data was gathered to measure the change in participant confidence and knowledge of joint-injury prevention. The results of the study showed statistical significance with improvements of participant confidence ($p = 0.00009$) and knowledge ($p = 0.00039$). The results show a continued need for occupational therapy client-centered practice and opportunities where occupational therapists (OT) could positively affect the cadet population with ergonomic-based education on activity modulation and occupation modification for the promotion of health management and occupational justice.

Introduction:

Occupational therapists use a therapeutic use of self to deliver client-centered interventions in a way that is meaningful to the client (American Occupational Therapy Association, 2020). It is an expansive practice that covers all occupational domains, and therefore provides a dynamic repertoire of skilled interventions. Physical rehabilitation and preventative healthcare are one of many of those skilled interventions provided. This delivery of skilled intervention differs from typical perceptions of healthcare, as occupational therapists utilize a holistic approach where the entire contexts of an individual are considered. This viewpoint allows occupational therapists to understand that a client's profession is part of the person, not the defining trait. This means that an ROTC cadet is also a student, a friend, family member, household member, etc.

The Reserve Officers' Training Corps (ROTC) was established in the 1800s as a method to prepare college students to enter the military field and produce higher-quality officers after commissioning school (United States Army Cadet Command, 2022). As the program has evolved throughout its history, the modern age emphasizes physical fitness and military education relative to combat maneuvers and leadership (Western New England University, 2016). In the United States, there are 20,000 – 30,000 cadets enrolled within one of the 274 current ROTC programs (Congressional Research Service, 2024; Department of Manpower Data Center, 2024). College ROTC program go on to produce approximately 8500 officers per year in the United States military. On top of an enrolled cadet's academic duties of the cadet's school, cadets modify daily routines to fulfill the role of a cadet which includes introduction to a physical training regiment and military education. Within the first year of a cadet's enrollment within an

ROTC program, especially in the first 9-weeks, the risk of an MSKI is greater than 50% on average (Sefton et al, 2016; Radzak et al, 2020; Wooldridge et al, 2022). 72% of those MSKI injuries occur within the joints of the body with 65-86.4% are overuse injuries (Chiaramonte, 2019; Wooldridge et al, 2022).

Of any MSKI, joint-related injury poses the highest threat to cadets. A joint-related injury is defined as an injury when there is temporary or permanent damage to the structures of an area where two or more bones meet (Oxford Reference, 2024). These injuries can include the tendons or muscles, bones, ligaments, or any other connective tissue that supports the structural integrity of a joint. These injuries are often sprains, strains, tears, fractures, or other acute or chronic conditions. Joint-related injuries pose a serious risk to cadets every year, as 27-38 training days are lost on average per injury (Chiaramonte, 2019; Molloy et al, 2020). Lost training days are not the absence of participation of ROTC training but also includes the reduced effectiveness or participation of ROTC training. These lost training days total over 10 million days per year on average and cost the Department of Defense $4.8 – 8 billion in rehabilitative and supplementary services (Chiaramonte, 2019; Clifton et al, 2023).

Although cadets engage in military training and education as part of a cadet's daily occupations, only 43% of cadets polled are confident in having the ability, knowledge, and/or skill to prevent injury in themselves or others (Wooldridge et al, 2022). The cadet curriculum includes the participation of multiple military science courses in conjunction with a cadet's typical academic responsibilities (WNE, 2016). The military science course educates cadets on small unit tactics and large-scale military mobility, military exercise programs and testing, and protocols, rules, and regulations regarding the topics. The discussion of ergonomics is absent

from the required material taught within the military science courses. A program that focuses on the specific and non-specific occupations of a cadet through the education of multifactorial ergonomics could be used to fill the gaps of cadet knowledge on the prevention, as well as the subjective perception that the cadet can prevent a joint-related injury.

Doctoral Experiential Overview

Setting & Target Population:

The University of Massachusetts – Amherst (UMASS Amherst) is the headquarters of the Western Massachusetts cadet command which encompasses 13 membership schools. (University of Massachusetts – Amherst, 2016). The number of students enrolled within the cadet program is approximately 60-80 as of 2024. The focus of this DEx capstone project was on this population with the inclusion material of that the students must be enrolled within one of the UMASS Amherst membership schools, be aged 18-40, are enrolled, previously enrolled, or will enroll as a cadet within an ROTC program, and must be proficient in reading, writing, and speaking the English language. Participants were excluded if the potential recruits did not meet the aforementioned criteria.

The setting of this DEx capstone project would occur at Western New England University (WNE). An interview was performed with the Officer-in-Charge (OIC) of the WNE ROTC cadre to discuss the background, unmet needs and problem statement, and the DEx capstone project proposal to occur at the WNE ROTC site with the collaboration of the OIC for the creation of the Preventing Wounded Warriors program. The program would educate the eligible participant population at the WNE Blake Law Center within one of the OT lab rooms where ergonomics would be taught over the 14-week duration of the DEx capstone project.

Problem Statement:

The interview with the OIC had concluded that the UMASS Amherst cadre does not have a mandatory or known optional injury prevention education course and did not have any joint-related injury prevention program. The cadets enrolled within the UMASS Amherst cadre were independently responsible for the prevention of injury, seeking support for education or injury prevention, and seeking out acute healthcare or medical services for rehabilitation. The cadre and cadets were not aware of occupational therapy or OTs and how a delivery service to meet the unmet needs could be implemented that could increase the confidence of cadets to prevent injury in themselves and others as well as objectively improving the knowledge of joint-related injuries. The purpose of meeting this unmet need would be to provide cadets with education where there were currently gaps to reduce the incidence of injury, increase cadet confidence and quality of life, and provide ergonomic education from an occupational therapy perspective.

Methodology:

The design of the Preventing Wounded Warriors program for the DEx capstone project would be a mixed-method quasi-experimental study. The study utilized three models and frameworks as the scholarly theory of practice. The first underlying model of practice was the biomechanical frame of reference (Kurrus et al, 2023). The biomechanical frame of reference was used to define the voluntary motor skills participants would need to engage in as part of a cadet's specific occupations, as well as the participants' nonspecific occupations. To expand on these motor skills to make the ergonomic education more client-centered and holistic, the model of human occupations (MOHO) and person-environment-occupation-participation (PEOP)

model were used in conjunction to supplement the biomechanical foundation of the Preventing Wounded Warriors DEx capstone project.

The MOHO model guides practice to include the human interactions with the participants and their environment in relation to occupational actions (Bugajska & Brooks, 2020). The educational material included not only participant occupations, but addressed the satisfaction and competence in the participant's ability to complete the tasks The PEOP model guided the holistic interventions of this DEx capstone project to recognize the characteristics of the participation which included the features of the participant's environments and psychological and social aspects of the participant's environments. To evaluate the social, epidemiological, behavioral & ecological, educational and policy implications, as well as the implementation, process, impact, and outcomes, the PRECEDE-PROCEED model was utilized.

Participants were recruited via participant's school-affiliated electronic mail system, the participant's school-affiliated online forum, and word of mouth. Participants who meet the inclusion criteria of the study signed a consent form to participate (n = 7), though one participant did not attend the study. The remaining participants (n = 6) engaged in the Preventing Wounded Warriors program in which the student researcher would deliver client-centered occupational therapy-based ergonomic education. The participants would receive four one-hour long educational instruction (Appendix A) once a week for four weeks. The participants were scheduled to participate at a time that was most convenient to each participant. Two participant groups participated concurrently at different times. Participants had the option to attend the study online or in-person, which all participants opted for online attendance via the Zoom platform. All participants would be confidential as the participant's names were not used for data recording.

Instead, a Researcher Identification Number (RIN) that consisted of a 4-digit combination of letters and/or numbers was created by each participant that would be used in place of a name. Before attending the first online classroom instruction, all participants were sent an instructional PowerPoint which instructed the participants how to change the participant's name to the RIN that the participant had created to ensure confidentiality. The use of a camera was optional.

The project would occur in three phases, the pre-survey and test phase, the education phase, and the post-survey and test phase. The participants were allotted 20 minutes to complete the pre-survey and test. After completion of the survey and test, the participants began receiving the first intervention using classroom instruction of ergonomics and joint-related injury prevention for the cadet specific and nonspecific occupations. The purpose of the survey was to monitor change in participant self-perception of the participant's own confidence to prevent injury in themselves, others, the participant's perception of the ROTC's emphasis, knowledge, and dissemination of injury prevention information by the ROTC program, as well as the participant's perception if a satisfactory joint injury prevention program was implemented from the ROTC program. Questions 1-5 were to gather demographic information and for injury surveillance and were not pertinent to participant change in confidence at the conclusion of the study. The purpose of the test was to determine the participant's knowledge of information pertaining to ergonomics of cadet-specific domains. Questions 1-4 were about incidence of injury, 5, 8-9 was participant knowledge of joint-related injury prevention, and questions 6-7, 10 were about the occupational impact of joint-related injury.

At the end of the sessions, participants were allowed to ask questions of the student researcher. The participants received a copy of the PowerPoint classroom instruction, and after

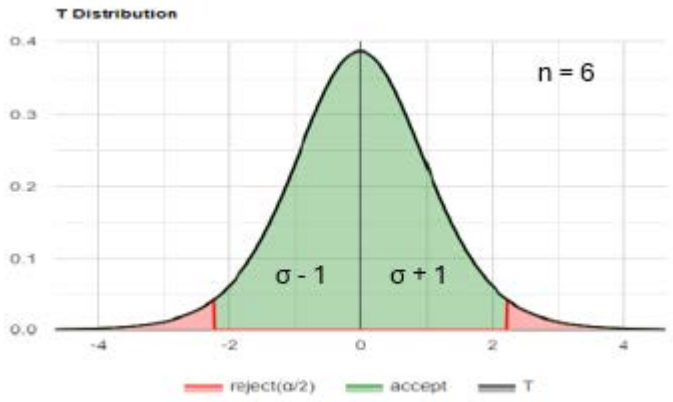
lesson 1 and 3, participants received supplementary handouts (Appendix E) via electronic email to the participants school associated email address. The handouts expanded on material that was covered during classroom instruction and was optional reading material and was not required to read for completion of the education phase. The participants continued to receive classroom instruction until the conclusion of the fourth intervention where the participants took the post-survey and test.

Results:

Data analysis was performed of the quasi-experimental participant groups using the Excel program following the formula to determine the confidence values (p) of change for pooled variable significance (σ). The data surveillance showed that 83% (n = 5) of participants had experienced a joint-related question which did not change post-survey. The elbows, hips, and ankles were reported to be the most injured joints (33.33% of participants). Questions on confidence ranged from 1 (strongly disagree) to 4 (strongly agree).

Survey

n = 6 α = 0.05 (two-tailed)	
$\bar{x}_1 = 28.67$ $\bar{x}_2 = 32.17$	$\sigma_1 = 0.864$ $\sigma_2 = 1.041$
$p = 0.00009 < \alpha_1$, therefore H_0 is rejected	



Pre-survey

RIN	TLBT	9999	0000	0820	0424	0909	# of 1	# of 2	# of 3	# of 4
Q2	2	1	2	1	1	1	4	2	0	0
Q3	3	3	1	1	1	2	3	1	2	0
Q4	3	3	1	1	2	3	2	1	3	0
Q5	2	1	1	1	1	1	5	1	0	0
Neck	0	1	0	0	0	0	1			
Spine	0	0	1	0	0	0	1			
Shoulder(s)	0	1	0	0	0	0	1			
Elbow(s)	0	1	0	0	1	0	2			
Wrist(s)	0	0	0	0	0	0	0			
Finger(s) / Thumb(s)	0	1	0	0	0	0	1			
Hip(s)	0	1	0	1	0	0	2			
Knee(s)	0	0	0	0	0	1	1			
Ankle(s)	0	0	0	1	1	0	2			
Toe(s)	0	0	0	0	0	0	0			
Q6	3	4	3	4	3	4	0	0	3	3
Q7	3	3	3	3	3	3	0	0	6	0
Q8	3	2	3	3	3	3	0	1	5	0
Q9	3	3	2	2	3	2	0	3	3	0
Q10	3	2	3	4	3	3	0	1	4	1
Q11	3	2	3	2	2	3	0	3	3	0
Q12	3	1	1	3	3	3	2	0	4	0
Q13	3	2	2	2	3	3	0	3	3	0

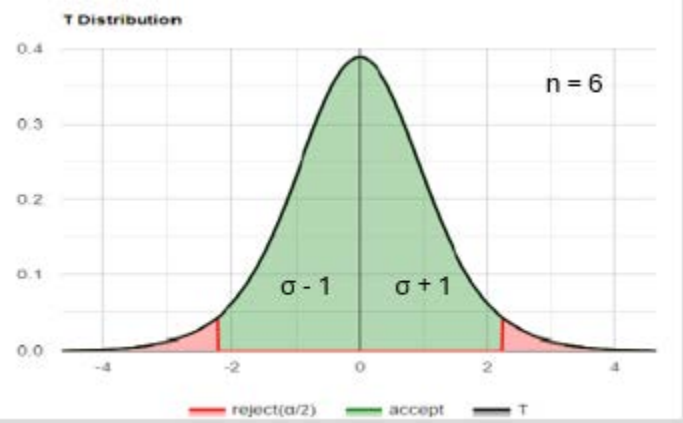
Post-survey

RIN	TLBT	9999	0000	0820	0424	0909	# of 1	# of 2	# of 3	# of 4
Q2	2	1	2	1	1	1	4	2	0	0
Q3	3	3	1	1	1	2	3	1	2	0
Q4	3	3	1	1	2	3	2	1	3	0
Q5	2	1	1	1	1	1	5	1	0	0
Neck	0	0	0	0	0	0	0			
Spine	0	1	1	0	0	0	2			
Shoulder(s)	0	1	0	0	0	0	1			
Elbow(s)	0	1	0	0	1	0	2			
Wrist(s)	0	1	0	0	0	0	1			
Finger(s) / Thumb(s)	0	0	0	0	0	0	0			
Hip(s)	0	1	0	1	0	0	2			
Knee(s)	0	0	0	0	1	1	2			
Ankle(s)	0	0	0	1	1	0	2			
Toe(s)	0	0	0	0	0	0	0			
Q6	3	4	3	4	3	4	0	0	3	3
Q7	3	4	3	3	4	4	0	0	3	3
Q8	3	4	4	4	4	4	0	0	1	5
Q9	3	4	3	3	4	4	0	0	3	3
Q10	3	3	3	4	4	3	0	0	4	2
Q11	3	2	2	2	4	3	0	3	2	1
Q12	3	2	1	3	3	2	1	2	3	0
Q13	3	3	2	2	4	4	0	2	2	2

Participants showed an overall 12.21% increase in self-perception of confidence, with a 16.67% increase in the perception that participants were confident to be able to prevent joint-related injury knowledge. Participants had a 43.75% increase in the perception of confidence to prevent injuries in themselves, 40% increase in the perception of confidence of preventing injuries in others, 9.68% increase in the perception of confidence that the ROTC cadre leadership demonstrated and emphasized the importance of preventing joint-related injuries, and a 20% increase in the perception of confidence that the ROTC cadre had established sufficient injury prevention supports.

Test

n = 6 α = 0.05 (two-tailed)	
$\bar{x}_1 = 28.67$ $\bar{x}_2 = 32.17$	$\sigma_1 = 0.864$ $\sigma_2 = 1.041$
$p = 0.00039 < \alpha_1$, therefore H_0 is rejected	



At the conclusion of the education phase, the participants scored an overall 77.78% increase on test scores with an average of 80% on the test. Participants showed a 69.23% increase on the incidence of injury questions, a 133.33% increase on preventative ergonomics questions, and a 31.25% increase on occupational impacts of joint-related injuries questions. Both the survey and test show that the results of the Preventing Wounded Warriors program had statistically significant improvements on the subjective confidence (p = 0.00009) of participants and the objective knowledge (p = 0.00039) of participants at the conclusion of the study.

Discussion and Recommendation:

Working with the cadet population poses a unique challenge for OTs. The study was conducted during the last week of finals for the WNE students and concluded 1-day before the

3rd and 4th year cadets had to relocate to Fort Knox for special assignment and change of duty station. During the 10th week, the OIC of the WNE ROTC membership school was reassigned to Fort Knox as a temporary duty station in support of the cadets who were on special assignment or were changing duty stations. The preparation of this was the reason for one participant who withdrew from the study before any data was collected or interventions were performed. When working with the cadet population, it is important to gather the military schedule of the ROTC cadets looking forward several months in advance to prevent cadet stress of participation and research retention of participants.

All participants preferred to attend the study online citing the removal of the time requirements of travel improved the quality of life for the participants. This posed another challenge as some cadets did not fully understand the technical requirements of skills and knowledge needed for the completion of the study from a participant's perspective. Electronic email reminders proved useful with attendance, but unstable communications resulted in several participants needing to reschedule several times in a single week. In order to mitigate this, the possibility of further accessible instructional material may be required more than the Zoom PowerPoint handout. Voice and video increases accessibility for future participants who may have vision or hearing impairments or low technological skills. The online completion of the survey and test was not proctored so there was not a way the researcher could ensure the participants were not reviewing the material that was given to them previously while the participants were completing the survey and test. Future iterations may want to include a way to proctor an online format or to delay distribution of materials until after the conclusion of the post-survey and test phase.

The military equipment used in the work domain of occupational therapy changes every several months to years, so it is crucial for future researchers to ensure the most recent information is being utilized when using the most current equipment for ergonomic demonstration and instruction. The program showed statistically significant improvements across several domains, but an unstructured interview with participants revealed that a need for increased social and psychological supports could be added to the Prevented Wounded Warriors program to further increase the holistic service delivery system.

The ROTC population is small and has unique challenges. The Preventing Wounded Warriors program is the first program to address ergonomics for this population for UMASS Amherst and membership school cadets. By laying the groundwork, OTs and student researchers can continue to gain interprofessional rapport and insight on how to address the unmet needs of cadets. Through interprofessional practice, OTs and students can increase cadet awareness of occupational therapy and occupational domains, as well as how cadets can become more independent in ergonomics. With closer collaboration, OTs will additionally gain insight on the meaningful activities that cadets engage in as part of the ROTC program and the kinds of psychosocial contexts to be aware of in the cadet's dynamic role as a college student in an ROTC program. More research is needed to determine joint-injury prevention over a longitudinal timeline for this study, and more research is needed in general for ROTC cadets from the holistic viewpoint of OTs as current research for this target population is very few.

