PHYSICAL THERAPY FOR

EQUESTRIAN ATHLETES

BY EMILY BLAKER, SPT

THE FACTS

WHAT DO WE KNOW ABOUT EQUESTRIAN INJURIES?

Photo by Irene Powlick

"Horseback riding is considered more dangerous than motorcycle riding, skiing, automobile racing, football, and rugby."

–BALL ET AL[1]

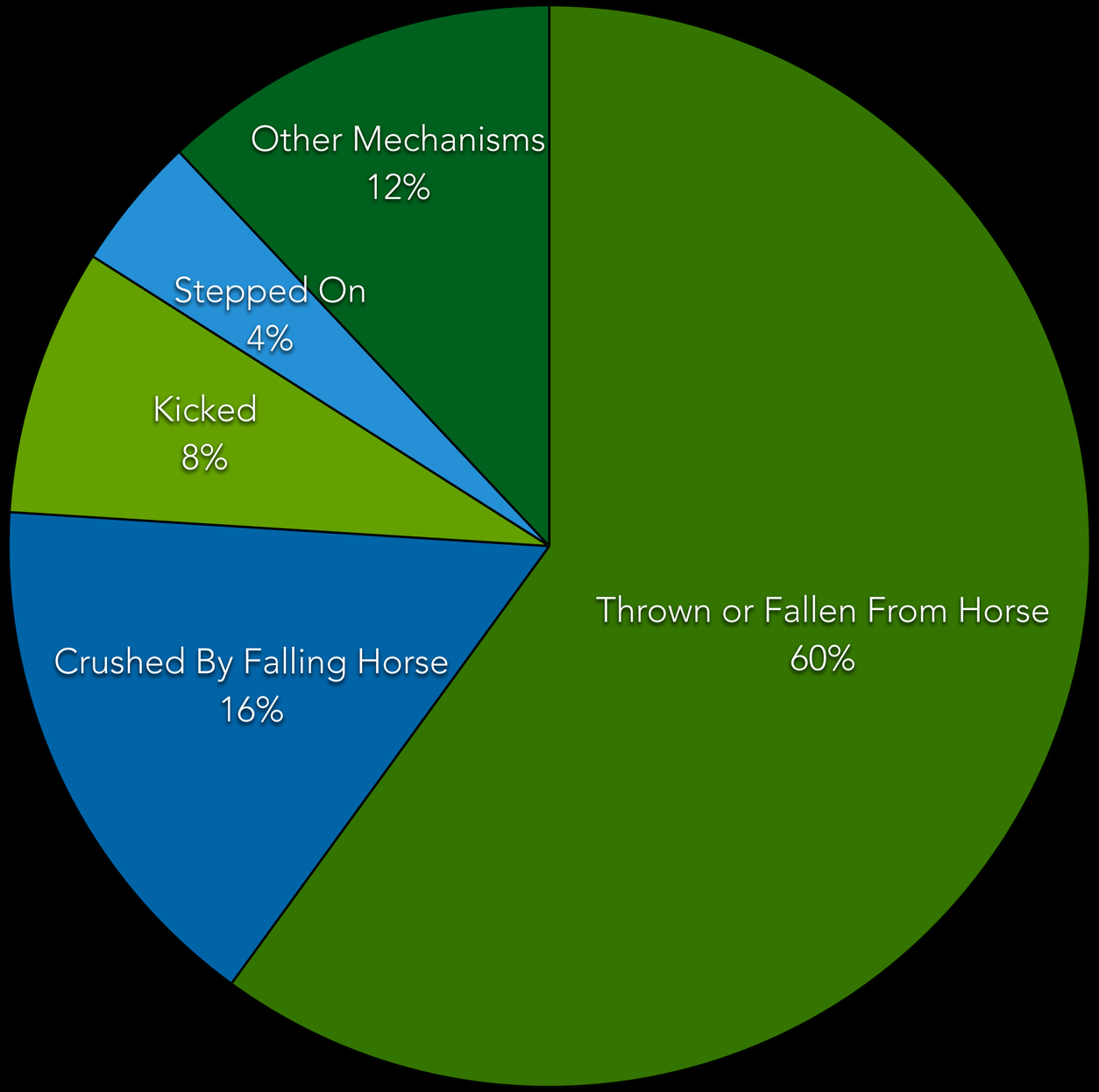




“Along with outdoor soccer and skiing, horseback riding is one of the three major sporting activities within the northern hemisphere most likely to result in long-term disability.”

–BALL ET AL[1]

GENERAL MECHANISMS OF MAJOR INJURY



Ball et al[1]