Learning Outcomes:

The DEx capstone and scholarly requirements include 12 learning objectives (Appendix F) that were created in collaboration with the OIC of the WNE ROTC who served as a site mentor, and the faculty mentor at WNE who worked closely with the student researcher. The student researcher met with the site mentor and faculty mentor at the beginning of the study, at the midpoint approximately 7-weeks into the capstone project, and at the end of the project for a final review to see if the 12 learning objectives had been accomplished. The document required the signature of the DEx capstone coordinator, site mentor, faculty mentor, and the student research at the initial, midpoint, and end point of the study. The conclusion of the study had showed that OTs and future researchers have a great opportunity to work as part of an interprofessional team while academia to provide the small and unique population of cadets with biomechanical and psychosocial factors that encompass all domains to future ergonomic interventions in a holistic, meaningful way for cadets to engage in their daily activities with a lessened risk of injury and improved confidence to prevent injury.

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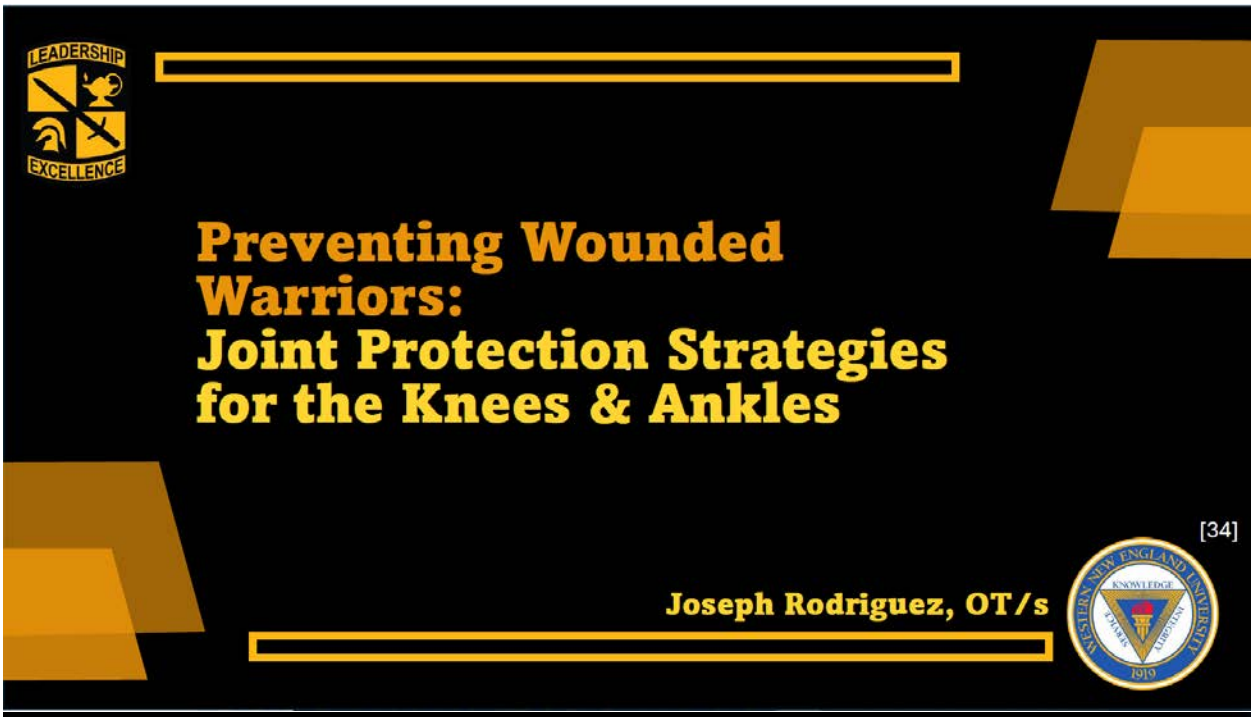
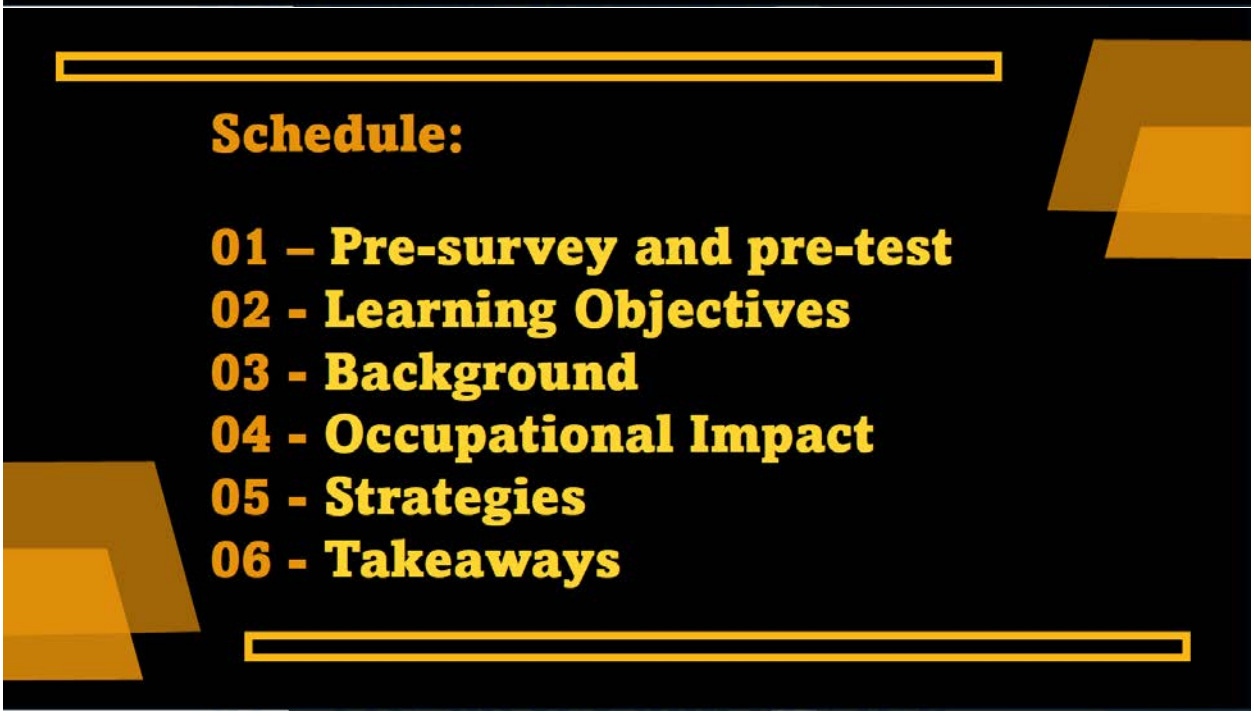
Appendix A – Educational Instruction

Lesson 1



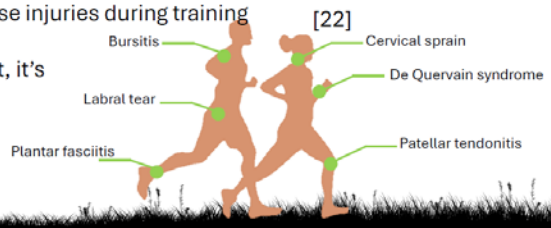


Learning objectives:

- **Understand what constitutes a joint-related injury**
- **Understand the rate of incidence of knee & ankle joint-injuries for military personnel**
- **Understand the effect on combat readiness and meaningful occupation**
- **Learn the strategies you can implement to reduce the rate of injury for yourself and others**

Background

- The majority of cadets want additional education to prevent injury and admit they lack confidence with preventing injury in others[36]
- 55% of U.S. Army active duty experience a musculoskeletal injury (MSI) [32, 29, 5]
- More than 50% of all disability related discharges[35]
- Nearly 20% of all joint-related injuries occur within the knee, making it the most injured joint of the body. In 2nd is the ankle that makes up 15.6% of injuries. [26]
- Overuse injuries make up the most common type of injury, including during training (40.1%)[17, 29]
- ~72% of all musculoskeletal injuries are considered overuse injuries during training making it the most common type of injury[29, 17]
- Most injuries are from running. If accounting for time spent, it's ruck marching for military personnel and trainees[4, 17, 11]



Occupational Impact

- Job performance is critical to feelings of occupational success for military personnel and those in programs for military selection[27]
- A strong sense of identity and confidence comes from being able to engage in meaningful occupations[10, 12, 24]
- To support a sense of identity, it is important to prevent the risk of injury as well as giving cadets, past, present, and future, the tools to continue to engage in meaningful occupation[14, 27, 32]
- On average, 37 training days are lost due to joint-related injuries and time-loss increases the risk of experiencing future injuries[16, 2]
- U.S. Army Public Health Command identifies the key aspects of preventing injury, and thus a loss of occupational participation include:
  - Education
  - Leadership Support
  - Injury Surveillance
  - Program Research and Evaluation[32]


[6]

Strategies – Ergonomics[15, 19, 32, 35, 5]


[30]

Dynamic/Functional Warm-up
- Gentle warm-up (ex. Knee-hugs)
- Stretching
- Active warm-up (high-knees)
- Dynamic stretching (walking lunges)

[18]

Neuromuscular balance
- Beginner: Single leg clock
- Intermediate: Unstable single leg balance
- Advanced: Leg squat running


[1]

Jump training/Landing specialization
- Beginner: Double leg box drop
- Intermediate: Double leg to single leg hop
- Advanced: Speed skate hop


[7]

Plyometrics
- Beginner: Alternating toe taps
- Intermediate: Jumping lunge
- Advanced: Forward bound


[25]

Strengthening
- Work muscles against resistance, mostly recommended with body weight to start and improving or maintaining as tolerated

Strategies – Occupational Tips and tricks

- Position matters! Align those knees
- Stand up every 30 minutes and move around, you should be walking around about 2.2 hours a day not including exercise per day[20]
- Most injuries lower extremity injuries occur from overuse, so it's best to be efficient.[35, 26]
  - Running is the leading cause of injury during training followed by ruck marching when taking time into effect
  - Speed > Distance
- Overtraining does the opposite, no more than 2 hours of heavy exercise per day and give at least 72 hours of rest or reduced activity with a light injury, such as a minor pull[11, 8, 29, 36]
- Heat is your friend, cold is okay in some cases (gel > ice)[11, 31, 33, 13]
- Kinetic therapeutic tape can keep reduces the load on your joints and can keep you in the game[21]

[23]


[28]

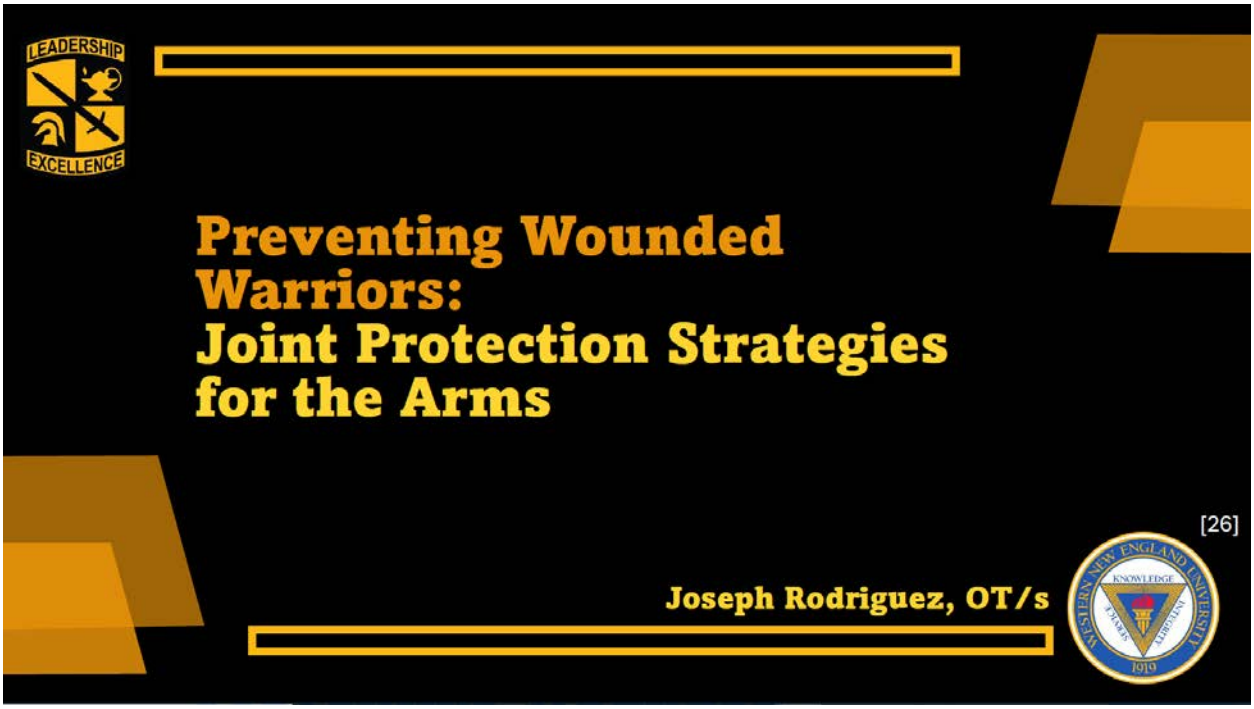
[3]

Takeaways:

- **Overuse injuries are joint-related injuries and account for most military injuries[32, 35, 5]**
- **Knees are the most injured areas, followed by ankles[26]**
- **37 training days on average are lost**
- **Running is the leading cause of injury, can be helped by training for time, followed by ruck marching when accounting for time[35, 26]**
- **You can prevent a loss of occupational sense of worth in yourself in others when focusing on ergonomics and occupational wellness**


References:

Lesson 2


LEADERSHIP
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Preventing Wounded Warriors:
Joint Protection Strategies for the Arms
[26]
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Schedule:
01 – Learning Objectives
02 – Background
03 - Occupational Impact
04 - Strategies
05 - Takeaways

Learning objectives:

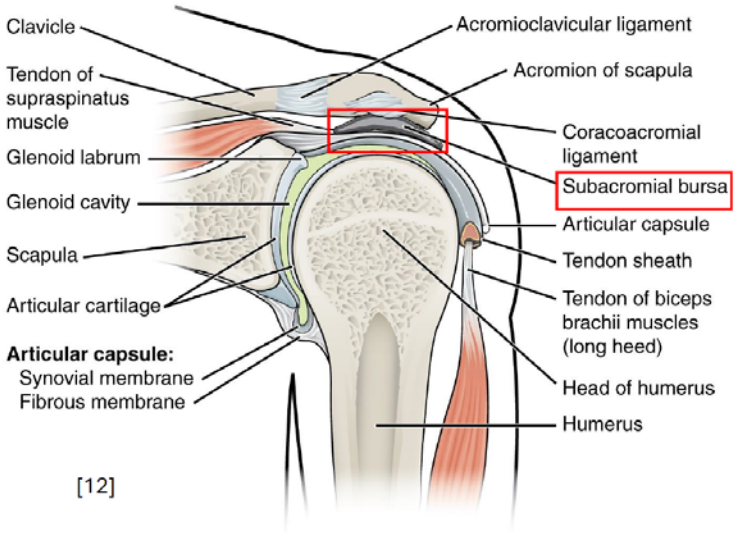
- **Understand the incidence of injury of the arm joints**
- **Understand the basic anatomy of the joints**
- **Understand the what occupations affect these joints based on the published FM 7-22 exercise recommendations [24]**
- **Learn the strategies you can implement to reduce the rate of injury for yourself and others**

Background

- Shoulders make up 12.1% of injuries, elbow 5.4%, & wrist 0.8-1.4% [9, 17]
- The vast majority of injuries are still considered overuse for these areas (~40% are overuse, next highest is sprains at 31.6%)
- For the upper extremities (UE), PT makes up the biggest contributor to the rate of injury
- The elbow has a work-loss rate of 33.6%, 4.2% of reverse-malingering occurs alongside this, and limited training/workdays for these areas is above the average **37** lost days at **36.3** +/- **59.7** days for UE injuries[2, 11, 22]
- The Army outlines that these UE dominant exercises/maneuvers are required to be scored according to the latest publishing of their Army Combat Fitness Test (ACFT):
  - Standing Power Throw (SPT)
  - Hand-Release Push-up (HRP)
- These exercises have UE contributions to their ACFT exercises
  - Sprint-Drag-Carry
  - Plank (PLK) [25]

[15]

Background cont. [2, 3, 8, 10]

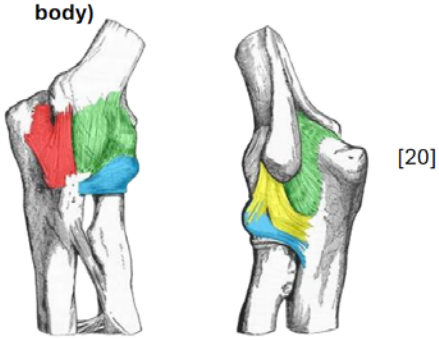


[12]

Background cont. [4]

Medial view (close to the body)

Lateral view (outside portion)

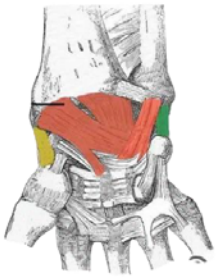


[20]

Joint Capsule
Annular Ligament
Ulnar Collateral Ligament
Radial Collateral Ligament

Lateral view (outside portion)

[21]



Radial Collateral Ligament
Palmar Radiocarpal Ligament
Ulnar Collateral Ligament

Occupational Impact[1, 24, 25]

Loss of participation in:

- ACFT and ACFT related activities like the
  - Deadlift
  - Standing Power Throw
  - HRP
  - Sprint-Drag-Carry
  - Plank
  - 2-mile run if not cleared by medical (or if there is a concern of shoulder subluxation)
- Firing range
- FM 7-22 related programs
- Significant sleep disruption, reduced quality of sleep[7]
  - Typical insomnia severity index (ISI) is 6.12+/- 5.59
  - An arm injury ISI score averaged 18.39 +/- 6.9
- A loss of up to significantly higher average lost training days
- Reduced occupations of social participation, which in the military's case means reduced unit cohesion
- Reduced effectiveness of daily activities outside of work also affects the satisfaction of participating within their home environment as well, or things they enjoy as hobbies
- Any hands-on military education is also diminished, even something as simple as an SL-3 layout to inventory on-hand gear