Stepped On

Photo by Angela King

Crushed By Falling Horse

Photo by Irene Powlick

Thrown or Fallen From Horse

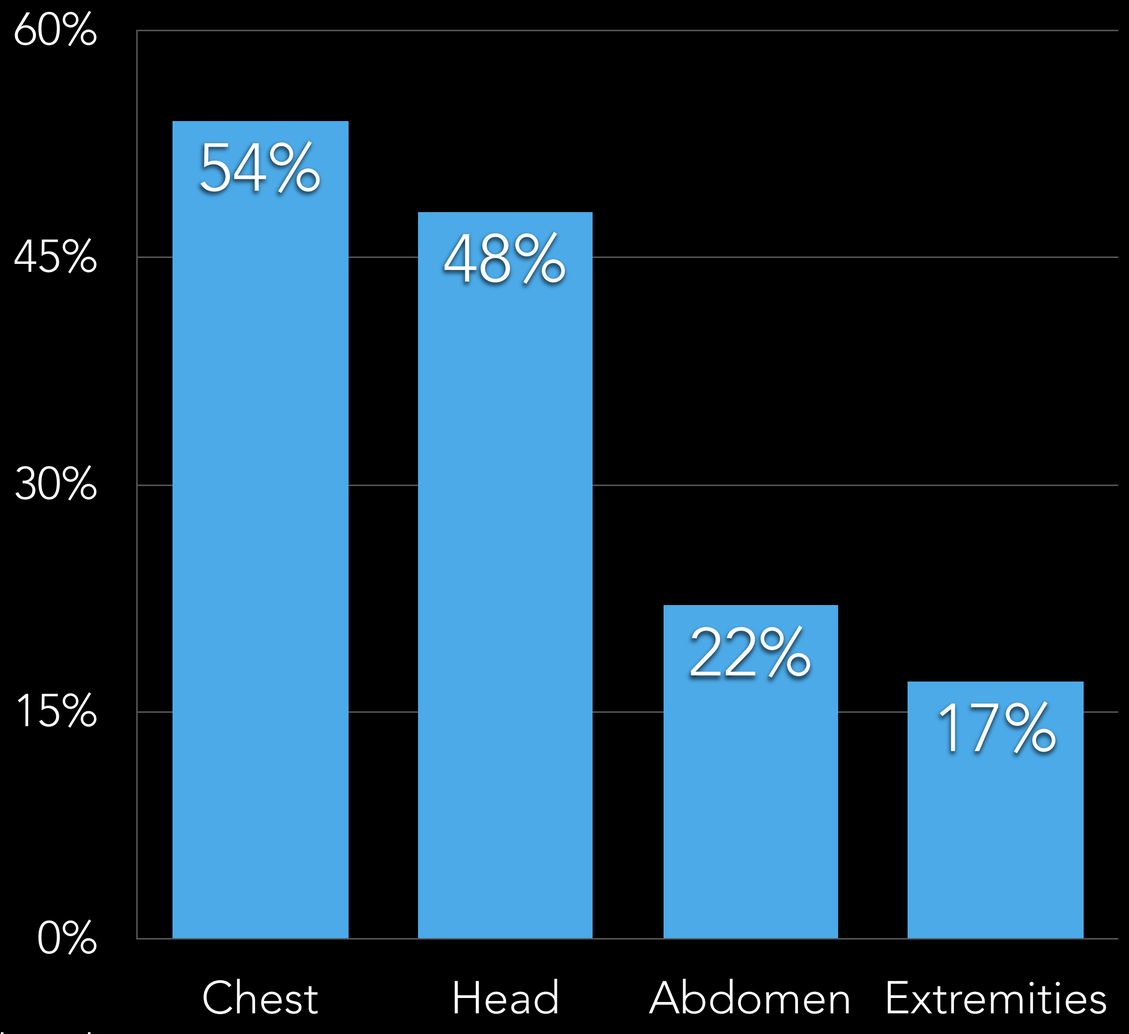
Photo by Irene Powlick

WITHOUT SAFETY GEAR

INJURIES SEEN IN RIDERS WHO DO NOT USE HELMETS OR OTHER SAFETY EQUIPMENT

Photo by TK210GraphiK

HEAD AND CHEST INJURIES ARE THE MOST COMMON SITES OF MAJOR INJURY IN RIDERS WHO DO NOT UTILIZE HELMETS OR OTHER SAFETY EQUIPMENT

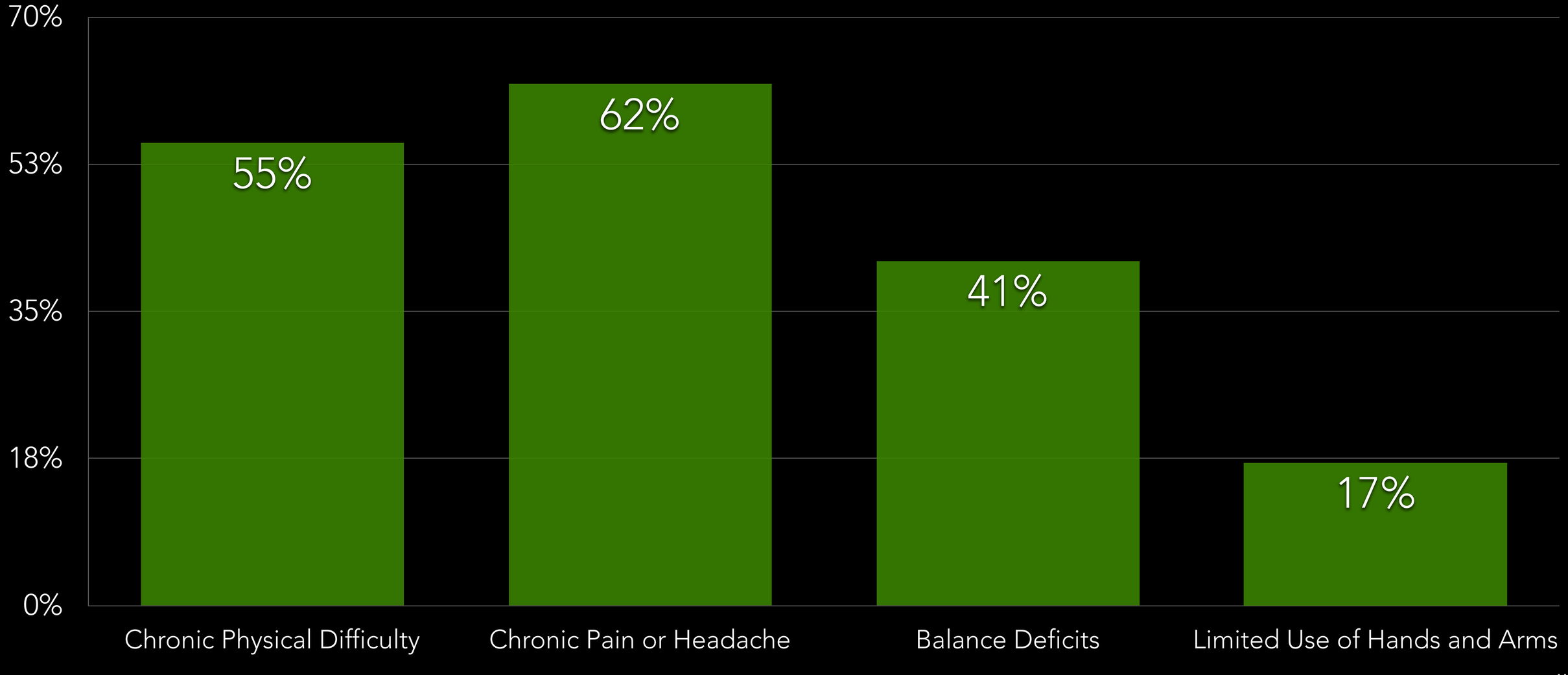


Ball et al[1]