Strategies – FM 7-22 Ergonomics[24]

General Tips to preserve shoulder, elbow, and wrist joints

Exercises and Drills Abbreviations		
300SR - 300 Meter Shuttle Run	HR - Hill Repeats	RUD1 - Running Drill 1
4C - Four for the Core	HSD - Hip Stability Drill	RUD2 - Running Drill 2
AGR - Ability Group Run	LM 1 - Landmine Drill 1	RUD3 - Running Drill 3
AWST - Army Water Survival Training	LM2 - Landmine Drill 2	RUD4 - Running Drill 4
CL1 - Climbing Drill 1	MB1 - Medicine Ball Drill 1	RUD5 - Running Drill 5
CL2 - Climbing Drill 2	MB2 - Medicine Ball Drill 2	RUD6 - Running Drill 6
CD1 - Conditioning Drill 1	MMD1 - Military Movement Drill 1	RUD7 - Running Drill 7
CD2 - Conditioning Drill 2	MMD2 - Military Movement Drill 2	SSD - Shoulder Stability Drill
CD3 - Conditioning Drill 3	PD - Preparation Drill	STC - Strength Training Circuit
ETM - Endurance Training Machine	P3T - Pregnancy and Postpartum Physical Training	STM - Strength Training Machine
FM - Foot March	PMCS - Preventive Maintenance Checks and Services	ST1 - Suspension Training Drill 1
FW - Free Weight Training	RD - Recovery Drill	ST2 - Suspension Training Drill 2
GD - Guerilla Drill	RR - Release Run	TR - Terrain Run
OPAT and ACFT Abbreviations		
2MR - 2-Mile Run	MDL - 3 Repetition Max Deadlift	SDL - Strength Deadlift
HRP – Hand-Release Push-Up	PWT - Seated Power Throw	SLJ - Standing Long jump
IAR - Interval Aerobic Run	SDC - Sprint-Drag-Carry	SPT - Standing Power Throw
LTK - Leg Tuck	RWR - Rest-to-Work Ratio	

ACFT – Army Combat Fitness Test OPAT – Occupational Physical Assessment Test

- Before exercise, undergo a dynamic and functional warm-up phase. For example:
  - Gentle warm-up
    - Shoulder: Pendulum, small arm circles
    - Elbow: Shoulder touch, wrist flexion and extension
    - Wrist: Concentric flexion/extension without weight
  - Static Stretch
    - Shoulder: Wall stretch, triceps stretch
    - Elbow: Straighten against force, supination/pronation
    - Wrist: Eccentric stretch (arm forward, other hand pulls wrist)
  - Active warm-up
    - Shoulder: Full range of motion arm circles, chain breakers
    - Elbow: Hammer supination/pronation, concentric exercise with weight
    - Wrist: Wrist curls/extension, knob turns (opening and closing motion)
  - Dynamic Stretch
    - Shoulder: Slow, deep push-ups, staggered buddy drags
    - Elbow: Rope pulldown (or resistance band)
    - Wrist: Bear crawl, wall push-up with wrist inversion

Strategies – FM 7-22 Ergonomics[13, 23, 25]

General Tips to preserve shoulder, elbow, and wrist joints cont.

- When performing shoulder abduction (arms moving in a windshield wiper motion), keep the palm facing forward during the entire motion
- Do not let gravity pull your shoulder down when carrying any time of weight and do rest using the maximum range of shoulder retraction (such as with a push-up or a plank position)
- Elbow pain often comes from the wrist due to the length of most wrist muscles, they attach all the way up to the elbow
- The scapula can restrict joint movement of the shoulder and cause contractures, the chest can reduce movement of the scapula
- Do not load your full bodyweight onto your wrist when they are inverted
- Heat is your friend, especially with these mobile joints. Warmup is critical to mobility, stability, and achieving strength and conditioning

Strategies – FM 7-22 Tips[24]

Specific Tips to preserve shoulder, elbow, and wrist joints examples

Push-ups [16]
- Wrist at 90 degrees (no hyperextension)
- Hands within 120% - 170% of shoulders apart
- Full back/knee extension with pads of the toes on the ground
- This evenly distributes force and reduces injury

Standing Power Throw
- Utilizing the dynamic warm up procedure to increase mobility while reducing risk of injury
- A six-week isokinetic weighted toss training can increase velocity by 14% and internal rotation up to 15% [18]

Sprint-Drag-Carry [14]
- Training with 20-30% of your body weight doing a single-arm farmer carry to train shoulder-gridle stability and endurance
- Prioritize isometrics to reduce strain of shoulder joint

Strategies – Occupational Ergonomics[1, 23]

SURROUNDINGS

13-14. A Soldier's surroundings include the home, workplace, neighborhood, emotional network, climat ecology, and healthcare environment where a Soldier goes to heal or prevent illness. Surroundings ca significantly impact the way Soldiers feel as well as their health outcomes. For example, a messy des cluttered with paper and used cups can stress some people. And a walking into a tidy clean space ca invigorate some people to focus quickly on a task.

13-15. In the study of epigenetics—how genes are expressed—the expression of genetic traits is linked t the environment. The possibilities for how biological, psychological, and social phenomena interact and ho differences in environment might affect health are practically endless. However, if surroundings can caus changes in health, modifying the surroundings can also influence H2F goals.

13-16. Changes to the environment and lifestyle do not have to be complicated or expensive. For exampl using darker curtains, a sleep mask, or earplugs can aid sleep; while re-painting a room a brighter color spending more time in nature can improve mood. Bringing a plant inside a home can improve indoor a quality and even the aesthetic appeal of a room. Other methods to change environment can include—

- Asking smokers to move outside (or cut back).
- Cleaning the house using safe household products.
- Using a water filter.
- Placing weapons in locked boxes.
- Keeping cords and obstacles out of the way.
- Increasing consumption of fresh vegetables and fruit instead of processed convenience foods.

Consider these occupational environment modifications and adaptations:

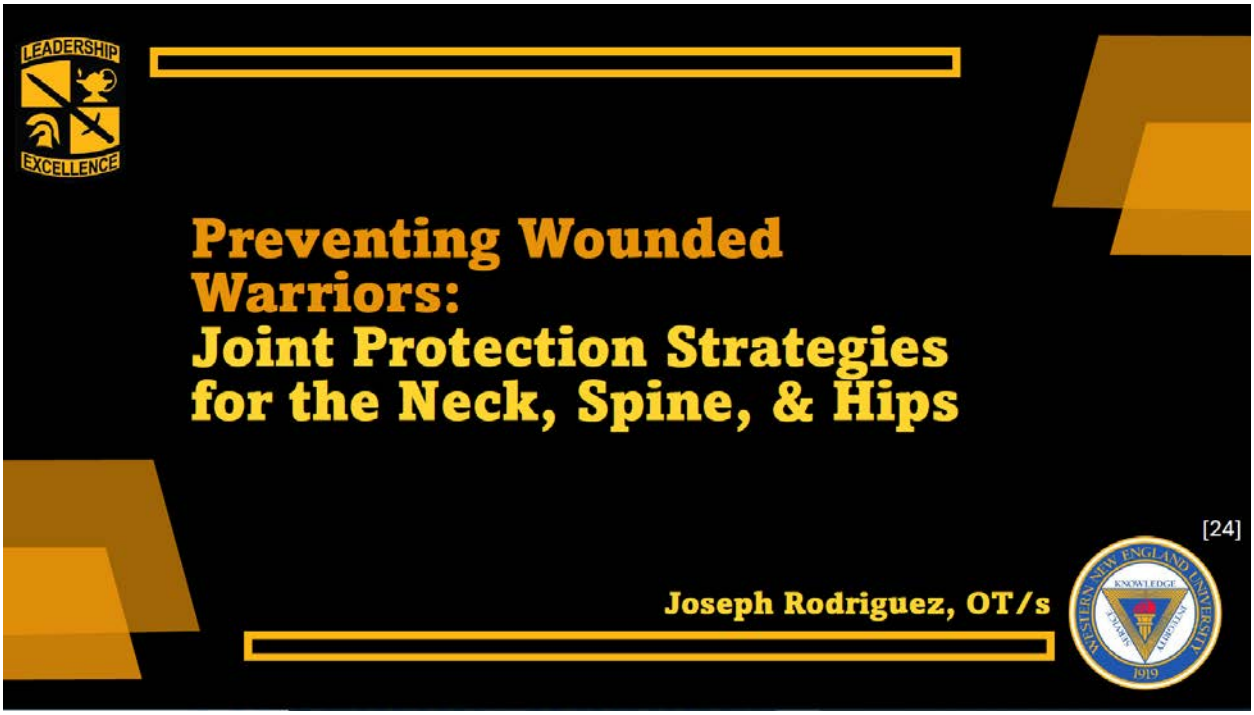
- While seated, your shoulders are relaxed, and elbows should be at 90 degrees with the hands hovering slightly above the keyboard. The fingers will press the keys instead of making elbow or wrist movements. Do not use a cushion for the wrist.
- Always place the forearms in neutral (wrist vertical and thumbs pointed up) and pull objects close to your body before lifting.
- Elbow pain often comes from the wrist due to most origin tendons being located at the elbow. Stabilizing the wrist, such as with wrist braces during the day, with heavy activity, and during sleep, prevents this pull and allows the elbow joint to reduce in inflammation.
- Stretches can be incorporated into your daily activities to help keep joints mobile and stable throughout the day.

Takeaways:

- **37 training days lost on average, but over 90 can happen more often with UE joint injuries**
- **Overuse continues to be the most likely type of joint-related injury**
- **Dynamic stretching improves velocity and range of motion to improve your scores of the ACFT**
- **Through ergonomic education, you can use activity management to prevent injury in yourself and your troops**
- **Elbow injuries often occur at the wrist level, shoulder can be affected by the chest and scapula**


References:

Lesson 3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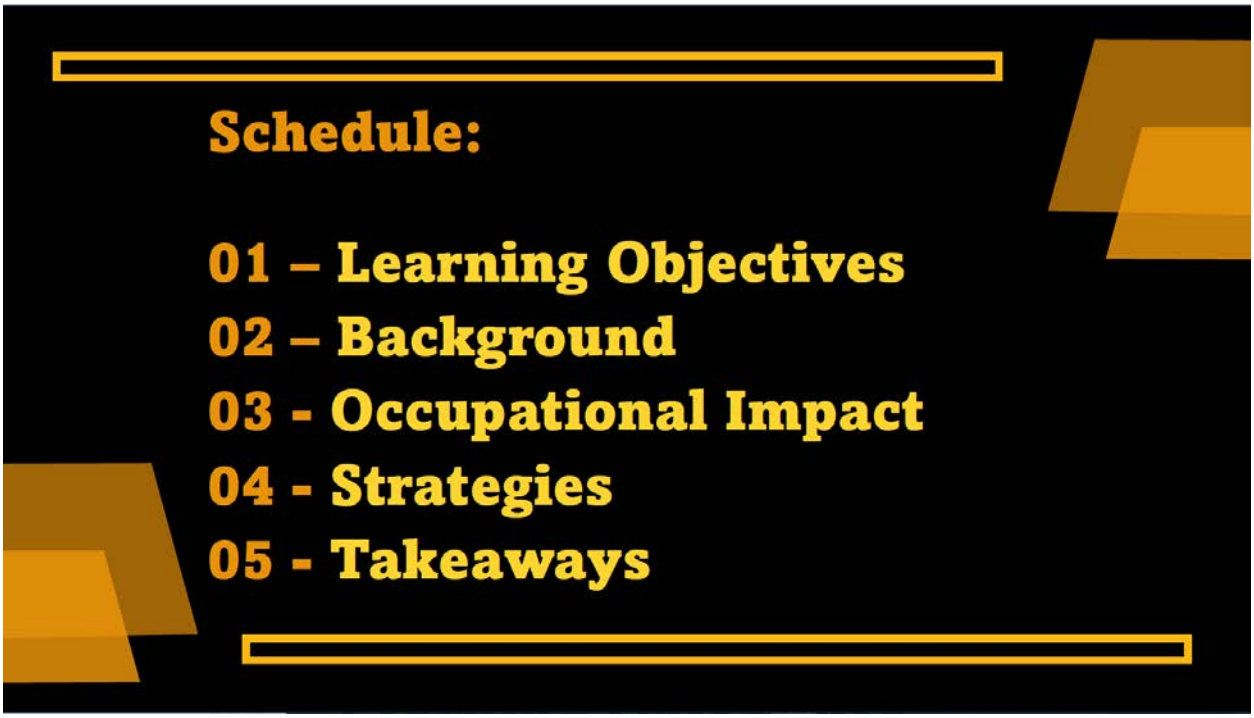
Preventing Wounded Warriors:
Joint Protection Strategies for the Neck, Spine, & Hips
[24]
Joseph Rodriguez, OT/s

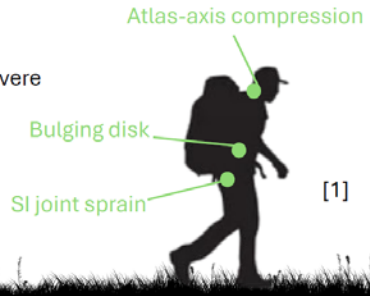

Schedule:
01 – Learning Objectives
02 – Background
03 - Occupational Impact
04 - Strategies
05 - Takeaways

Learning objectives:

- **Understand the incidence of injury of the neck, spine, & hip joints**
- **Understand the basic anatomy of the joints**
- **Understand the what occupations are affected by these types of injuries**
- **Learn the strategies you can implement to reduce the rate of injury for yourself and others**

Background

- The spine, specifically the lower back, makes up the most amount of overuse injuries for active-duty personnel[12]
- The spine makes up 9.5% of joint-related injuries for cadets, hips make up 9%, and the neck makes up 2.2%[19]
- Injuries in these areas serve as a predictor for future problems if not managed with ergonomic modifications and the treatment of symptoms before they get worse[4, 11, 12, 21]
- Sources for injuries stem from a variety of experiences over a military career, examples:
  - Overuse (repetitive motions, stretching, loading of joints)
  - G-force (sudden deceleration or acceleration)
  - Acute (training injuries, combat injuries)
- Inappropriate ergonomics of weightbearing and loading of the joints are severe contributors to injuries of these areas[17]
- Loading over the joints are direct contributors to overuse injuries



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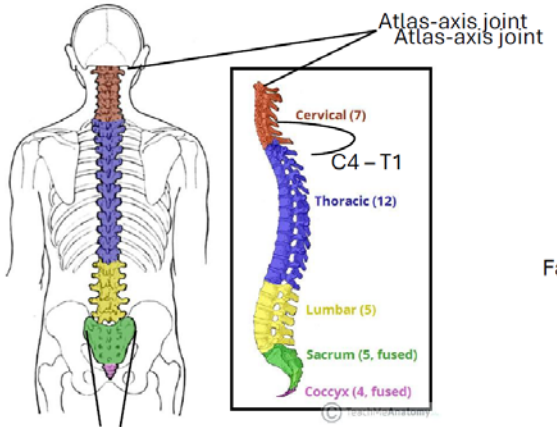

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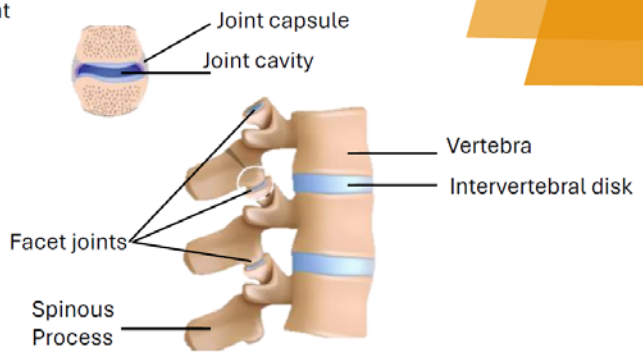

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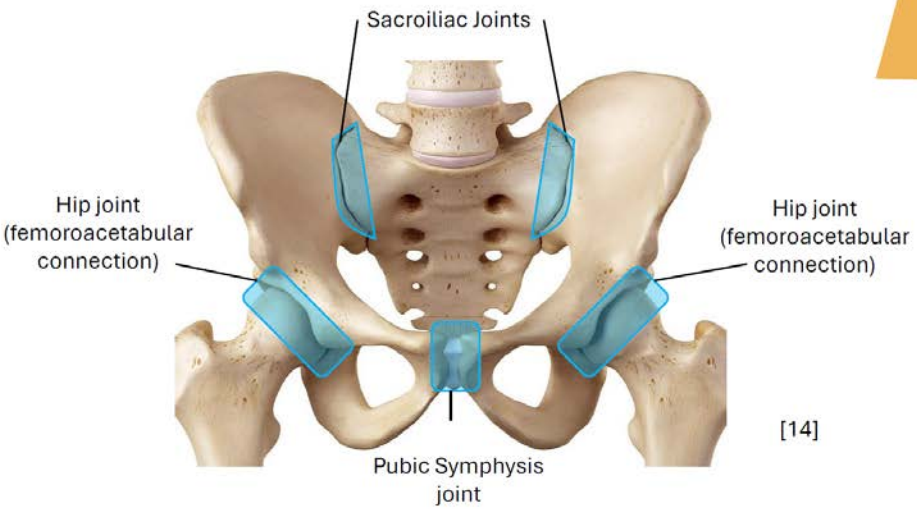


[14]

Occupational Impact[22]

Loss of participation in:

- All military-related training
  - High risk of total restricted duty and light duty from these locations of injuries
  - Increase risk of Unqualified (white) category of the OPAT
    - Deferment of IMT, BCT Future Soldier Training
  - Unable to participate in AIT, and OSUT
  - High risk of deconditioning, reduced H2F quality
- Reduced Movement Lethality
  - Casualty Evacuation and Extraction
  - Building a Fighting Position
  - Move Under Fire
  - Move Over/Under/Around Objects
- Reduced Mental Readiness[16, 22]
  - Resilience
  - Social Acuity
  - Occupational satisfaction and competence
  - Occupational Identity (Character)

Strategies – FM 7-22 Tips[3, 7]

Specific Tips to preserve neck, spine, and hips

[18]

[2]

[10]

Neck

- Cervical spine rotation (turn head against light resistance)
- Cervical retraction (chin-tuck stretch)
- Lateral flexion (Head tilt with mild pull)

Spine

- Deadlift (remember alignment of the lower extremities)
- I, Y, Ts (In back extension, extend arms in a thumb-up position in front of you, diagonally, and to your sides)

Hips [13, 20]

- Clam in side-lying with external rotation (on your side, knees tucked to 45 degrees, open the knees)
- Monster walks (45-degree squat and hold position, walk diagonally to a set point)

Strategies – Tips[5]

Specific Tips to preserve neck, spine, and hips

M.O.E.L.L.E 4000 Airborne Ruck System

- Latest ruck system utilized by the U.S. Army that superseded the previous ALICE and M.O.E.L.L.E II ruck systems
- 4000 stands for cubic inches of space
- Typical ruck sack weight during a movement weigh anywhere from 35-70 lbs., though in some instances have been known to weigh more if carrying special equipment
- When accounting for time spent participating in an exercise, ruck marching has the highest rate of incidence
  - Heavy loading over back, hips, and knees
  - Improper usage increases load over the neck and shoulders
- Distribution of weight needs to be optimal in order to reduce load over a specific joint

Strategies – Tips[5, 9]

Specific Tips to preserve neck, spine, and hips

- The softest, most pliable pieces (ex. Sleeping bag) should be located at the bottom of the pack
- Heaviest weight should be located towards the center of the pack towards the front lying against the back (ex. Sapi plates)
- Medium weight should be distributed outside of the main heavy weight (ex. Kevlar)
- The lightest weight should fill out the rest of the rucksack
- Canteens and other attachable material should be distributed evenly around the pack with the helmet (and other singular material that won't fit into the pack) should be distributed centrally on the pack, heaviest (helmet) on top

Strategies – Tips[5, 9]

Specific Tips to preserve neck, spine, and hips

1. To fit the pack, you'll start by donning the pack and leaning your upper body forward
2. Grabbing the shoulder straps, pull them straight backwards by extending the arms down towards your hips
   a. The pressure should feel somewhat tight along the AC joint down to the crux of the armpit
   b. This prevents the pack from sliding during movement, reduce inertia over the upper back and shoulders
   c. You should not feel any tingling or numbness over the shoulders and down the arm after wearing the pack
3. Tighten the hip strap over the ilium (top bony protrusion) of the hip wear the bottom of the strap sits just above the hip joint of the femur
4. Tighten the chest strap across the upper part of the pectorals (pectoralis minor) to keep the pack close to your back without it sliding or "bouncing" during movement
5. The weight is ultimately distributed over the hips while you march in a slightly forward leaning position (approximately 15-25 degrees)

Strategies – Occupational Ergonomics

General Tips to preserve neck, spine, and hips

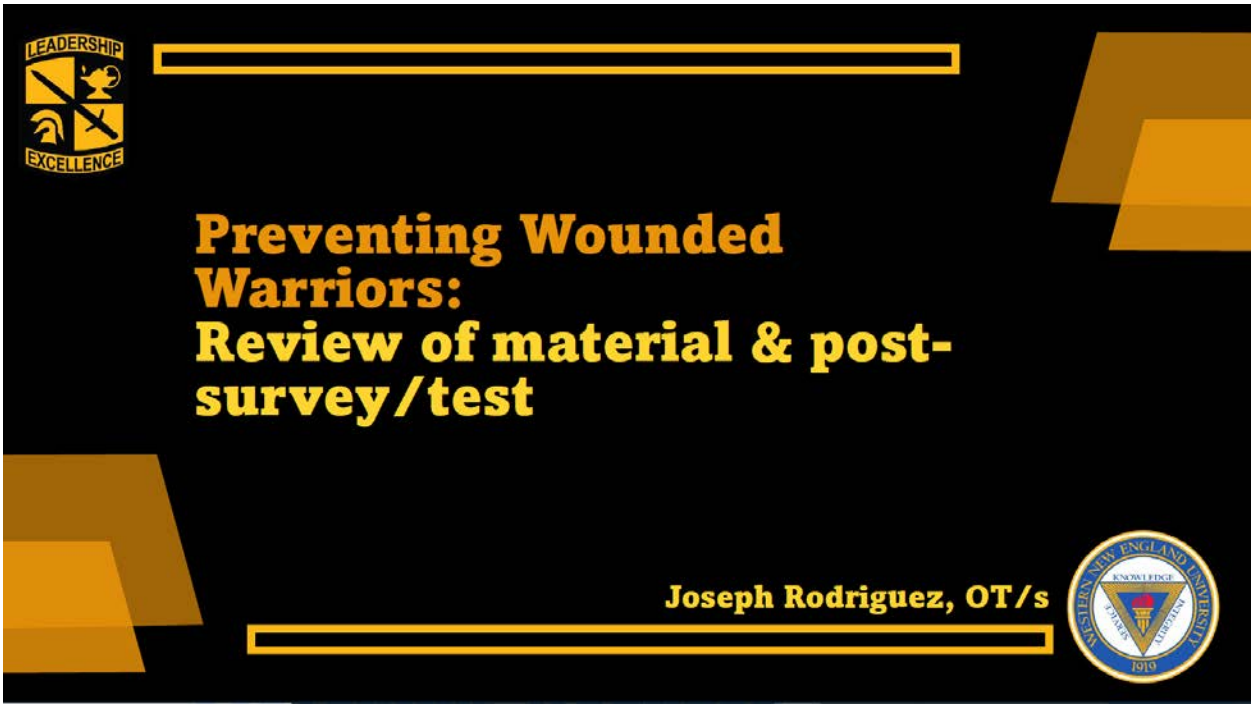
- Wearing a back brace has not been shown to reduce the rate of injury, in fact, is prohibited by the Department of Defense (DoD) when used for prevention
  - The only evidence for its usage in the prevention of back pain during exercise
- Utilize office ergonomics (90-90-90 posture, proper spacing of knees from the seat, etc.) to reduce unnecessary loading of the spine and neck joints
  - You can use a rolled towel for lumbar support while sitting
  - Head should be in a neutral position while looking at a monitor or screen, if on a computer, the monitor should be an arm's length away
- Remove all falling hazards from your home and work area
- Move objects where you do not need to bend over when reaching for them (ex. Clothes hamper, power strips, etc.)
- When lifting, bend your knees and reach with your arms to grab an object
  - Slide it to you as close to your body as you can
  - Tighten your stomach muscles and stand straight up without using your back to lift
- Stretch throughout the day, at least every 20 minutes – 2 hours
  - Neck: Tuck your chin and pull your neck back like you're giving yourself a double chin
  - Spine: Gentle rotation and lateral flexion
  - Hips: Place your arm between your knees and push closed for 10 seconds, then wrap your arms around your knees and try to open for 10 seconds

Takeaways:

- Neck, back, and hip injuries in the military increase the likelihood of lifetime services needed to manage pain
- The distribution of weight is a main contributor to injuries of these joints while in the military
- Continue to follow the dynamic stretching protocol and stretch throughout the day
- Prevention of injury in these joints is especially emphasized, as it can have greater consequences on occupational participation
- Ruck marching, when accounting for time, is the greatest area of joint-related injury, so ensure an ergonomic fit of your pack and use the recommended weight distribution

References:

Lesson 4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Preventing Wounded Warriors:
Review of material & post-survey/test
Joseph Rodriguez, OT/s
WESTERN NEW ENGLAND UNIVERSITY
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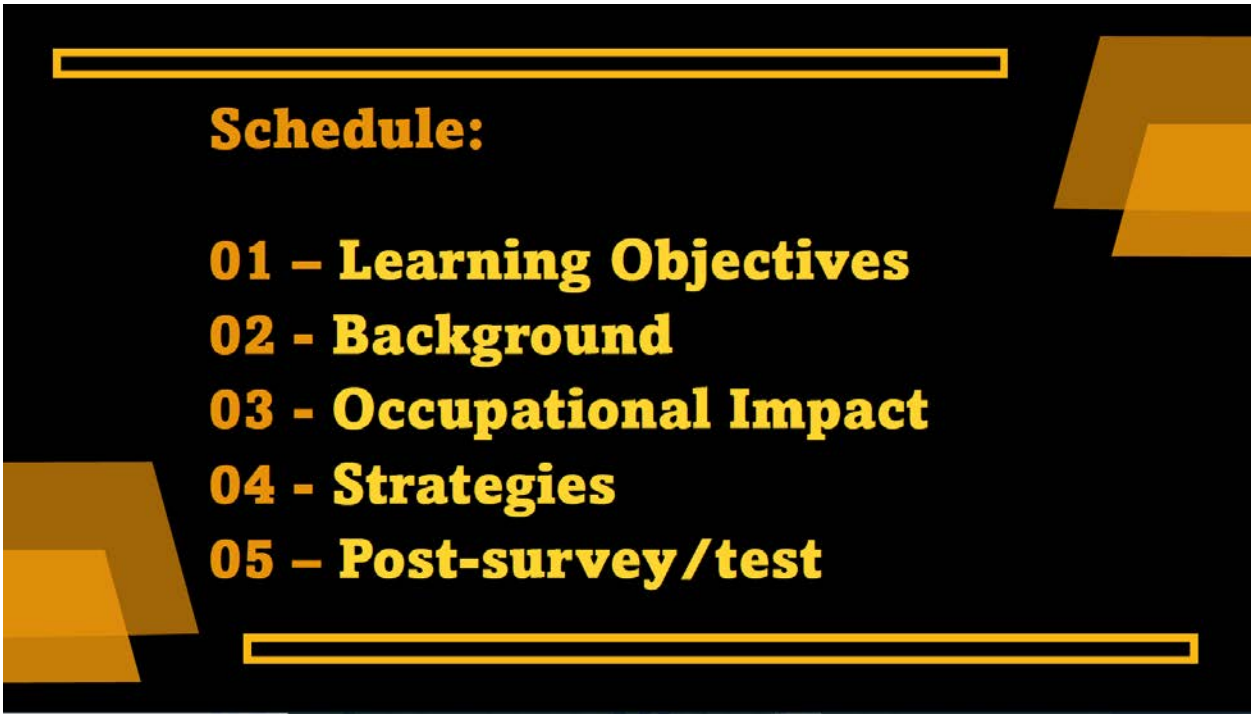
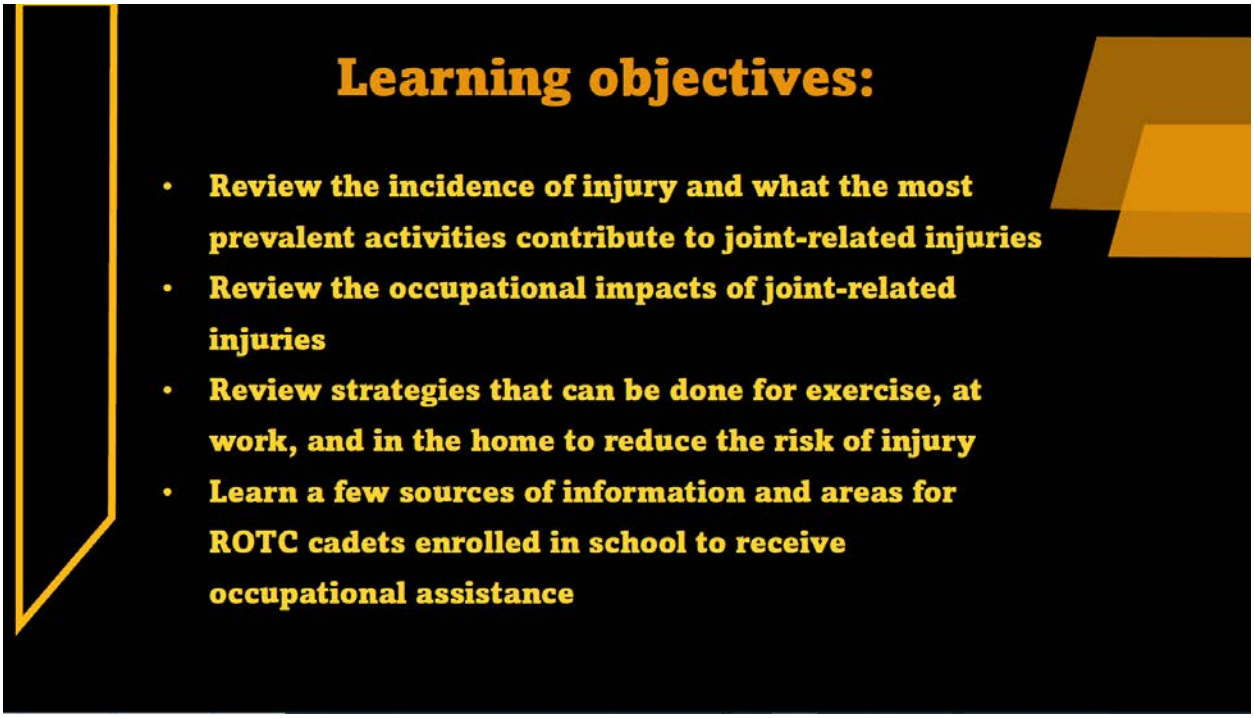

Schedule:
01 – Learning Objectives
02 - Background
03 - Occupational Impact
04 - Strategies
05 – Post-survey/test



Background

- **38% of cadets** report that they are injured while enrolled in an ROTC program every year and **48% of 1st-year Army personnel** report experiencing a musculoskeletal injury (MSKI)
- **72%** of MSKI are joint-related injuries with **overuse** injuries making up the majority of MSKI
- **Running** has the highest incidence of injury for ROTC active-duty, and reserve personnel more than **military training**, and the **knees** are reported to have the highest report of injury, followed by the **ankle,** and **shoulder**
- When accounting for time spent performing an activity, **ruck marching** leads to up to **500%** more injuries compared to running
- **37 full training days** are lost on average due to joint-related MSKI with **shoulders** and **elbows** having some of the **highest amount of average training days lost**, and **spine, neck,** and **hip** injuries often lead to the greatest amount of **light duty** and **restricted duty** designations per injury
- Injuries cost the Department of Defense **$4.0 – 8 billion every year** on **joint-related injuries**
- The **UMASS** cadre currently **does not** have a joint-related injury prevention program in place and has agreed to work with the **WNE OTD** program to establish the **Preventing Wounded Warriors** program for cadets enrolled within the UMASS cadre while the leadership is undergoing additional injury prevention education
- Additional sources (handouts, PowerPoints, manuals) are being created before July 12th, 2024, to supplement cadet learning to become better leaders in preventing injury

Occupational Impact

- Restricted, light, and limited duty can lead to **partial** or **complete** cessation of occupational participation in both your **professional** and **personal** lives
- **Professionally**, FM 7-22 related occupations include:
  - IMT
  - BCT
  - AIT
  - OSUT
  - OPAT designation of unqualified (white) category
  - ACFT scores
  - As well as various military trainings, such as leading PT, advancing job-specific knowledge, movement orders, and unit/headquarter-level operations
  - Promotions and career advancement/fulfillment is affected
  - The quality of life for your troops will also decline due to experiencing preventable injuries, even if just temporary

Occupational Impact

Personally

- Activities of Daily Living (ADLs, such as feeding, dressing, grooming, etc.)
- Instrumental Activities of Daily Living (IADLs, doing laundry, cleaning, driving, taking care of others etc.)
- Health Management (physical activity, medications, nutrition, etc.)
- Rest and Sleep (preparation, participation, and quality)
- Education (formal, informal, and interest exploration)
- Work (Officer competency, advanced training, volunteering)
- Play (participation, exploration of hobbies)
- Leisure (relaxing and participation of)
- Social Participation (community, family, partners, and peer group comradery)

Strategies – Occupational Tips and tricks

- **Body ergonomics** during **exercise**, in the **office**, and within the **home or any environment** you find yourself in
  - Prioritize speed over distance, train for stability, ensure packs are fitted and weight is distributed
  - Don't lock your knees, remember lifting mechanics
  - Non-slip mats in wet areas, ensure areas are well lit, sit with hips, knees, and ankles 90-90-90 degrees with feet flat on the floor etc.
- The necessity of movement every **30 minutes** and no longer than 2 hours
- While **stretching** is important, it is only one part of a **dynamic, functional** warm up and is **not** the key component to the prevention of injury. It should be done as part of a sequence
- Recognize the signs of joint-related injuries in yourself and others, enforce the **need** of well-being over the **want** of participation when it will **reduce overall quality of life and military readiness**, follow up with joint-related injuries
- Understand symptom **prevention** and management with **modalities** like cold, heat, therapeutic taping, and bracing

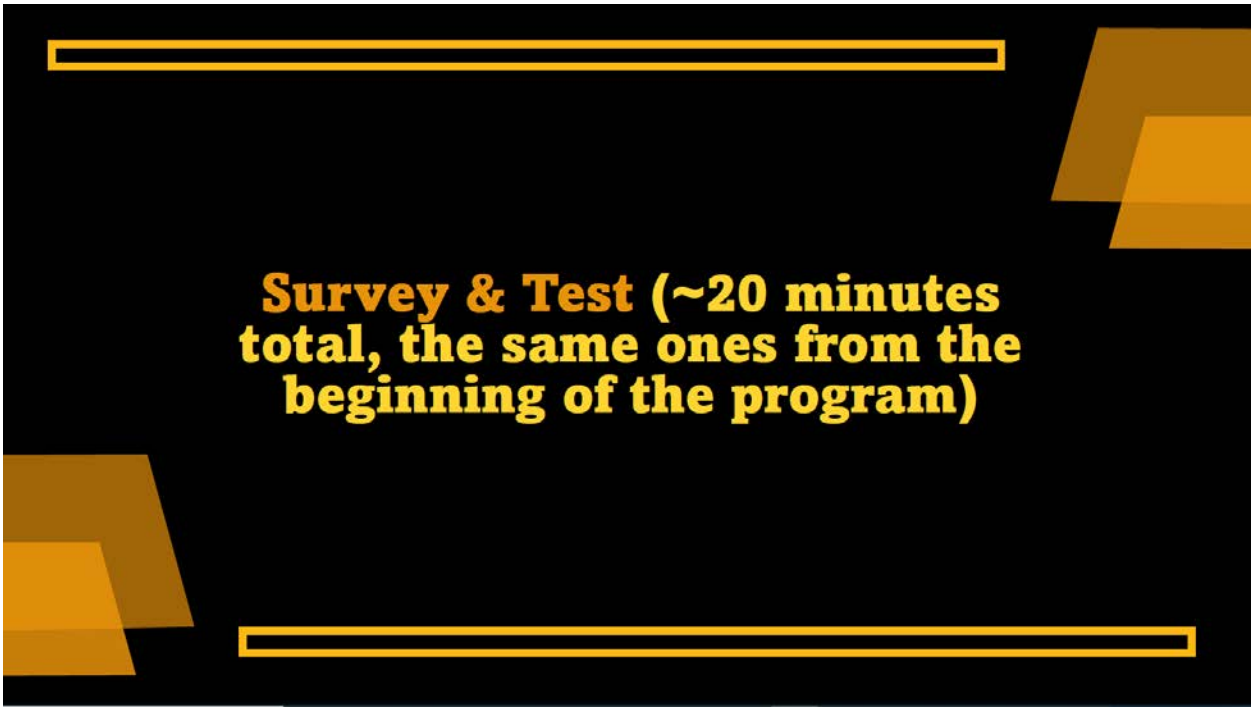
Strategies – Occupational Tips and tricks