***Rider pictured sustained back and shoulder injury, but was wearing helmet.

Photo by Eliza DeSantis

ONE STUDY SHOWED THAT THE MAJORITY OF THESE PATIENTS EXPERIENCED LONG TERM DISABILITIES AS A RESULT OF THEIR ACCIDENT



Ball et al[1]

DESPITE HAVING EXPERIENCED A TRAUMATIC INJURY AND RESULTING LONG TERM DISABILITY, ONLY 49% OF THIS POPULATION OF EQUESTRIANS RECEIVED ANY TYPE OF REHABILITATIVE THERAPY

49%

Ball et al[1]

Photo by Ellie Lang

WITH SAFETY GEAR

INJURIES SEEN IN RIDERS USING HELMETS AND OTHER SAFETY EQUIPMENT

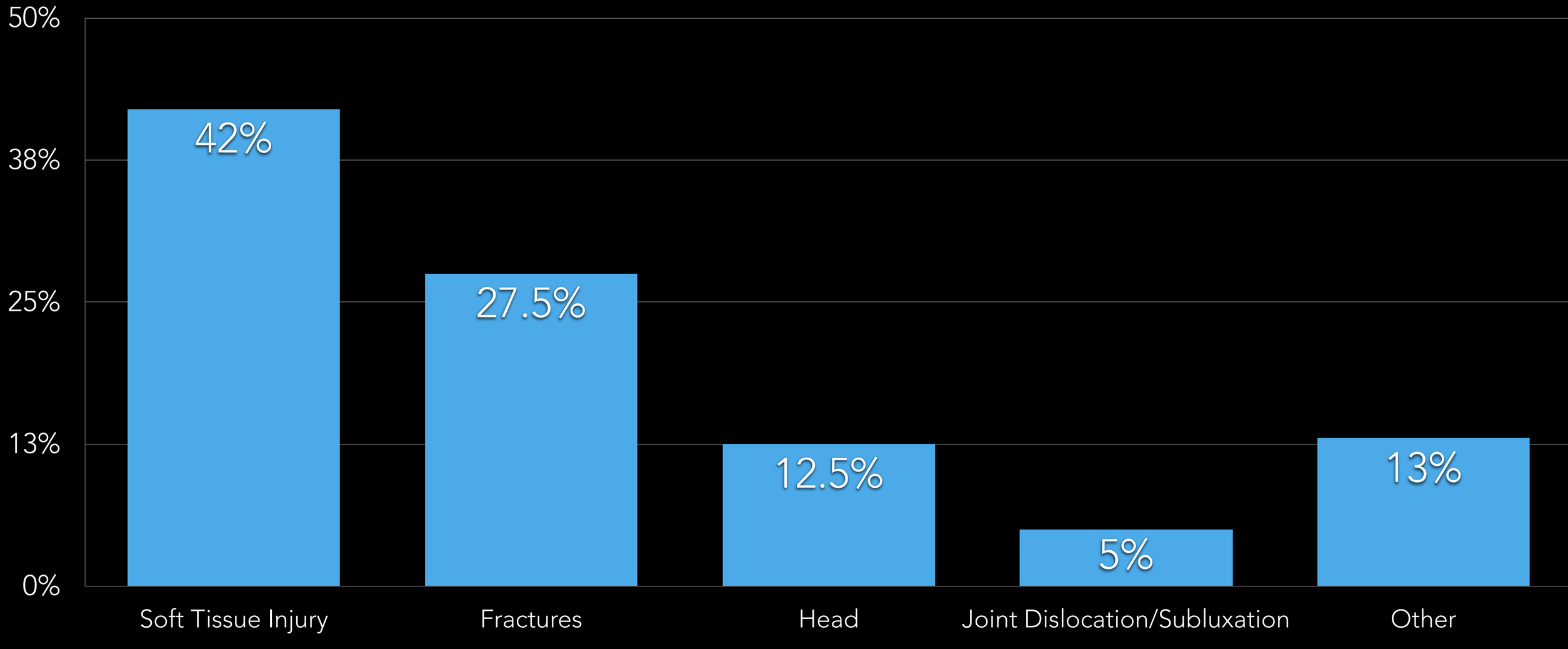
Photo by Irene Powlick

ONE STUDY LOOKED AT EQUESTRIAN INJURIES AT A REGIONAL TRAUMA CENTER IN IRELAND. IN IRELAND HELMETS ARE MANDATORY FOR MANY COMPETITIVE AND PROFESSIONAL EQUESTRIAN ACTIVITIES.