NOTE

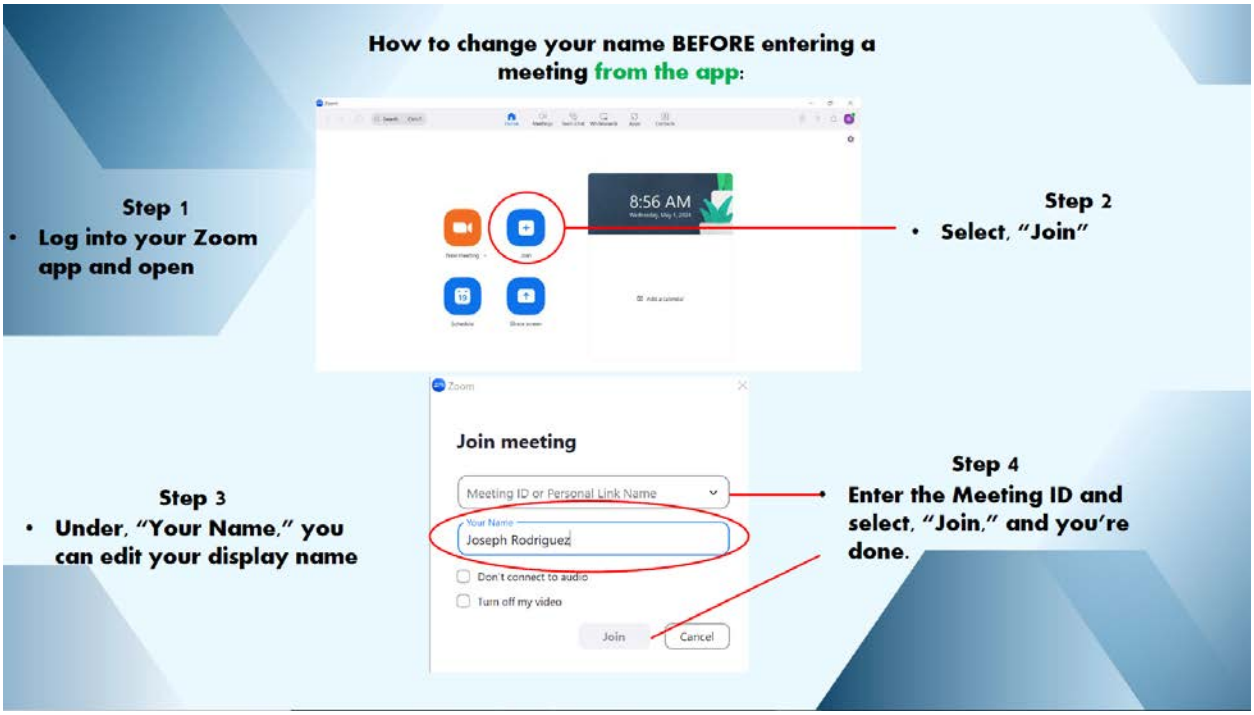
- Bracing can be used to **prevent symptoms** from worsening when they occur, such as when you feel pain at the origin of a tendon (elbow when moving the wrist), but should **not** be used to manage symptoms **with no other ergonomic modification**
- Usage of **back braces** for the sole purpose of the **prevention** of acute injuries is **not recommended** by the **Department of Defense** due to a lack of supporting evidence (simply acts as a **biofeedback tool** to correct posture and not as a preventative tool), though can be used when performing repetitive movements to reduce overuse injuries as **supported** by evidence

  - Research appropriate type of brace and duration of bracing
  - Research **how** to use a brace and how it's fitted

  - Do not **overuse** them (example, recreationally wearing a back brace for more than 2 hours or more than 2 weeks can lead to weakening of trunk muscles)


Survey & Test (~20 minutes total, the same ones from the beginning of the program)

Appendix B – Zoom PowerPoint



Appendix C – Survey

Joint-Related Injury Prevention Confidence Survey

Injuries, such as joint sprains, ligament tears, fractures, or repetitive motion injuries are common types of joint-related injuries that prevent the ability to participate in military-style training or exercise. Many cadets, potential, previous, or enrolled, experience injuries every year that could have been prevented for themselves or others.

By taking this survey, you are furthering the knowledge for not only the fields of occupational therapy or occupational science, but also the Reserve Officers' Training Corps (ROTC) to gauge the current confidence in the prevention of injury. This information can be used to assist the overall U.S. Army Public Health Command (USAPHC) in future development of injury prevention programs. This is a voluntary survey where all responses are anonymous. Your personal information will never be shared with outside individuals or entities, and only your research identification number will be used by the study staff for this study documentation.

To begin:

Fill out the Research Identification Number at the top of the paper using the 4-digit number/letter combination that you created. If you do not remember your number, you will generate a new research identification number ***before*** taking this survey. You will mark each question to identify a response to a question that ***best*** describes your agreement to the question presented. For the electronic version, you will make a mark using your keyboard/keypad in the open box on the right. Once you are finished with the paper version, hand the form to the researcher. With the electronic version, you will email this back to the researcher to their WNE associated email address.

1.) Is this a Pre-survey or a Post-survey?	
Pre-survey…….	
Post-survey……	

2.) What is your sex?	
Male……...	
Female……...	
Would rather not say…….	

3.) What is your age?	
18-21 years of age…….	
22-25 years of age…….	
26-29 years of age…….	
30-33 years of age…….	
34-37 years of age…….	

38-40 years of age…….	

4.) What is your affiliation to the ROTC?	
Enrolled cadet……	
Previously enrolled cadet……...	
Potentially enrolling as a cadet at a later date……...	

5.) In the past 3 months, have you experienced a joint-related injury while training or exercising (knees, ankles, hips, wrists, shoulders, etc.)?	
Yes	No
If "yes," where was the injury located? Select all that apply. If "no," skip to question 6.	
Neck	
Spine	
Shoulder(s)	
Elbow(s)	
Wrist(s)	

Finger(s) or Thumb(s)	

Continue on page 4.

Continued from question 5, page 4.

Hip(s)	
Knee(s)	
Ankle(s)	
Toe(s)	

6.) How would you describe your physical fitness compared to others your age?	
Poor…….….	
Below Average…….…….	
Average…….	
Above Average…….…….	

7.) Joint-related injuries can be prevented.	
Strongly Disagree…….	

Disagree……....	
Agree……	
Strongly Agree…….	
8.) I have the confidence to prevent joint-related injuries in myself.	
Strongly Disagree…….	
Disagree……....	
Agree……	
Strongly Agree…….	

9.) I have the confidence to prevent joint-related injuries in others.	
Strongly Disagree…….	
Disagree……....	
Agree……	
Strongly Agree…….	

10.) My leadership (or educators) believe that injuries can be prevented.	
Strongly Disagree…….	
Disagree…….....	
Agree……	
Strongly Agree…….	

11.) My leadership (or educators) keep me informed on what types of joint-related injuries can be prevented.	
Strongly Disagree…….	
Disagree…….....	
Agree……	
Strongly Agree…….	

12.) My leadership (or educators) have provided me an appropriate amount of education or information to prevent joint-related injuries.	
Strongly Disagree…….	
Disagree…….....	
Agree……	
Strongly Agree…….	

13.) My leadership (or educators) model joint-related injury prevention efforts indicated by an established and sufficient program.	
Strongly Disagree…….	
Disagree…….....	
Agree……	
Strongly Agree…….	

Appendix D – Test

Pre/Post-Test Knowledge Quiz

Injuries, such as joint sprains, ligament tears, fractures, or repetitive motion injuries are common types of joint-related injuries that prevent the ability to participate in military-style training or exercise. Many cadets, potential, previous, or enrolled, experience injuries every year that could have been prevented for themselves or others.

By taking this test, you are furthering the knowledge for not only the fields of occupational therapy or occupational science, but also the Reserve Officers' Training Corps (ROTC) to gauge your current knowledge about the prevention of joint-related injury. This information can be used to assist the overall U.S. Army Public Health Command (USAPHC) in future development of injury prevention programs. This is a voluntary test where all responses are anonymous. Your personal information will never be shared with outside individuals or entities, and only your research identification number will be used by the study staff for this study documentation.

To begin:

Fill out the Research Identification Number at the top of the paper using the 4-digit number/letter combination that you created. If you do not remember your number, you will generate a new research identification number ***before*** taking this test. You will highlight or circle each answer to the presented question with either the paper or electronic form. Once you are finished with the paper version, hand the form to the researcher. With the electronic version, you will email this back to the researcher to their WNE associated email address.

Pre/Post-Test Knowledge Quiz

Is this a pre-test or post-test? (circle or highlight one) Pre-test Post-test

Content Quiz

1.) What exercise is the leading cause of injury in the Army?

a. Running
b. Military training
c. Sports
d. Weightlifting

2.) When adjusted for time performed, what injury occurs the most in the Army?

a. Resistance training
b. Ruck marching
c. Weightlifting
d. Running

3.) What is the most common type of injury during training?

a. Acute
b. Chronic
c. Overuse
d. Underuse

4.) What is the most injured joint during training?

a. Shoulder
b. Foot
c. Elbow
c. Knee

5.) Stretching before exercise is the key component to preventing joint-related injuries.

a. True
b. False

6.) How many full training days are lost approximately after an injury on average per soldier?

a. 17
b. 27
c. 37
d. 47

7.) What is the annual estimated cost the Department of Defense spends on injuries per year?

a. $1.5 – 4 billion
b. $3.3 - 6 billion
c. $2.6 – 5 billion
d. $4.8 - 8 billion

8.) How many cadets are approximately injured per year while enrolled in an ROTC program?

a. 38%
b. 48%
c. 28%
d. 58%

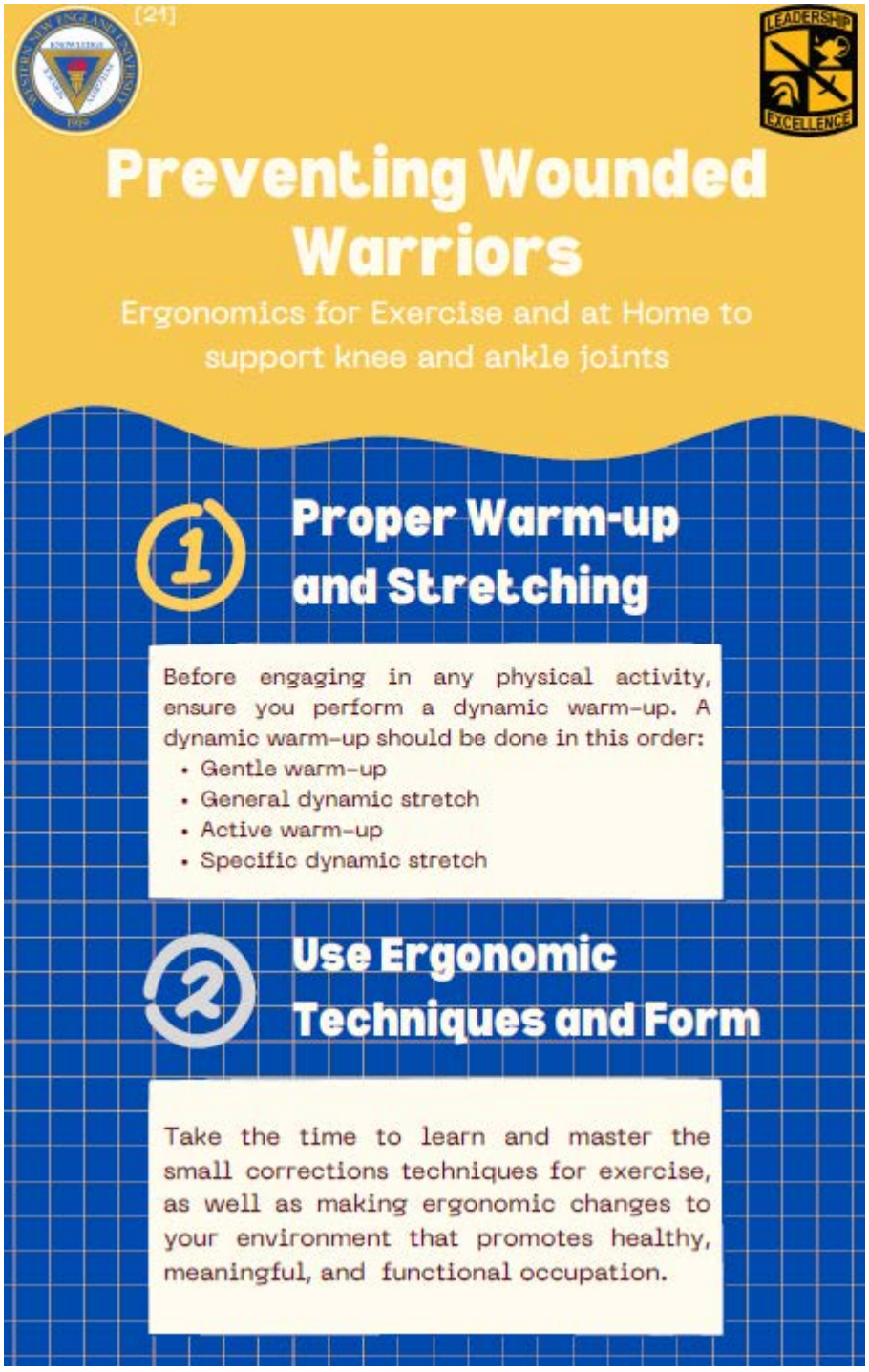
9.) Wearing back braces/belts reduces the risk of injuries to the back and spine when weightlifting.

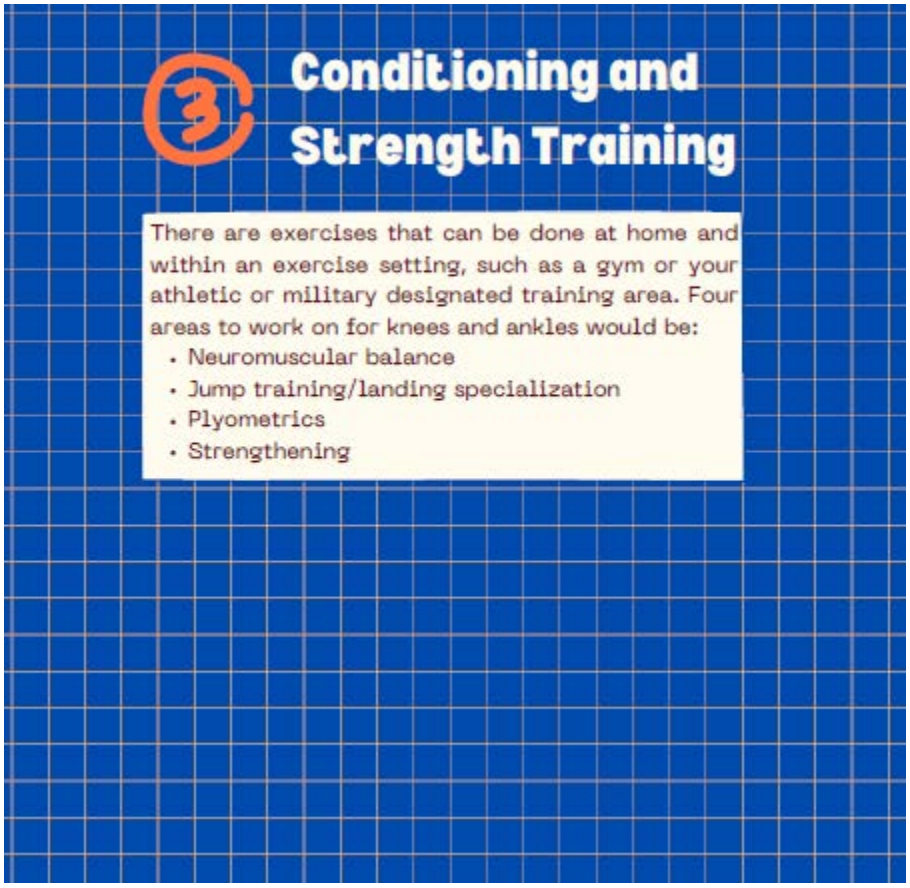
a. True
b. False

10.) Most joint-related injuries can be prevented in yourself and others through education and activity management.

a. True
b. False

Appendix E – Supplementary Handouts


[21]
Preventing Wounded Warriors
Ergonomics for Exercise and at Home to support knee and ankle joints
1
Proper Warm-up and Stretching
Before engaging in any physical activity, ensure you perform a dynamic warm-up. A dynamic warm-up should be done in this order:
• Gentle warm-up
• General dynamic stretch
• Active warm-up
• Specific dynamic stretch
2
Use Ergonomic Techniques and Form
Take the time to learn and master the small corrections techniques for exercise, as well as making ergonomic changes to your environment that promotes healthy, meaningful, and functional occupation.


3
Conditioning and Strength Training
There are exercises that can be done at home and within an exercise setting, such as a gym or your athletic or military designated training area. Four areas to work on for knees and ankles would be:
• Neuromuscular balance
• Jump training/landing specialization
• Plyometrics
• Strengthening

1 Proper Warm-up and stretching (Total time ~5-10 minutes)

Gentle Warm Up

To begin, a general aerobic stretch should be paired with intermittent static stretching. This is to increase blood flow to muscles that move and stabilize the joints of the knees and ankle so that they become "warm." When muscles become "warm," they are more elastic and are less susceptible to strains and sprains. [9, 19]

Time

- 2-3 minutes

Examples

[20]

Air Squat

- 15-30
- Toes and knees should be pointed forward
- Feet shoulder-width apart
- Bend knees slightly less than 90 degrees

[14]

Knee Hug

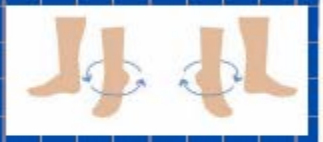
- 10-20
- Keep upper body straight up
- Lift knee swiftly to chest and pull in
- Motions should be fluid, one after another

[22]

Calf Raise

- 15-30
- Raise heel of ground onto the front of your toes (the first big knuckles)
- Do not bounce, motion should go up and hold for 2-3 seconds before slowly back down

[1]



Ankle Rotation

- 10 on one foot at a time (20 total)
- One foot stabilizes flat on the ground, the other raises onto front of your foot
- Make a circle with the raised foot 2-3 seconds

Reasoning

[2]

Muscles and ligaments stabilize the joints of the body. Muscles are thermoelastic, meaning they stretch more when heated. Ligaments are less elastic, but are still pliable, allowing up to 25% more motion when warmed up. You are 36% less likely to injure yourself, such as with sprains and strains, if you start with this before an exercise compared to a static stretch. [17, 23 4]

1 Proper Warm-up and stretching (cont.)

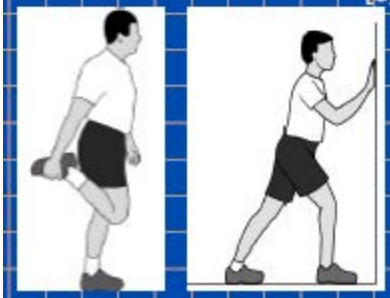
Static Stretch

After your muscles have been warmed up, next is to stretch the tendons of the body through a greater range of motion for a bit longer. This will allow the body to increase it's range of motion (ROM) for greater flexibility. This amount of time increases contractile strength, meaning greater joint stability as well as increased joint ROM. Too much stretching (static stretching beyond this time) may have adverse strength-based stability effects. [18]

Time

- 3-5 minutes
- Mix and match, no longer than 2 minutes per stretch

[8]



[12]

Active Warm-up

These are similar to the Gentle Warm-up phase, just with increased effort in order to increase aerobic respiration (generation of energy from converting air). Gentle warm-ups can be performed again, but here are a few examples which may have higher effort for this stage.

Time

- 2-3 minutes
- Short periods of moderate to high effort

Examples

[10]

High Knees

- 20-30
- Jogging in place with bounding on the front of your feet gently, bending the knees and hips on impact
- Knees should raise above the hips

[11]

Butt Kicks

- 20-30
- Jogging in place with bounding on the front of your feet gently, bending the knees and hips on impact
- Heels should touch the glutes with each bound

1 Proper Warm-up and stretching (cont.)

Dynamic Stretching

Dynamic stretching should use more effortful movement that moves through a greater ROM beyond the halfway point. This serves as the beginning of the cooldown point of the warm-up phase by winding down with functional, moving, and often alternating stretches. Ending with these types of stretching has shown to improve measured power which leads to improved active muscle performance. [9]

Time

- 3-5 minutes
- Moving, functional stretches

Examples

[13]

Walking Lunges

- 10-15 forward, 10-15 backward
- Knees should not touch the ground (~6 inches off the ground)
- Maximum reach during the step without knee touching the ground

[15]

Standing Elbow To Knee Crunch

- 30 (1 on each side counts as 1 overall)
- Do not bend forward, let your knee touch your elbow, rotate your trunk
- Do not rotate your foot when raising the alternating knee, keep them pointed forward

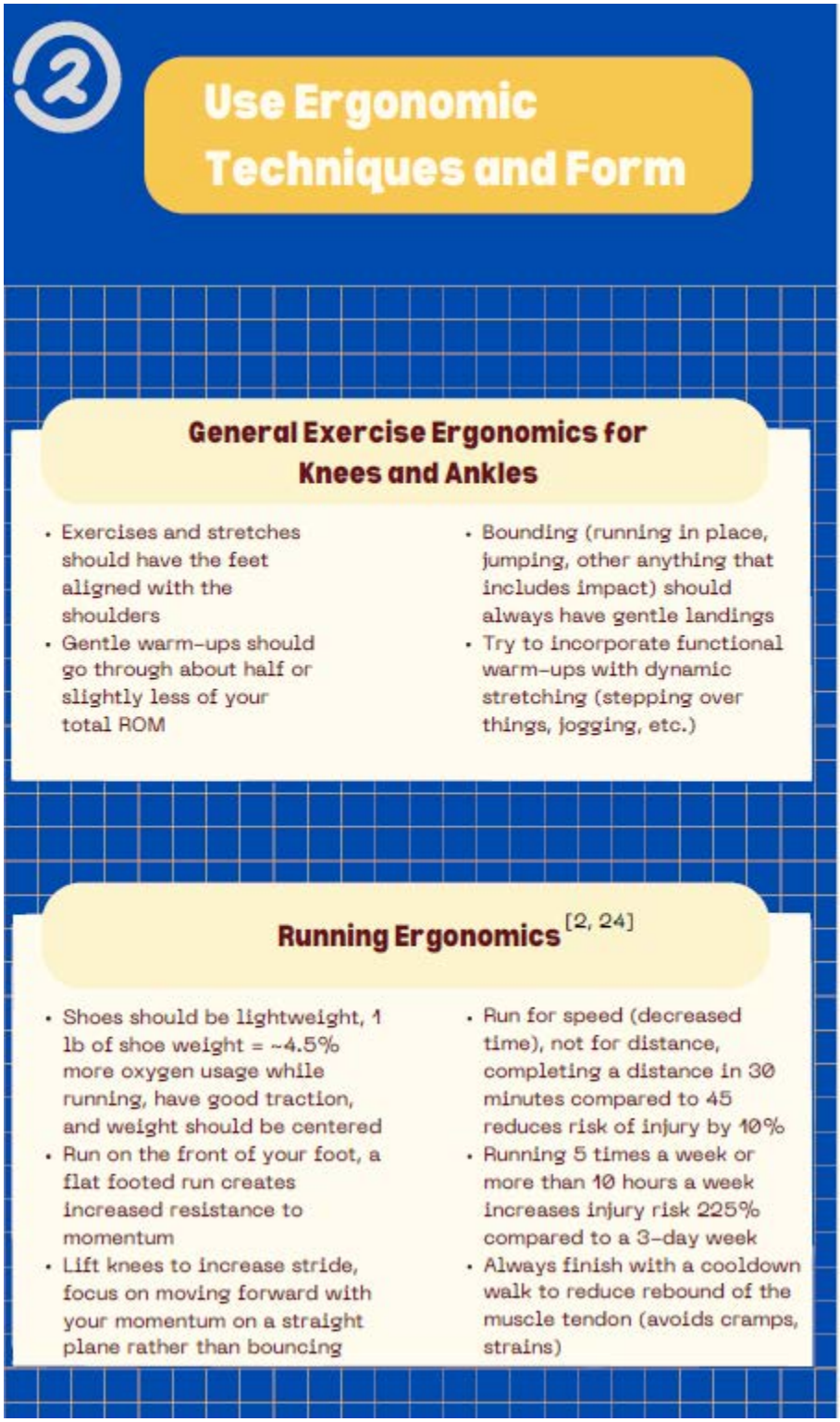
[16]

Mountain Climbers

- 30 (1 on each side counts as 1 overall)
- One hip is flexed, knee bent at 90 degrees, and forward foot is flat on the ground
- Rear foot is in dorsiflexion
- Alternate

Note

Active warm up exercises can be done as well with emphasis on the stretching portion of the exercise. They can also be made dynamic by making them move or include a functional aspect to it.


2
Use Ergonomic Techniques and Form
General Exercise Ergonomics for Knees and Ankles
• Exercises and stretches should have the feet aligned with the shoulders
• Gentle warm-ups should go through about half or slightly less of your total ROM
• Bounding (running in place, jumping, other anything that includes impact) should always have gentle landings
• Try to incorporate functional warm-ups with dynamic stretching (stepping over things, jogging, etc.)
Running Ergonomics [2, 24]
• Shoes should be lightweight, 1 lb of shoe weight = ~4.5% more oxygen usage while running, have good traction, and weight should be centered
• Run on the front of your foot, a flat footed run creates increased resistance to momentum
• Lift knees to increase stride, focus on moving forward with your momentum on a straight plane rather than bouncing
• Run for speed (decreased time), not for distance, completing a distance in 30 minutes compared to 45 reduces risk of injury by 10%
• Running 5 times a week or more than 10 hours a week increases injury risk 225% compared to a 3-day week
• Always finish with a cooldown walk to reduce rebound of the muscle tendon (avoids cramps, strains)

Home Ergonomics

- Never squat down to reach something that puts the knee in maximum ROM, place low objects at knee level or higher
- Sit with your ankles, knees, and hips at a 90 degree angle (feet flat on floor, don't let them dangle), and the seat should be 3–4" from the back of your knees
- Walk around or stand every 20–30 minutes (a standing desk works great)
- Ensure the home is free of clutter to prevent knocking into things
- Keep areas well lit, especially around corners
- Shoes/boots with ankle support to prevent inverting and rolling your ankle while doing tasks
- Ensure proper lacing and re-lacing before activity as needed
- LISTEN TO YOUR BODY, if you ache, treat, rest, and recover before it becomes worse

Conditioning and Strength Training [7, 6]

Neuromuscular Balance

This uses multiple joints and muscles in order to functionally weight-bear. This activates the nervous system that emphasizes on quality, efficiency, and alignment of the body. It is important to train your vestibular and proprioceptive systems to promote joint stability. This promotes locomotive strength, mobility, and neuromuscular response.

Examples

Examples

Beginner (<8 weeks)

- Single leg balance
- Single leg clock
- Single Leg balance with ball toss
- Tightrope walk on a line that is placed on the floor

Intermediate (>8 weeks)

- Unstable single leg balance (such as leaning forward with a leg extension or using a mat under the foot)
- Leg squat
- Unstable single leg clock

Advanced (>11-12 weeks)

- Unstable surface single leg ball toss
- Single leg squat on an unstable surface
- Leg squat running man (alternating legs)

Jump training/Landing specialization

Most injuries, especially with the anterior cruciate ligament (ACL) occurs from deceleration or sudden twisting motions. This type of training help teach the ergonomics of landing and deceleration while building up muscles that contribute to reducing the loading force against the ligaments of the knee and ankle responsible for stability during deceleration. These muscles include the quadriceps, hamstrings, and soleus for example. Do not forgot landing ergonomics explained previously about landing softly.

Examples

Beginner (<8 weeks)

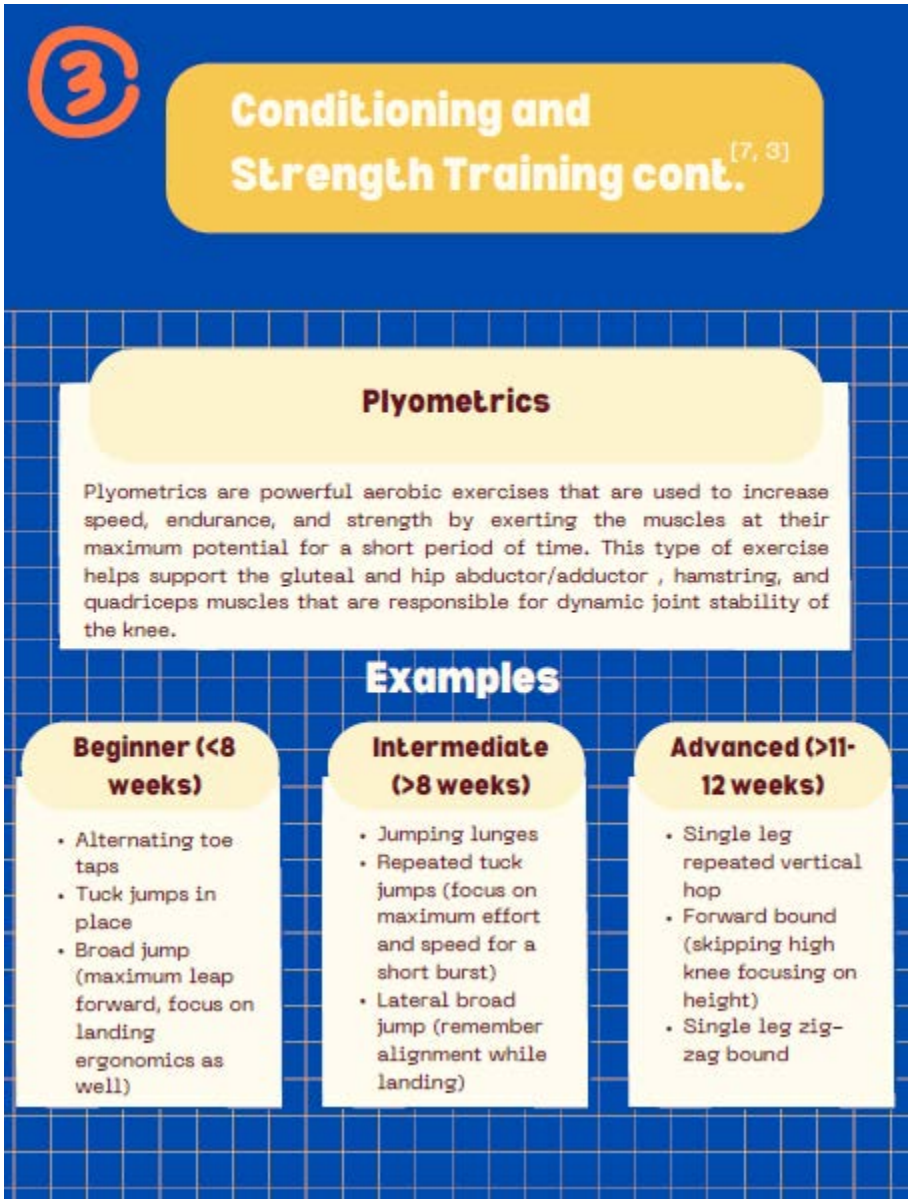
- Single leg box step-up or a double leg box drop
- Single leg box drop
- Double leg side jump
- Box ~24 inches

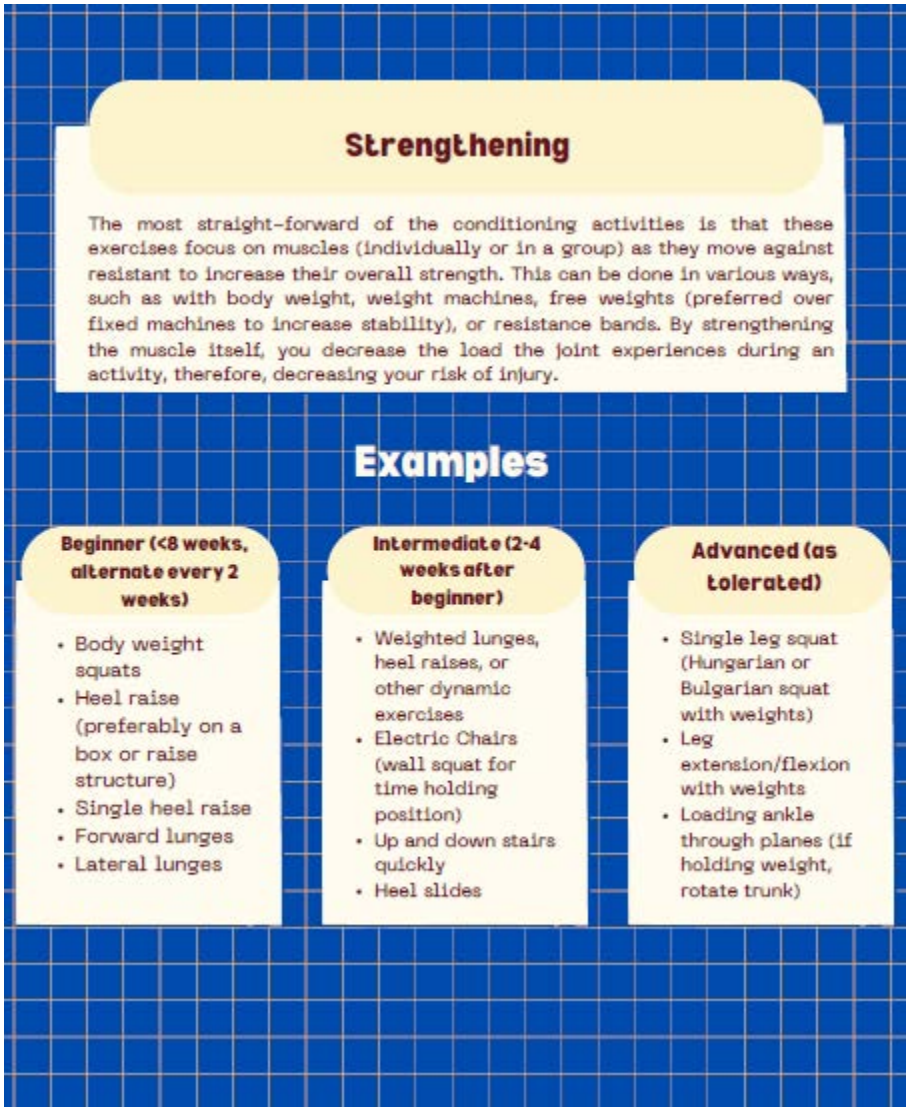
Intermediate (>8 weeks)

- Double leg box jump up to single or double leg box drop
- Single leg side hop (ankle, knee, and shoulder should be aligned while landing)
- Double leg to single leg hop
- Box >24 inches