Abdulkarim et al[2]

Photo by Irene Powlick

IN THIS POPULATION HEAD INJURIES MADE UP ONLY 12.5% OF THE INJURIES RESULTING IN A TRAUMA CENTER VISIT, AND SOFT TISSUE INJURIES WERE MOST COMMON



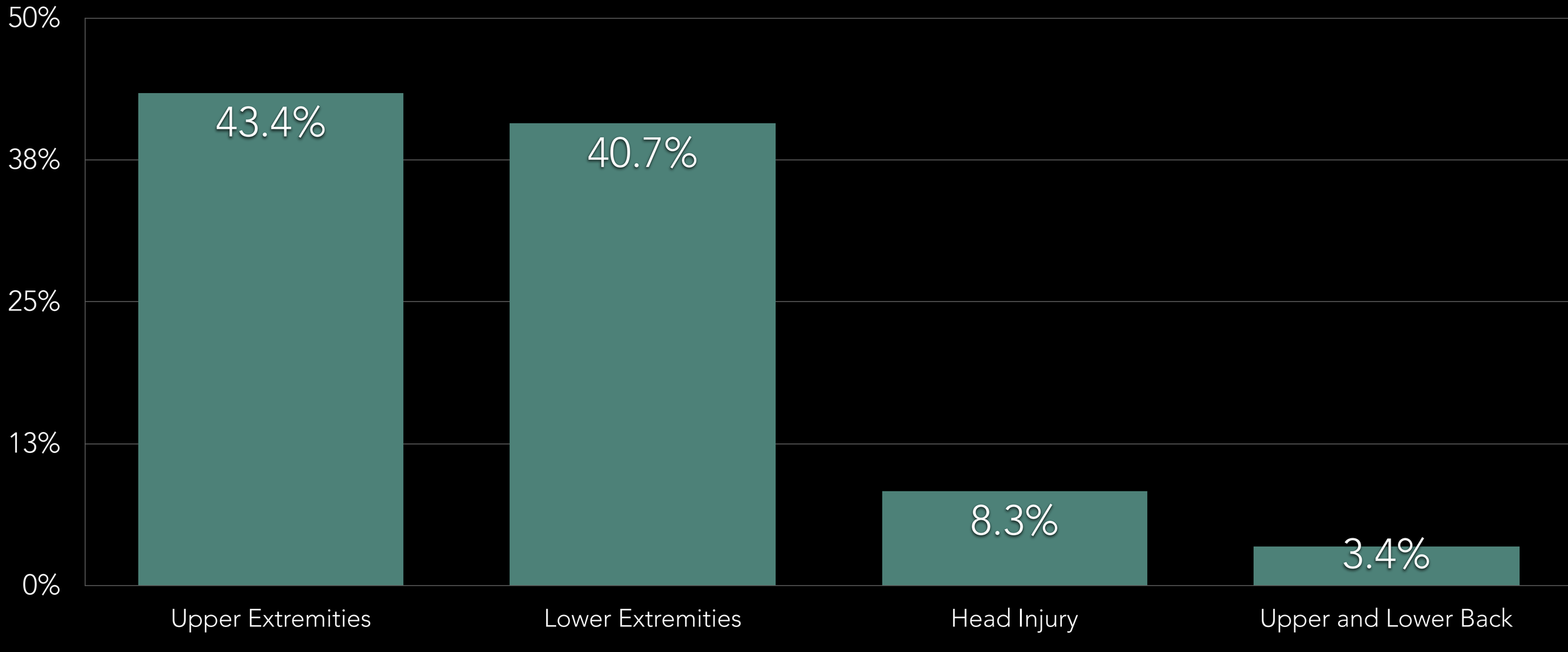
Abdulkarim et al[3]

A STUDY IN MALAYSIA LOOKED AT EQUESTRIANS WITH 100% HELMET USE

Majeedkutty et al[3]

Photo by Eliza DeSantis

IN THIS EQUESTRIAN POPULATION HEAD INJURIES MADE UP ONLY 8.3% OF INJURIES



Majeedkutty et al[3]

HOW BIG A DIFFERENCE DO HELMETS REALLY MAKE?