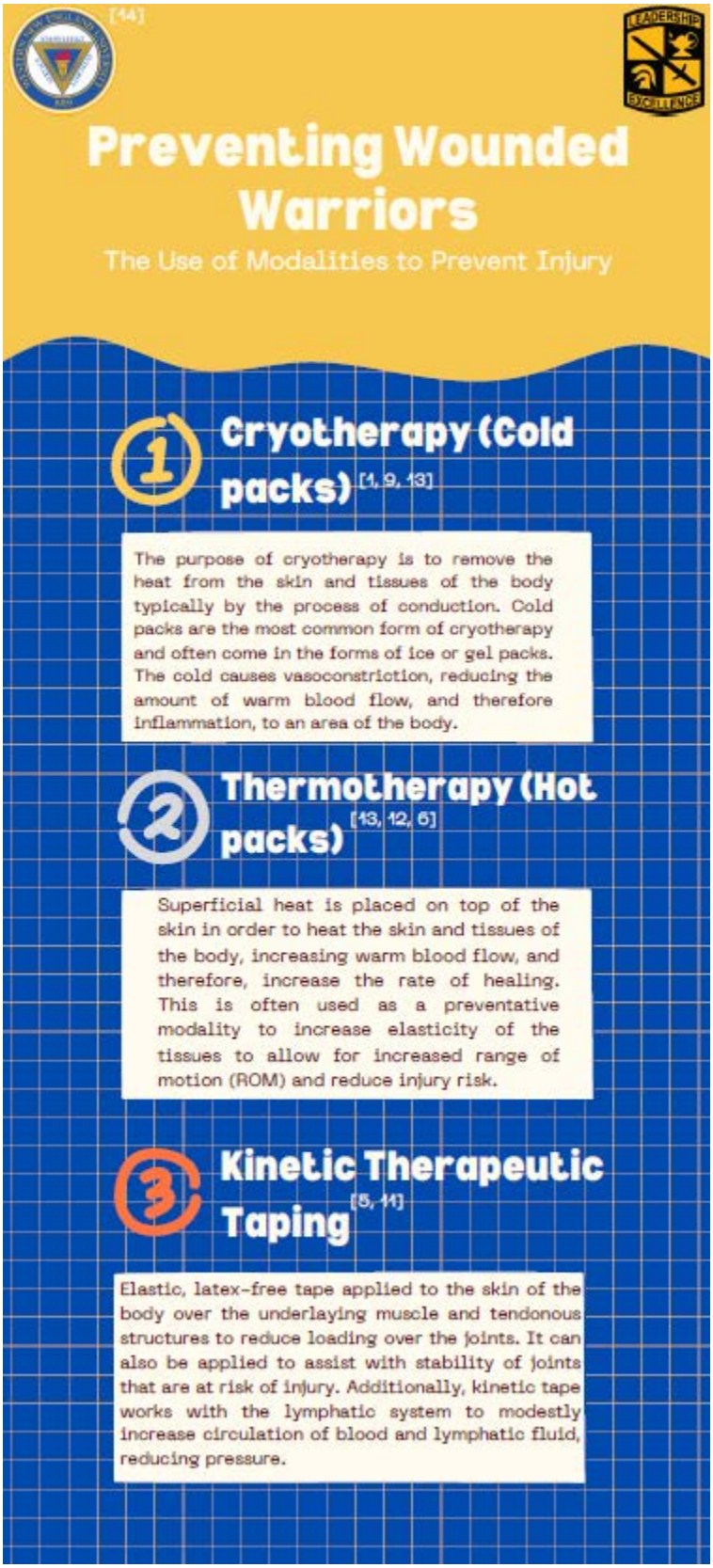
Advanced (>11-12 weeks)

- Speed skater hop (do not rotate knees inward)
- Tuck jump
- You are landing for speed and power at this point while maintaining landing control


3
Conditioning and Strength Training cont. [7, 3]
Plyometrics
Plyometrics are powerful aerobic exercises that are used to increase speed, endurance, and strength by exerting the muscles at their maximum potential for a short period of time. This type of exercise helps support the gluteal and hip abductor/adductor , hamstring, and quadriceps muscles that are responsible for dynamic joint stability of the knee.
Examples
Beginner (<8 weeks)
• Alternating toe taps
• Tuck jumps in place
• Broad jump (maximum leap forward, focus on landing ergonomics as well)
Intermediate (>8 weeks)
• Jumping lunges
• Repeated tuck jumps (focus on maximum effort and speed for a short burst)
• Lateral broad jump (remember alignment while landing)
Advanced (>11-12 weeks)
• Single leg repeated vertical hop
• Forward bound (skipping high knee focusing on height)
• Single leg zig-zag bound


Strengthening
The most straight-forward of the conditioning activities is that these exercises focus on muscles (individually or in a group) as they move against resistant to increase their overall strength. This can be done in various ways, such as with body weight, weight machines, free weights (preferred over fixed machines to increase stability), or resistance bands. By strengthening the muscle itself, you decrease the load the joint experiences during an activity, therefore, decreasing your risk of injury.
Examples
Beginner (<8 weeks, alternate every 2 weeks)
Body weight squats
Heel raise (preferably on a box or raise structure)
Single heel raise
Forward lunges
Lateral lunges
Intermediate (2-4 weeks after beginner)
Weighted lunges, heel raises, or other dynamic exercises
Electric Chairs (wall squat for time holding position)
Up and down stairs quickly
Heel slides
Advanced (as tolerated)
Single leg squat (Hungarian or Bulgarian squat with weights)
Leg extension/flexion with weights
Loading ankle through planes (if holding weight, rotate trunk)


References


[14]
Preventing Wounded Warriors
The Use of Modalities to Prevent Injury
1
Cryotherapy (Cold packs) [1, 9, 13]
The purpose of cryotherapy is to remove the heat from the skin and tissues of the body typically by the process of conduction. Cold packs are the most common form of cryotherapy and often come in the forms of ice or gel packs. The cold causes vasoconstriction, reducing the amount of warm blood flow, and therefore inflammation, to an area of the body.
2
Thermotherapy (Hot packs) [13, 12, 6]
Superficial heat is placed on top of the skin in order to heat the skin and tissues of the body, increasing warm blood flow, and therefore, increase the rate of healing. This is often used as a preventative modality to increase elasticity of the tissues to allow for increased range of motion (ROM) and reduce injury risk.
3
Kinetic Therapeutic Taping [5, 11]
Elastic, latex-free tape applied to the skin of the body over the underlaying muscle and tendonous structures to reduce loading over the joints. It can also be applied to assist with stability of joints that are at risk of injury. Additionally, kinetic tape works with the lymphatic system to modestly increase circulation of blood and lymphatic fluid, reducing pressure.

1 Cryotherapy [1, 9, 13]

Ice or Gel?

There are a lot of types of packs out there, but which is better, ice or gel? Studies have not shown any significant difference between the use of the two, but gel packs have an advantage of being more form fitting to the joints, therefore being able to increase contact and apply cooling at a slightly more even rate.

Time

- No more than 20 minutes
- 5 minutes off cold

Application

- Wrap in a towel (at least 4 layers thick)
- You will feel CBAN
  - Cold, then burning, then aching, then numbness
- Apply for up to 20 minutes to an area that is experiencing acute inflammation

[3]

Home usage/alternatives

- Plastic cup filled with water in the freezer (can peel back or apply like a stick)
- Bag of frozen vegetables
- Ice cubes in a cloth

Notes

- Once again, do not apply directly on the skin or for longer than 20 minutes
- Watch for cold-induced urticaria (skin triggering or allergic reaction within minutes of exposure)
- Check feeling after 2 minutes to ensure cold pack is appropriately applied
- This slows the conduction of nerves and reduces elasticity, so it should not be used before exercise or activities where dexterity is necessary
- This can preserve joint health after acute inflammation, but should not be used to increase stability or ROM

Examples of cold-induced urticaria

[2]

[4]

2

Thermotherapy [13, 12, 6]

Hot Packs: Dry or Moist Heat?

While both forms of heat have been shown to improve ROM, decrease joint-related injury, and decrease pain symptoms, moist heat is by far the better pick. The muscles, including tendons, around joints are thermoelastic and increase their flexibility when heated. This leads to greater range of motion as well as neuromuscular response to improve stability during activity. Moist heat penetrates to the deeper tissues of the joints.

Time

- 10–20 minutes before exercise or stretching

Application

- ~8 towel layers thick (1–2 on the moist hot pack itself), add another layer if too hot
- Place around the whole joint (top and bottom)
- 15–20 minutes (at least 10 minutes)

[10]

Home usage/alternatives

- Sock filled with rice that is placed in the microwave for ~1–2 minutes (moist heat that can be contoured)
- Fill about 3/4 of the way; can also use oatmeal or beans

Notes

- Do not use if there is a concern with Deep Vein Thrombosis (DVT), open wounds, areas of infection or known malignancy, over jewelry, or over acute edema
- Heat should be between 104 and 113 degrees Fahrenheit
- Check skin after 5 minutes
- Reduces risk of muscular contractures (reduce range to a nonfunctional range) by 29% and articular contractures by 50%
- Increased elasticity increases neuromuscular response time to allow for greater deceleration time

3 Kinetic Therapeutic Tape[5, 11]

What types of tapes to use?

There are a lot of brands out there, but you want to use Kinsiotape, Theraband Tape, or Dynamic tape for athletic use or injury prevention. Rock tape is similar but is more resistant to movement and more stable (useful after a sustained injury). The goal is to reduce load over the joints by using the elasticity of the tape to mimic muscle pull. The design of the tape is to also mimic skin and promote healthy blood flow and thermoregulation.

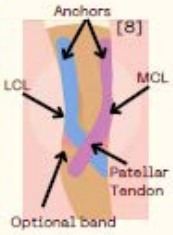
Timeline

- Wear to 3-5 days
- You can shower with it on

Application Notes

- The initial piece placed down without stretch is called the "anchor" (~2 inches long)
- An anchor on both sides raises the skin, useful for nerve compression or lymphatic movement
- 10% stretch for lymph
- 25% for muscle
- 50% for ligaments/joint contractures
- 75-100% for scars (scars can reduce mobility)
- The tape is placed along the muscle to provide assistance, reduce load, and across joints for stability
- Check for skin irritation when using for the first time
- Once placed, use friction to heat the adhesive for greater stick
- Can be placed over hair (preferred no hair)
- Use alcohol to clean area (no oils, dirt, etc.)
- Round the edges of the tape to prevent lifting

Knee Application Pattern



- Start with 90 degree bend in knee
- Anchors at the quadriceps and tape along the medial and lateral collateral ligaments (MCL, LCL)
- Cross at the patellar tendon
- Optional band around the ligaments below the patella for increased stability (anchor is cross over on each other on the back of the leg)
- All tape is at 50% stretch (anchors 0%)
- Used for joint instability (or when twisting is frequent), it feels like "pressure," "clicking," or feelings of "sliding" when taking a step when the joint is unstable

Ankle Application Pattern[7]

- Attach anchor over ankle to support tibiofibular and talofibular ligaments
- 50% stretch down under foot to support calcaneofibular ligament and plantar fascia
- Attach on other side at the same anchor point

- 2nd anchor point on below big toe knuckle (cuboid bone)
- Wrap behind achilles to other side below the toe knuckle (intermediate cuneiform)

- 3rd anchor over half-way point of foot on calcaneofibular ligament
- Wrap under heel bone (calcaneus) back to original anchor point


References

Appendix F – Learning Objectives

DOCTORAL EXPERIENTIAL CAPSTONE STUDENT LEARNING OBJECTIVES & EVALUATION PLAN

This Experiential Learning Plan and Evaluation requires documentation of a formal evaluation mechanism and objective assessment of the student's performance during and at the completion of the doctoral experiential component. The student, the faculty mentor, and the site mentor collaborate to ensure completion of the doctoral experience.

Student Name: Joseph Rodriguez, OT/s
DEx Capstone Site: Western New England University ROTC
DEx Capstone Dates: April 8th, 2024 – July 12th, 2024
DEx Capstone Site Mentor: Travis Wright
DEx Capstone Faculty Mentor: Dr. Erin Murray, OTD, OTR

WNE OTD Learning Objectives: What does the student want/need to know? What skills does the student need to develop?

Evidence of Accomplishment: How will performance be measured and evaluated and by whom? Name the activity, project, or skill that will be accomplished. Identify the target date of completion. At midterm and final, present evidence of progress and/or accomplishment

Progress: Site and faculty mentor will rate student's progress at midterm and final

Comments: The faculty and site mentors and the student should provide written comments regarding the student's progress on each objective at midterm and final

Initial Approval of DEx Capstone Student Learning and Evaluation Plan

I agree with the above-stated objectives and feel that all learning objectives are obtainable within the fourteen (14) - week timeframe. I believe that the stated objectives encompass all aspects of the student role in this doctoral experience. I understand that the site mentor or student can add additional objectives at any time as the situation and experience dictate, with the approval of the faculty advisor. Any objectives that are proposed to be removed will need to be approved by the faculty mentor.

Site Mentor Signature Date	Student Signature Date
TRINIDAD.EDWARD.SEBASTIAN.1169477902 Digitally signed by TRINIDAD.EDWARD.SEBASTIAN.1169477902 Date: 2024.04.16 11:03:14 -04'00'	Joseph Rodriguez 4/15/2024

 OTD Faculty Date 4/15/2024	 4/15/2024 OTD Doctoral Experiential Capstone Coordinator Date

LEARNING OBJECTIVES & EVALUATION PLAN

WNE OTD Objective #1 Document my experience in collaboration for program or service delivery with professionals and/or members of consumer groups who are not occupational therapists. This includes being able to negotiate the role of occupational therapy as part of an interprofessional team.
Planned activity or Methodology • Keep record of all communications between the student researcher and other professions (e.g., Emails) • Pre/Post surveys • Perform a needs assessment after interviews with the population
Who is responsible? • Joseph Rodriguez
What resources are needed? • Access to a laptop or PC • Internet • Test handouts • A program to store and assess data (e.g., Excel, SPSS, etc.)
What is the timeline? April 8th, 2024 – July 12th, 2024 • Needs assessment will be compiled within the first week

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- Pre- and post-survey will be given during the first and last week
- Documentation will occur throughout the entire duration of the DEx capstone

</td></tr>
<tr><td colspan="2">Evidence of accomplishment

- Student researcher will provide digital and/or physical evidence to the DEx mentor that the first week goals have been attained
- The DEx mentor will be provided will evidence of record keeping and progress throughout the entire duration of the project

</td></tr>
<tr><td>Midpoint

☐ Accomplished
x☐ Making Progress
☐ Not Progressing
☐ Needs Attention</td><td>Comments</td></tr>
<tr><td>Final

x☐ Accomplished
☐ Making Progress
☐ Not Progressing
☐ Needs Attention</td><td>Comments
Documents have been made readily available to cadre and cadets.</td></tr>
<tr><td colspan="2">WNE OTD Objective #2

Documentation of a needs assessment for a particular population and using said assessment as the foundation for planning a successful Doctoral Experiential Capstone Project. Additional evidence will include feedback from consumers that indicates the impact of the project on the population they represent.</td></tr>
<tr><td colspan="2">Planned activity or Methodology

- Review previously completed needs assessment.
- Perform additional research for components to create a needs assessment.
- Utilize information gathered from additional research to revise the previously completed needs assessment.
- DEx mentor will review new needs assessment document.
- DEx mentor will provide recommendations for altering the student researcher’s needs assessment.
- Student researcher will utilize recommendations from DEx mentor to further revise documentation until DEx mentor declares the document satisfactory.

</td></tr>
</table>

Who is responsible? • Joseph Rodriguez
What resources are needed? • Laptop or PC • Access to the internet • Access to documentation • Access to research databases • Access to library services
What is the timeline? Within one week of April 15th, 2024
Evidence of accomplishment • DEx mentor and Capstone faculty mentor have signed a Project Proposal document approving that the needs assessment is sufficient. • The document is uploaded to the student researcher's e-portfolio.

Midpoint	Comments
☐ **Accomplished** x☐ **Making Progress** ☐ **Not Progressing** ☐ **Needs Attention**	Needs assessment has been completed. Student has continued to re-vise as needed and as new students have entered the program.
Final	**Comments**
x☐ **Accomplished** ☐ **Making Progress** ☐ **Not Progressing** ☐ **Needs Attention**	

WNE OTD Objective #3

Demonstrated proficiency with the use of personal computers, learning platforms, electronic health records and assistive technology sufficient to fully document the Doctoral Experiential Capstone Project for WNE as well as for members of the population served by that project.

Planned activity or Methodology

- Student researcher will perform research on technologies and applications relevant and useful to the organization and completion of DEx capstone project documentation.

Who is responsible?

- Joseph Rodriguez

What resources are needed?

- Laptop or PC
- Access to the internet
- Access to evidence-based practice databases
- Access to programs to support the goal of documentation, data entry and analysis, and a journal entry program to assist with timeline goals and reminders

What is the timeline?

Approximately 14 weeks:

- Data will perform research and receive recommendations from DEx mentor during the first day and will become proficient in their use within the first week
- Successful and timely program usage will be noted by appropriate usage of them throughout the entirety of the DEx capstone

Evidence of accomplishment

- By midpoint, the pre-survey and pre-test will have been entered into a data storage program
- During the last week, all final data of the DEx capstone will have been entered into their appropriate programs and completed

Midpoint	**Comments**

☐ **Accomplished** x☐ **Making Progress** ☐ **Not Progressing** ☐ **Needs Attention**	Student researcher has created a pre and post survey to administer with their program.
Final x☐ **Accomplished** ☐ **Making Progress** ☐ **Not Progressing** ☐ **Needs Attention**	**Comments** Student has results of research with cadre.

WNE OTD Objective #4

Recognize and be able to describe the diverse systems of service delivery that are most cost-effective and considerate for health, social, and educational settings, both traditional and nontraditional. Through both clinical and reflective writing, be able to articulate a sensitivity to cultural, linguistic, and other diversities and describe solutions for care disparities.

Planned activity or Methodology

- The student researcher will collaborate with the DEx mentor, and if appropriate, the site mentor to identify which service delivery systems are the most appropriate, effective, and efficient for the given population
- The student will perform research in order to update themselves on the current usage of service delivery systems, identifying those that are effective, efficient, and easy to use and implement

Who is responsible?

- Joseph Rodriguez

What resources are needed?

- Access to the internet
- A laptop or PC
- Access to a physical or digital library
- Access to evidence-based practice databases
- Access to published peer-reviewed systems research
- Access to reviews on which delivery systems are the best to use

What is the timeline?