Photo by Sara Hernandez Whorten

HELMET USE RESULTS

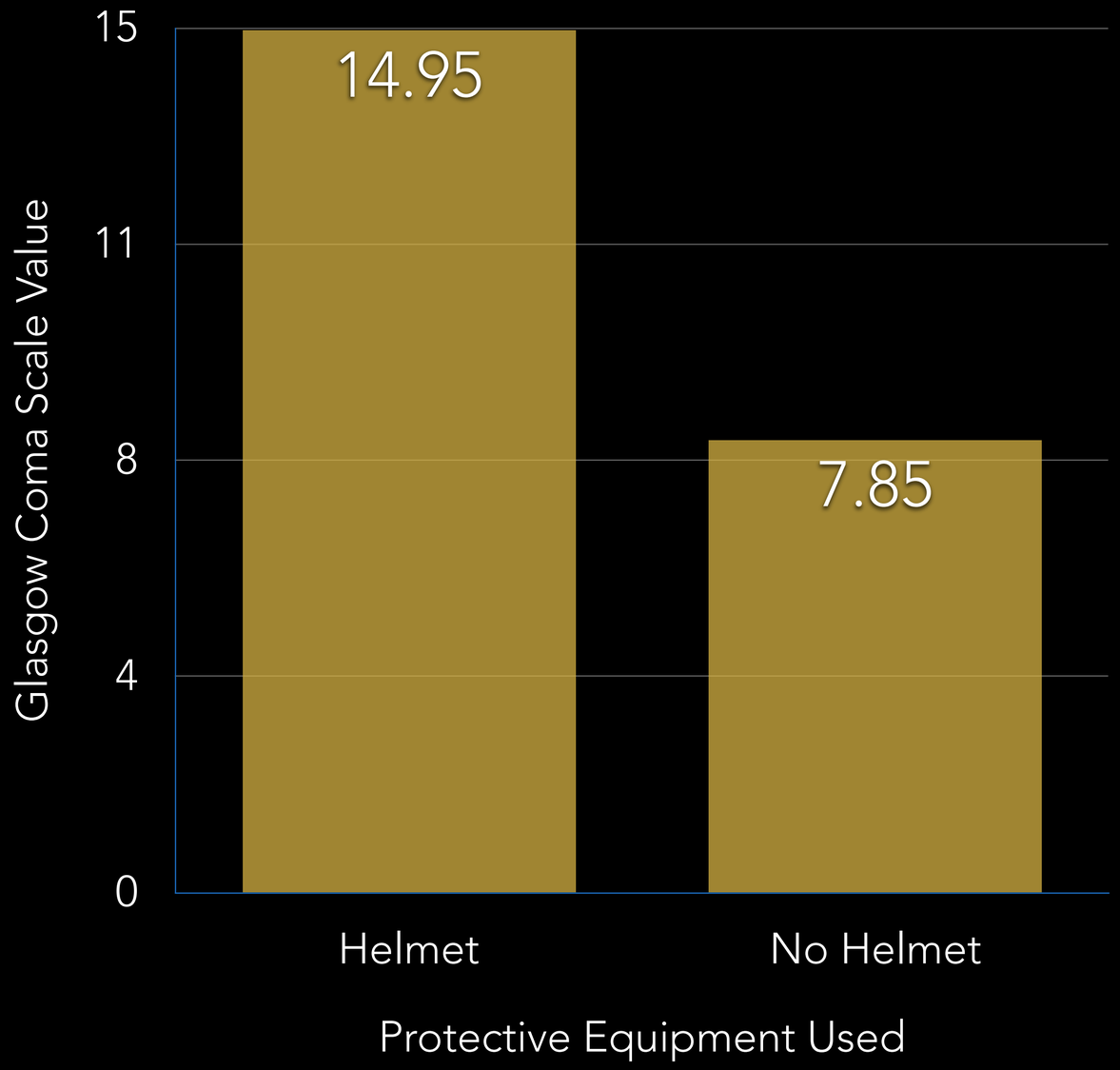


TABLE 38-2

Glasgow Coma Scale

The Glasgow Coma Scale or GCS is a neurological scale that aims to give a reliable, objective way of recording the conscious state of a person for initial as well as subsequent assessment.

BEHAVIOR	RESPONSE	SCORE
Eye opening response	Spontaneously	4
	To speech	3
	To pain	2
	No response	1
Best verbal response	Oriented to time, place, and person	5
	Confused	4
	Inappropriate words	3
	Incomprehensible sounds	2
	No response	1
Best motor response	Obeys commands	6
	Moves to localized pain	5
	Flexion withdrawal from pain	4
	Abnormal flexion (decorticate)	3
	Abnormal extension (decerebrate)	2
	No response	1
Total score:	*Best response*	15
	Comatose client	8 or less
	Totally unresponsive	3

Bier et al[4]

“Use of a safety helmet was accompanied by a relative risk reduction of **96%** and riders without a helmet were exposed to a 5-fold higher risk for inter cranial hemorrhage.”

–BIER ET AL[4]

HOW ABOUT SAFETY VESTS?

- There are only two studies on air vests. One was of such low quality that it should be disregarded (although the study itself found inconclusive results). The other study retrospectively showed that riders wearing air vests were injured more often and more severely, but could not prove a causation.
- Standard safety vests were studied in the pediatric population in one study, which concluded that the use of one did not lower the risk of torso injuries. (Hessler[5])
- Dr Mark Hart (USEF's team physician) says there is research showing that standard body protectors reduce penetrating injuries to the torso and reduce frequency of rib fractures. (Potter[6])

Photo by Emily Blaker

HOW ABOUT SAFETY VESTS?

- “Military studies examining injuries as the result of being thrown through the air show that the way the spine moves in an impact can be a predictor of injury. They found that the more rigid the body was held on impact, the greater the spine injuries. The issue with air vests is they can force the spine into a rigid frame, likely increasing the axial forces along the spine. Riders are held rigid until the vest deflates (about 2 minutes), so are held in a rigid frame on impact, likely affecting spine injury.” - Reed Ayers (Research scientist and equestrian)

Photo by Emily Blaker

OTHER PAIN

PAIN FROM NON-TRAUMATIC INJURIES

Original Image source unknown

HORSEBACK RIDING IS A FULL BODY SPORT, SO DYSFUNCTION CAN OCCUR IN ALMOST ANY BODY PART.

PHYSIOWORKS AUSTRALIA COMPILED THIS LIST:

Back Injuries

- Back Muscle Pain
- Bulging Disc
- Degenerative Disc Disease
- Facet Joint Pain
- Pinched Nerve
- Sacroiliac Joint Pain
- Sciatica

Hip & Groin Injuries

- Adductor Tendinopathy
- Femoroacetabular Impingement (FAI)
- Gluteal Tendinopathy
- Greater Trochanteric Pain Syndrome
- Groin Strain
- Hip Arthritis (Osteoarthritis)
- Hip Labral Tear
- Osteitis Pubis
- Piriformis Syndrome
- Poor Hip Core
- Trochanteric Bursitis

Calf and Leg Injuries

- Achilles Tendon Rupture
- Achilles Tendonitis / Tendinitis
- Calf Muscle Tear
- Shin Splints
- Stress Fracture

Anke & Foot Injuries

- Anterior Ankle Impingement
- Heel Spur
- High Ankle Sprain
- Metatarsalgia
- Morton's Neuroma
- Peroneal Tendonitis
- Pes Anserinus Bursitis & Tendinitis
- Pes Planus – Flat Feet
- Plantar Fasciitis
- Posterior Ankle Impingement
- Retrocalcaneal Bursitis
- Severs Disease
- Sprained Ankle
- Stress Fracture Feet
- Tibialis Posterior Tendinopathy

Wrist Injuries

- de Quervain's Tenosynovitis

Elbow Injuries

- Tennis Elbow or Squash Elbow
- Golfers Elbow
- Olecranon Bursitis

Shoulder Injuries

- AC Joint Injury
- Bursitis Shoulder
- Dislocated Shoulder
- Rotator Cuff Calcific Tendinitis
- Rotator Cuff Syndrome
- Rotator Cuff Tear
- Shoulder Impingement
- Shoulder Tendonitis