- During the first two weeks after initial consultation (no later than April 22nd), a set of appropriate systems will be identified for usage
- By midpoint, research conducted will allow the student researcher to identify and transfer any data to newer programs if necessary
- By endpoint, the student researcher will research which data analysis programs and service delivery systems are the most optimal to use

Evidence of accomplishment

- The student researcher will tell the DEx mentor which programs will be used by the end of the first week
- Weekly meetings and meetings as necessary will be utilized in order to identify any changes of delivery service programs the student researcher will use
- By July 7th, the student researcher will have all service delivery systems and data storage and analysis programs finalized and reviewed by the DEx mentor for approval

Midpoint	**Comments**
☐ **Accomplished** x☐ **Making Progress** ☐ **Not Progressing** ☐ **Needs Attention**	**Student has been readily available for meetings and has communicated very effectively.**

Final	**Comments**
x☐ **Accomplished** ☐ **Making Progress** ☐ **Not Progressing** ☐ **Needs Attention**	

WNE OTD Objective #5

Document the ability to work with others to identify meaningful objectives, organize, manage, and motivate people and resources, communicate effectively, and supervise action to accomplish stated program or service goals.

Planned activity or Methodology

- The student researcher will collaborate with the given population and any associated staff in order to identify all needs and objectives
- The student will perform at least one session per week (identified after collaboration with the site mentor) to educate participants to accomplish the stated goals

Who is responsible

- Joseph Rodriguez
- Site mentor

What resources are needed?

- Internet
- PC or laptop
- PowerPoint program
- Access to digital databases
- Physical classroom on the WNE campus to allow for weekly sessions to be performed
- Outlook program to allow for communications between the student researcher and the stie mentor and/or participants

What is the timeline?

Approximately 14 weeks to accomplish:

- Communications will occur throughout the duration of the program
- Sessions will be held within a physical classroom in which the student researcher will educate the participants in accordance with previously stated goals

Evidence of accomplishment

- Goals will be evaluated by the student researcher during midpoint and endpoint to identify what goals are met, in the process of being met, or not being met
- These goals will be identified digitally within the student researcher's service delivery systems and data storage programs
- Goal accomplishment and feedback will be provided to the student researcher at the end of the DEx capstone through the use of the post-survey

Midpoint ☐ **Accomplished**	**Comments**

x☐ **Making Progress** ☐ **Not Progressing** ☐ **Needs Attention**	Student has begun to lead program sessions.
Final x☐ **Accomplished** ☐ **Making Progress** ☐ **Not Progressing** ☐ **Needs Attention**	**Comments** Feedback shows increased confidence with cadets

WNE OTD Objective #6:

Through both clinical and reflective writing, be able to articulate the therapeutic/clinical reasoning (procedural, interactive, narrative, ethical, scientific, pragmatic) process that I use during planning, delivery, and evaluation of population-based and evidence-driven occupational therapy services. Demonstrate the ability to implement, in existing programs, and plan for in developing programs, an occupational therapy process that is occupation based, client centered, culturally sensitive, and ethnically appropriate.

Planned activity or Methodology

- The **student researcher will perform a review of literature and needs assessment in order to educate the student researcher on gaps in care and a need to address the gaps**
- Ethical and clinical reasoning will be provided through the forms of the participant agreement forms developed by the student researcher
- Weekly sessions throughout the duration of the program will educate participants on the therapeutic and clinical reasoning to address the gaps in care
- Clinical and reflective writing of the entirety of the program will be performed at the end of the DEx capstone and will be presented

Who is responsible?

- Joseph Rodriguez

What resources are needed?

- Laptop or PC
- Internet
- PowerPoint
- Access to evidence-based databases
- DEx mentor review of material to be presented to the participants

<table>
<tr><td colspan="2">

- Creation of a poster presentation of the methods and results of the DEx capstone project

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<tr><td colspan="2">

What is the timeline?

Approximately 14 weeks to construct service delivery processes, articulate therapeutic and clinical reasoning, and evaluate the population:

- During the first week, a review of literature, population profile, and needs assessment will be created or performed by the student researcher
- Forms to gather permission end educate the participants on what their roles are within the DEx capstone will be given during the first week
- During each week, sessions based on evidence-based practice which address the population's needs will be administered
- During the last week by the end of the week, all data will be collected about the DEx capstone project to be presented in a poster format

</td></tr>
<tr><td colspan="2">

Evidence of accomplishment

- All forms to gather permission or serve as preliminary research will be approved by the DEx mentor in which the student will document on when they were completed
- By the last week, a poster project will be shown to the DEx mentor for recommendations and final approval

</td></tr>
<tr><td>

Midpoint

☐ **Accomplished**

x☐ **Making Progress**

☐ **Not Progressing**

☐ **Needs Attention**

</td><td>

Comments

Student has done extensive research in preparation for delivery of program.

</td></tr>
<tr><td>

Final

x☐ **Accomplished**

☐ **Making Progress**

☐ **Not Progressing**

☐ **Needs Attention**

</td><td>

Comments

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</table>

WNE OTD Objective #7:

Document experiential and scholarly project that reflects the literature in the field and uses responsive, ethical models. The scholarly process and results should be made accessible to the college and the community, especially to the population served by the project. A report of the project, presented in a professional format that others can replicate or build upon, will be evidence of accomplishment.

Planned activity or Methodology

- The student researcher will perform weekly sessions to educate the population based on their identified needs
- The methods and results of the project will be made publicly available physically and digitally

Who is responsible?

- Joseph Rodriguez
- DEx faculty mentor, DEx site mentor

What resources are needed?

- Internet
- Laptop or PC
- PowerPoint
- Word
- WNE OTD poster format

What is the timeline?

- The last week of the DEx project, no later than July 17th

Evidence of accomplishment

- A physical poster will be presented to the WNE OTD and associate community during the OTD poster presentation event by endpoint
- A digital document journalling the background, methods, and results of the DEx project will be submitted to be made available on the WNE library digital database by endpoint

Midpoint	**Comments**
☐ **Accomplished** x☐ **Making Progress**	

☐ **Not Progressing** ☐ **Needs Attention**	
Final x☐ **Accomplished** ☐ **Making Progress** ☐ **Not Progressing** ☐ **Needs Attention**	**Comments** Student has created a poster explaining the project.

WNE OTD Objective #8:

Through both clinical and reflective writing, be able to articulate a clear awareness of my own personal and professional strengths and boundaries and identify supports and strategies for goal achievement.

Planned activity or Methodology

- The student researcher will work collaboratively with the DEx mentor to address strengths and goals throughout the duration of the DEx project
- The student researcher and DEx mentor will collaboratively develop a timeline for goal achievement
- Final documentation and papers related to the DEx project will make a clear awareness of personal and professional strengths or progress

Who is responsible?

- Joseph Rodriguez
- DEx mentor

What resources are needed?

- Physical or digital meeting space
- Internet
- Laptop or PC with access to audio and video if meetings will take place digitally
- Word
- OneNote

What is the timeline?

- Goals, strengths, and weaknesses will be identified during the first week of the DEx project

- By midpoint, meetings with the DEx mentor will identify strengths and areas of improvement based on reports from the student researcher and available data
- By endpoint, the presentation of reports and data to the DEx mentor will identify academic and professional progress through clinical and professional writing reviewed by the DEx mentor

Evidence of accomplishment

- Session notes will be documented and dated when they occur
- Meeting times and DEx project planning will be recorded within the OneNote and evidenced by a timesheet log
- Word will be utilized for notetaking in which entries will be data
- All presented papers will be reviewed and approved by the DEx mentor if necessary

Midpoint	**Comments**
☐ **Accomplished** x **Making Progress** ☐ **Not Progressing** ☐ **Needs Attention**	Student has begun to lead sessions and will adjust as needed.
Final	**Comments**
x☐ **Accomplished** ☐ **Making Progress** ☐ **Not Progressing** ☐ **Needs Attention**	An analysis on strengths and weaknesses has been provided, as well as opportunities for improvement.

WNE OTD Objective #9

The student researcher will develop understanding of work-related musculoskeletal injuries in which they will be able to successfully present the information. Presentations will display professional clinical and therapeutic reasoning, and evidence-based practice.
Planned activity or Methodology • The student researcher will perform daily research related to work-related musculoskeletal injuries • The student researcher will complete an educational PowerPoint(s) each week to be presented to the participants within the DEx project
Who is responsible? • Joseph Rodriguez
What resources are needed? • Internet • PC or laptop • Access to a library • Access to digital databases • DEx mentor meetings • PowerPoint
What is the timeline? • The student researcher will perform preliminary research and develop educational goals for each week • The timeline will be presented and approved by the DEx mentor by the end of the first week • Each weekly session will be reviewed and approved by the DEx mentor • By endpoint, the poster presentation will demonstrate a professional understanding of clinical and therapeutic research and applications of methods to educate for work-related musculoskeletal injuries
Evidence of accomplishment • Weekly sessions will be approved by the DEx mentor and presented to the participants by the student researcher • Weekly PowerPoint sessions and the final poster presentation will demonstrate a professional understanding of the stated goal by the student researcher

Midpoint	**Comments**
☐ **Accomplished**	

x☐ **Making Progress** ☐ **Not Progressing** ☐ **Needs Attention**	Student has developed detailed power points to be delivered throughout the program.
Final x☐ **Accomplished** ☐ **Making Progress** ☐ **Not Progressing** ☐ **Needs Attention**	**Comments** Student displays proficiency with describing injury prevention and areas that are affected.

WNE OTD Objective #10: The student researcher will identify the current supports and barriers for the population of college-aged Reserve Officers' Training Corps (ROTC) cadets, previous cadets, or potential cadets who are currently enrolled at WNE.
Planned activity or Methodology • The student researcher will collaborate with the ROTC cadre population and associating staff in order to develop a knowledge of current supports and barriers • The knowledge of supports and barriers will be identified within a review of literature, needs assessment, population profile, and final DEx poster presentation
Who is responsible? • Joseph Rodriguez
What resources are needed? • Physical or digital space to meet for interviews • Internet • Laptop or PC • Word
What is the timeline? • Interviews will occur during the first day and the pretest will be administered • The review of literature, needs assessment, and population profile will be completed during the first week of the DEx project

• The final poster presentation will be completed by endpoint
Evidence of accomplishment • During the first day, the pre-test survey will be administered • By the end of the first week, the needs assessment, population profile, and review of literature will be completed and reviewed by the DEx mentor • By endpoint, the post-test survey will be administered • By the end of the last week, the final poster presentation will be completed to be presented during the OTD poster presentation at WNE

Midpoint ☐ **Accomplished** x☐ **Making Progress** ☐ **Not Progressing** ☐ **Needs Attention**	**Comments** Student is on track with their timeline.
Final x☐ **Accomplished** ☐ **Making Progress** ☐ **Not Progressing** ☐ **Needs Attention**	**Comments** Previous analysis was provided.

WNE OTD Objective #11 The student researcher will develop professional knowledge of and develop and implement an evidence-based program to address work-related musculoskeletal injuries within the ROTC population.
Planned activity or Methodology • Preliminary research will be performed in order for the student researcher to create a timeline that reflects evidence-based clinical and therapeutic program development and implementation • All handouts and educational sessions will reflect clinical and therapeutic evidence-based practice to address work-related musculoskeletal injuries within the ROTC population

<table>
<tr><td colspan="2">

- Final written papers and posters will reflect the student researcher's professional development of knowledge, and program development and implementation

</td></tr>
<tr><td colspan="2">Who is responsible?

- Joseph Rodriguez

</td></tr>
<tr><td colspan="2">What resources are needed?

- Internet
- Laptop or PC
- Access to digital or physical libraries
- Meetings with the DEx mentor
- PowerPoint

</td></tr>
<tr><td colspan="2">What is the timeline?

- Collaboration with the DEx mentor to create a timeline, as well as present preliminary research and development to be approved, will be completed by the first week
- By endpoint, the professional development of the student researcher's knowledge of program development and implementation will be observed through presented DEx project material to the DEx mentor

</td></tr>
<tr><td colspan="2">Evidence of accomplishment

- Notes on DEx mentor feedback
- Documentation of weekly meetings
- Construction of all necessary handouts, educational sessions, and final poster

</td></tr>
<tr><td>Midpoint

☐ Accomplished

x☐ Making Progress

☐ Not Progressing

☐ Needs Attention</td><td>Comments

Student researcher has created educational materials for sessions.</td></tr>
<tr><td>Final

x☐ Accomplished

☐ Making Progress</td><td>Comments

Student has gone to extensive lengths to provide the most current research in order to educate the cadets. Student has made cadre aware of military documentation that is</td></tr>
</table>

☐ **Not Progressing** ☐ **Needs Attention**	not up to date with current evidence and has provided handouts.

WNE OTD Objective #12: The student researcher will further the knowledge of developmental educational programs which address musculoskeletal risk of joint-related and repetitive motion injuries for the field of occupational therapy.
Planned activity or Methodology • The student researcher will create and implement weekly educational sessions for the ROTC participants within the DEx project • The research completed during the project's duration will be documented and presented in an academic manner to provide publicly available evidence-based practice
Who is responsible? • Joseph Rodriguez • WNE OTD library database
What resources are needed? • Internet • PC or laptop • Word • PowerPoint • DEx mentor meetings • Access to a physical or digital library • Access to evidence-based practice journals
What is the timeline? • By the endpoint, the student researcher will have developed a final poster based on documentation and research performed throughout the duration of the DEx project to be reviewed by the DEx mentor
Evidence of accomplishment • Creation of weekly educational sessions which the DEx mentor reviews and approves

• The creation of the final poster presentation which consists of information to further the academic knowledge of evidence-based practice within the OT field	
Midpoint ☐ **Accomplished** x☐ **Making Progress** ☐ **Not Progressing** ☐ **Needs Attention**	**Comments** **Student has done extensive research and created evidence-based sessions to reflect this.**
Final x☐ **Accomplished** ☐ **Making Progress** ☐ **Not Progressing** ☐ **Needs Attention**	**Comments** The student's results and feedback can be used to further current knowledge of injury prevention.

DOCTORAL EXPERIENTIAL CAPSTONE STUDENT LEARNING OBJECTIVES & EVALUATION PLAN

MIDPOINT SITE MENTOR/STUDENT EVALUATION

Student evaluation of Site mentor, experience and self (please comment on opportunities provided, supervisory relationship and individual performance):

Captain Trinidad has showed great interest in the nature of the study as well as has played a role in educating his current cadets about the values of engaging in the study. He has persevered with various communication adaptation needed for this project and overall coordination and has been willing to work with me in-person at lengths at a time to create more effective service delivery.

Site mentor evaluation of student performance (Identify if all objectives have been met. If yes, please comment on students' achievement for each objective. If no, please identify why goal not met):

Student continues to make progress towards goal of educating cadets on joint-injury prevention, see below:

1. Documentation is extensive and detailed and has provided education of what occupational therapy is and its role in the UMASS cadre.
2. Evidence was given during the first meeting on the reasoning for the study.
3. Student has demonstrated proficient use of technology and databases.
4. Language of material provided is understandable.
5. A second meeting was held to clarify overall goals for the program.
6. Several educational session have been completed with two groups of cadets. PowerPoints and PDFs have clearly stated benefits to education and military readiness.
7. Interactions and writing is professional and scholarly.
8. Several physical and digital meetings has demonstrated clear awareness of proficiency and conduct. Collaborative improvement strategies have been engaged and are progressing.
9. Presentations are professional demonstrate clear understanding of joint-protection strategies.
10. Student has identified that the ROTC cadre does not currently have a joint-injury prevention program.
11. Student has conducted several classes.
12. Student is referring to the FM 7-22 and expanding on injury prevention.

Please check one:

____X___ Sufficient progress has been made on the identified learning objectives and I recommend that the student continue this Doctoral Experiential Capstone.

_____ The Student has NOT progressed towards achievement of the identified objectives for the Doctoral Capstone Experience. It is recommended that this Student's Learning and Evaluation Plan be reviewed and revised as needed

Site Mentor Signature Date TRINIDAD.EDWARD.SEBASTIAN.169477902 Digitally signed by TRINIDAD.EDWARD.SEBASTIAN.169477902 Date: 2024.05.28 11:06:17 -04'00'	Student Signature Date 5/28/2024 

 OTD Faculty Date 5/24/24	 OTD Doctoral Experiential Capstone Coordinator Date 6/12/2024

DOCTORAL EXPERIENTIAL STUDENT LEARNING OBJECTIVES & EVALUATION PLAN

FINAL SITE MENTOR/STUDENT EVALUATION

Student evaluation of Site mentor, experience, and self (please comment on opportunities provided, supervisory relationship, and individual performance):

Continued work with the UMASS Amherst cadre of WNE has proven a challenge that has been mitigated due to successful communications and transfer of power from Captain Trinidad to Captain Washburn. Captain Trinidad remains the primary contact, although virtual at this point, but has been responsive and has met all needs for me to succeed during the DEx capstone. He has provided insight to assist in the tailoring of the modified FM 7-22 to be sent to him by the end of day of 7/12/24.

Site mentor evaluation of student performance (Identify if all objectives have been met. If yes, please comment on students' achievement for each objective. If no, please identify why goal not met):

Student has met most goals with continued progress being made of the aforementioned documentation. See below:

1. All progress has been documented. Student is expected to continue to demonstrate how occupational therapy can improve the cadet's education through distribution of final document.
2. Objective previously completed.
3. Student continues to demonstrate proficiency with electronic devices and documentation.
4. Student has provided handouts that are easily understood and provide benefit to cadets and cadre leadership.
5. Student continues to display professionalism through interaction with cadre leadership and cadets.
6. Early drafts of final FM 7-22 document explain reasoning behind each recommendation.
7. Results have been made accessible.
8. Student has included supports and identified strengths and limitation in their handouts.
9. Injury knowledge and display of knowledge is proficient.
10. Current supports and barriers previously identified.
11. Four PowerPoints have been provided for education.
12. Results contribute to knowledge of injury prevention.

Please check one:

____X____ Sufficient progress has been made on the identified learning objectives and I recommend that the student continue this Doctoral Experiential Capstone.

_____ The Student has NOT progressed towards achievement of the identified objectives for the Doctoral Capstone

Experience. It is recommended that this Student's Learning and Evaluation Plan be reviewed and revised as needed

Site Mentor Signature Date TRINIDAD.EDWARD.SEBASTIAN.169477902 Digitally signed by TRINIDAD.EDWARD.SEBASTIAN.169477902 Date: 2024.07.11 11:12:59 -04'00'	Student Signature Date 07/11/24
7/13/2024 OTD Faculty Date	7/13/2024 OTD Doctoral Experiential Capstone Coordinator Date