Neck Injuries

- Facet Joint Pain
- Neck Arm Pain
- Neck Headache
- Neck Sprain
- Pinched Nerve

Thigh Injuries

- Hamstring Strain
- Thigh Strain

Knee Injuries

- ACL Injury
- Bursitis Knee
- Chondromalacia Patella
- Fat Pad Syndrome
- ITB Syndrome
- Knee Arthritis
- Knee Ligament Injuries
- Lateral Collateral Ligament
- Medial Collateral Ligament Sprain
- Meniscus Tear
- Osgood Schlatter's
- Patella Tendonitis (Tendinopathy)
- Patellofemoral Pain Syndrome
- Plica Syndrome
- Posterolateral Corner Injury
- Sinding Larsen Johansson Syndrome

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PAIN IN 80 SHOWJUMPING RIDERS (PRELIMINARY STUDY)

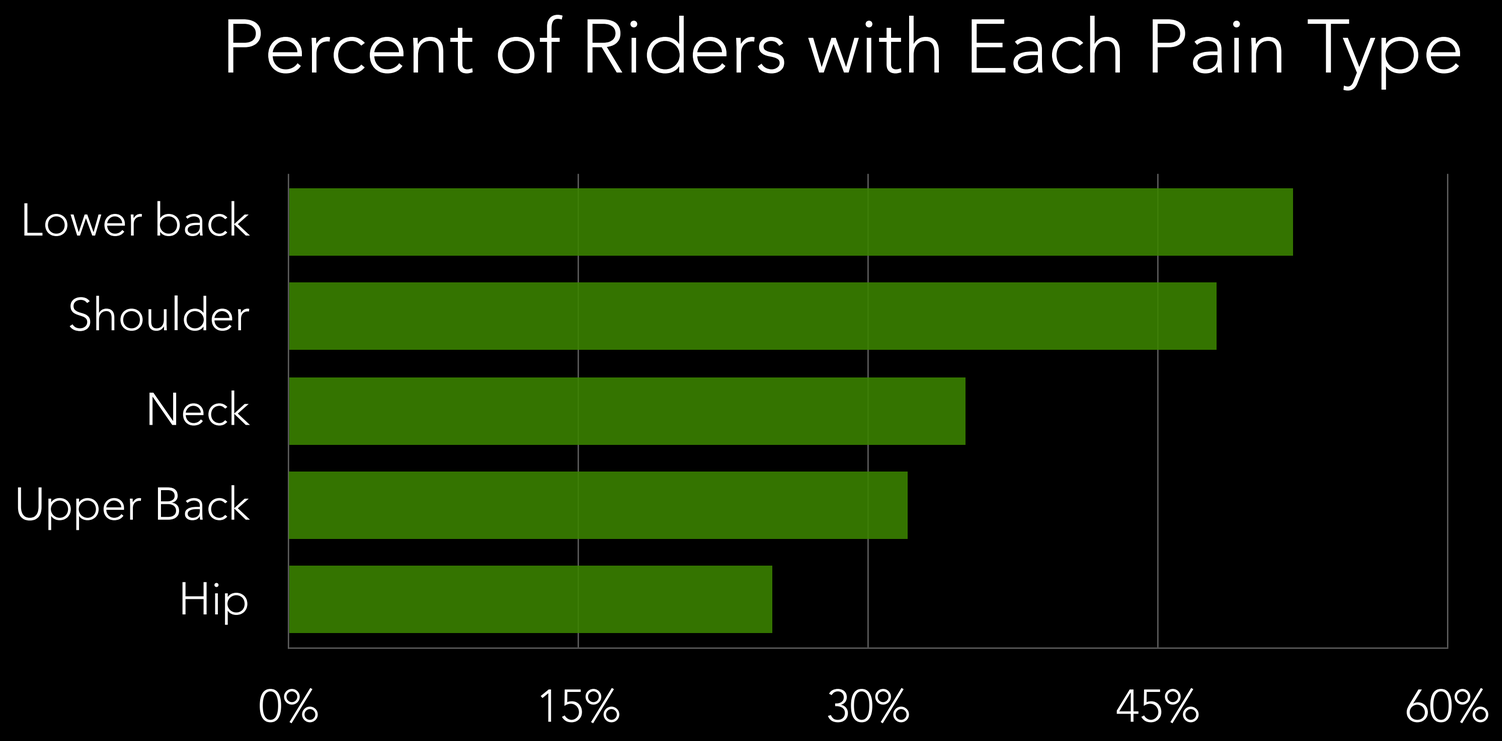
- Median age 23 years
- 89% female, 11% male
- 70% amateur competitive riders, 12.5% recreational, 17.5% professional
- 59% (47 people) of these riders currently were experiencing pain
  - 67% of these had chronic pain, 33% had acute pain
  - 15% had a diagnosis
  - 47% used therapy (usually physiotherapy) and 25% utilized an exercise program to manage and treat the pain

Location of Pain	Participants	Median Level of Pain	Highest Level of Pain	Median Pain Duration (Years)
Lower back	29 (62 %)	Mild	Severe	2 - 3
Knee	22 (47 %)	Mild	Severe	2 - 3
Ankle	17 (36 %)	Mild	Severe	2 - 3
Neck	15 (32 %)	Mild	Severe	4 - 5
Hip	13 (28 %)	Moderate	Moderate	2 - 3
Upper back	11 (23 %)	Moderate	Moderate	2 - 3
Elbow	7 (15 %)	Mild	Mild	4 - 5
Head	6 (13 %)	Mild	Mild	4 - 5
Wrist	6 (13 %)	Mild	Mild	4 - 5

Lewis[8]

PAIN IN 31 EVENTING RIDERS (PRELIMINARY STUDY)

- Median age 32.5 years
- 58% female, 42% male
- 96% of these riders currently were experiencing pain
  - 96% treated pain with medications
  - 19% used physiotherapy to treat pain



Lewis, Baldwin[9]

SO WHAT CAN WE DO FOR EQUESTRIAN ATHLETES?


Photo by Sara Hernandez Whorton

#1


Photo by Irene Powlick

ADVOCATE FOR HELMET USE TO PREVENT TRAUMATIC BRAIN INJURY


Photo by Cyd Ross


Photo by Eliza DeSantis

#2

ADVOCATE FOR PHYSICAL THERAPY TREATMENT FOR EQUESTRIAN ATHLETES FOLLOWING INJURY OR TO PREVENT INJURY.

WE CAN DISCUSS WITH LOCAL PHYSICIANS ABOUT THE IMPORTANCE OF REHABILITATIVE THERAPY FOR THIS POPULATION FOLLOWING CONCUSSION OR MUSCULOSKELETAL INJURY. WE CAN ALSO ADVERTISE EQUESTRIAN SPECIFIC PHYSICAL THERAPY SERVICES AT LOCAL EQUESTRIAN CENTERS.

#3

EDUCATE RIDERS ABOUT THE IMPORTANCE OF UNMOUNTED FITNESS PROGRAMS TO BUILD MUSCLE STRENGTH AND ENDURANCE.

#4

REHABILITATE THESE ATHLETES WITH THE SPECIFIC DEMANDS OF THEIR SPORT IN MIND

WHAT DO WE KNOW ABOUT RIDER FITNESS DEMANDS?

A REVIEW OF THE LITERATURE ON FITNESS DEMANDS IN EQUESTRIAN ATHLETES:

- As a horse progress through the gaits (walk, trot, canter) the rider's heart rate and oxygen consumption increase. This is thought to be due to increase in tonic muscular contraction of the trunk.
- Faster gaits and jumping require rider to move into a forward riding position which necessitates weight bearing through rider's legs as opposed to a seated position, where weight bearing is mainly through the pelvis.
    - The forward position increases metabolic cost and increases levels of blood lactate

- *"Only when further physiological and biomechanical data are available from a greater range of equestrian disciplines and from a range of levels of athletes, will the demands of these sports be more clearly understood. Until such time, the development of evidence-based sport specific and potentially performance enhancing rider strength and conditioning programmes cannot be realised" - Douglas et al*

Douglas et al[10]

“Muscular fitness is important for the rider to withstand long periods of tonic or quasi-isometric muscle contraction as their position is maintained. […] The human muscles specific to posture maintenance during riding are the adductor magnus, erector spinae, and the rectus abdomenus.”

–LEE[11]

“Although research in this field is limited, a few published studies have concluded that riding alone only minimally improves equestrian fitness and that cross-training is necessary to reach optimal physiological fitness. [..] However, riders have above average upper body and abdominal strength when compared to non-rider norms.”

–LEE[11]

IMPORTANCE OF CORE STRENGTHENING EXERCISES

- A study published in the International Journal of Performance Analysis in Sport showed that an 8 week long unmounted equestrian core fitness program can significantly decrease left-right mean pressure differential. The mean stride length of the horse was also shown to increase by 8.4%
    - This study shows that rider core fitness has a significant impact on rider symmetry and can improve both human and equine performance
    - *an asymmetrical rider may be more at risk for falls, back pain, and other dysfunction

Hampson, Randle[12]

Photo by Irene Powlick

A LOOK AT AN 8 WEEK THERABAND ISOMETRIC STRENGTHENING PROGRAM FOR DRESSAGE RIDERS

- Significant improvements were seen in muscular endurance
- Significant improvements were seen in USEF Training Level Rider Test scores at the end of the 8 weeks
- It was found that there was no significant correlation between changes in muscle strength and improvement in riding test scores. However, there was a significant correlation between changes in muscular endurance and changes in total riding test score.
  - This indicates we may want to focus on muscle endurance more than strength alone when working with equestrian athletes.

Table 4.0: Physical Fitness and Riding Test Performance Scores (mean ± SD)

Test	Pre-Intervention (N=18)	Post-Intervention (N=18)
Step Test Recovery Heart Rate (bpm)	97.7 ±18.9	93.4 ± 17.3*
Isometric Row (ftlb.)	19.2 ± 4.4	27.6 ± 5.1*
Right Hip Adduction (ftlb.)	35.8 ±10.9	57.6 ± 19.1*
Left Hip Adduction (ftlb.)	36.1 ± 9.1	52.7 ± 16.5*
Hip Adduction Total	71.9 ± 19.1	110.3 ± 33.0*
Right Handgrip (lb.)	31.4 ± 4.9	32.7 ± 4.8*
Left Handgrip (lb.)	30.4 ± 6.0	30.5 ± 5.5
Handgrip Total (lb.)	61.8 ± 10.5	63.2 ± 10.1*
Composite Muscular Strength**	152.8 ±29.5	201.1 ± 43.5*
Partial Curl Up (reps)	38.1 ± 13.9	45.9 ± 12.5*
Isometric Chest Raise (scc)	111.7 ± 73.4	163.3 ± 105.5*
Composite Muscular Endurance^	149.8 ± 82.2	209.2 ± 112.3*
USEF Training Level Rider Test Total Score (#/100)	57.9 ± 7.4	60.9 ± 5.1*
Rider Position Component Score (#/20)	11.2 ± 1.9	11.9 ± 1.4
Effective Use of Aids Component Score (#/20)	11.4 ± 1.7	11.9 ±1.0

Lee et al[11]

EXERCISES IN THE 8 WEEK PROGRAM

- 1) **Back Extensions:** Subject should attach elastic to a non-moveable object at shoulder height, be seated and grasp the elastic with both hands at their chest, pull backwards straightening the truck then slowly return to starting position and repeat.
- 2) **Isometric Seated Row:** Subject should attach elastic to non-moveable object, hold elastic in their hands, sit upright keeping bent elbows near their sides and squeeze shoulder blades together while pulling the resistance band and hold the position.

Lee et al[13]

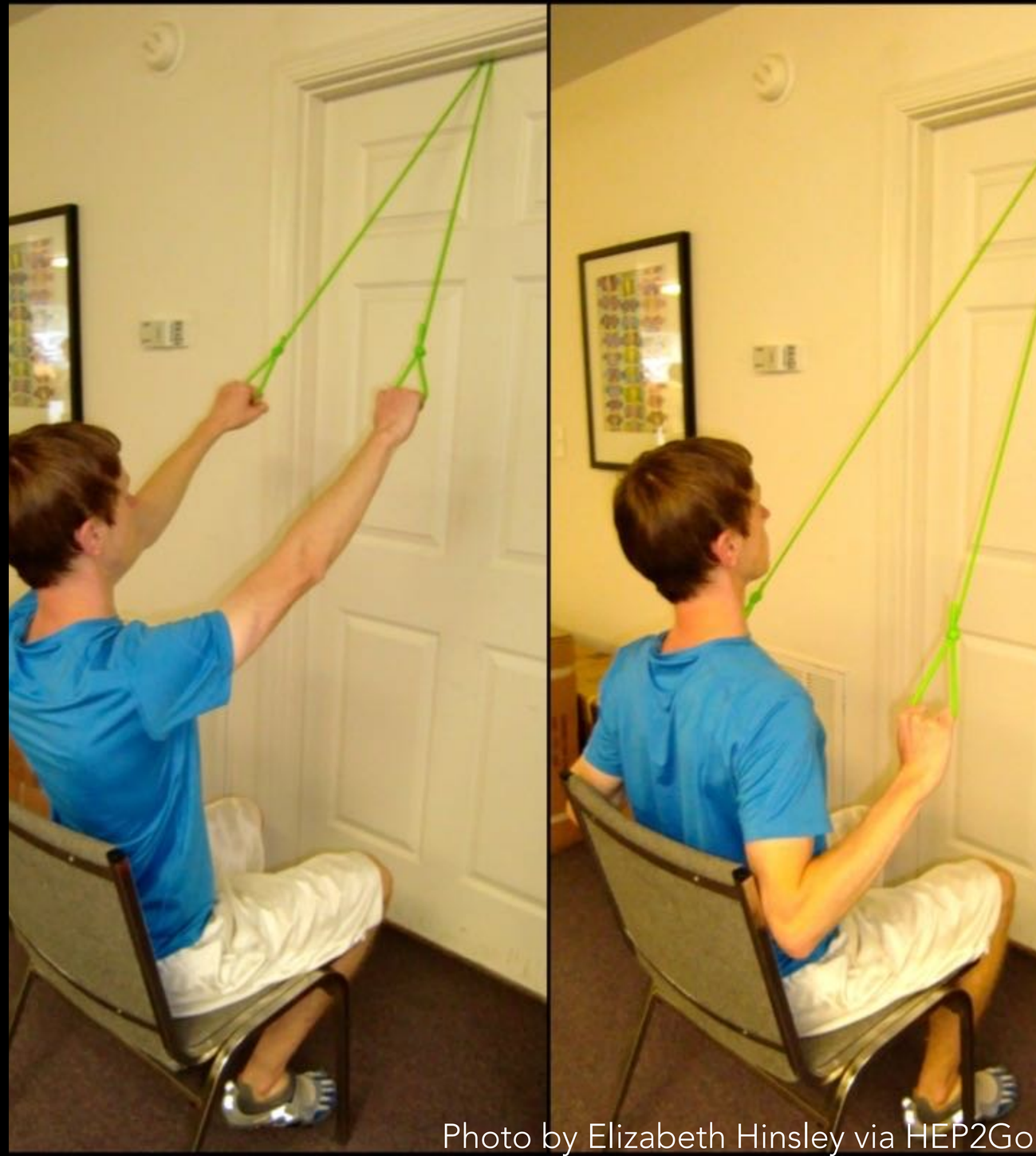


Photo by Elizabeth Hinsley via HEP2Go

EXERCISES IN THE 8 WEEK PROGRAM

- 3) **Hip Adduction:** Subjects should attach the elastic to a non-moveable object at ankle level at their side, place the foot that is on the same side of elastic in the elastic loop, keep their knee straight, pull the leg inward and hold the position.
- 4) **Wall Squats:** Participants should put their back on a wall, squat down with knees bent at a 90-degree angle, place a tennis ball between the knees and maintain weight in the heels. Elbows or hands should not come in contact with the thighs and squatted position should be maintained.

Lee et al[11]

Photo by HEP2go

EQUESTRIAN, HEALTH EXPERT, AND PERSONAL TRAINER AMY KNEELAND RECOMMENDS AN EXERCISE ROUTINE INCORPORATING STABILITY BALLS, BALANCE, DISCS, AND WOBBLE BOARDS, WHICH TRAIN THE USER TO BALANCE AND DEVELOP CORE STRENGTH.

White[6]

Photo by Nesve Yayalar via HEP2Go

Photos by HEP2go

WHAT DO WE NEED? FROM THE PERSPECTIVE OF A RIDER:

- Proper safety equipment
- Good balance and proprioception
- Strong core muscles
- Strong upper limbs
- Strong legs, particularly hip adductors, quadriceps, and hip extensors
- Full range of motion in all joints, but particularly spine, hips, ankles, and shoulders
- General cardiovascular fitness and muscle endurance

Photo by Irene Powlick

KEY TAKE AWAYS:

- Horse sports are dangerous
- Helmet use significantly reduces risk of traumatic brain injury
- Equestrian athletes can experience injuries and pain in any body part
- Chronic pain is common in this population
- We need to advocate for more physical therapy treatment in this patient population
- Physical therapy should focus on balance, core strength, and muscle endurance


Photo by Sara Hernandez Whorton


Photo by Alan Farrow


Photo by TK210GraphiK


Photo by Irene Powlick


Photo by US Department of State


Photo by Irene Powlick

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