sport ireland

UCD DUBLIN

IRISH RESEARCH COUNCIL
An Chomhairle um Thaighde in Éirinn

National Dairy Council 2017

Low energy availability in athletes & associations with health & performance

Danielle Logue

#lowenergyavailability

Research in sport

Incidences of injury & illness:

peaks in training load (Thornton, 2015; Owen, 2016)

Inadequate recovery (Pyne, 2000; Neville, 2008)

Intensified competition (Morgans, 2014).

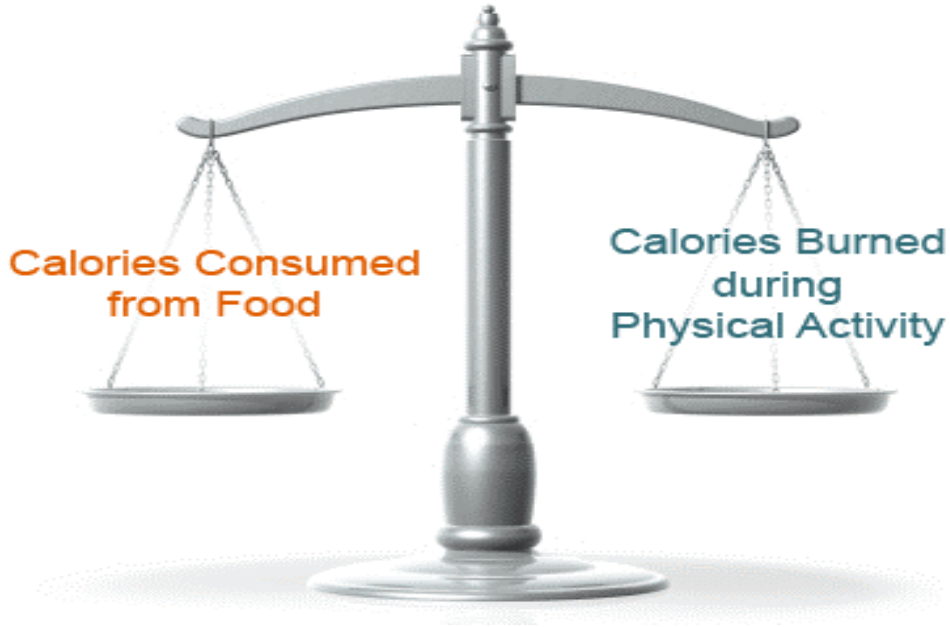
Common athlete issues!

- Stressful and busy lifestyle!
- Unrealistic goals!
- Recurrent injuries and illnesses
- Indiscriminate use of supplements!
- Inadequate fuel for performance

Low Energy availability!

Energy Availability

The amount of energy you have to fuel your body's needs after you subtract out the calories (energy) you use for exercise.



Low Energy Availability

Insufficient energy for normal body functioning

Loucks AB, Kiens B, Wright HH et al. (2011) *J Sports Sci.* **29**, 7-15.

Calculating energy availability

(EI- EEE) / kg FFM

EI = Dietary intake

EEE= Exercise Energy Expenditure

FFM= Fat Free Mass (body composition needed)

1800 kcal/day

1200 kcal/day "x2 training sessions"

FFM (60 kg with body fat @ 20% = 60 (BW) -12 (FM)= 48 kg (FFM))

(1800 – 1200/ 48 kg FFM)

12.5 Kcal/kg energy availability

Loucks AB, Kiens B, Wright HH et al. (2011) *J Sports Sci.* **29**, 7-15.

Energy availability thresholds

Optimal EA of **~45 kcal/kg FFM/day**: recommended to ensure sufficient energy for normal bodily function

Sub-clinical EA ranges from **30-45 kcal/kg FFM/day**: appropriate for athletes aiming for weight-loss within a well-constructed dietary & exercise regimen over a short period.

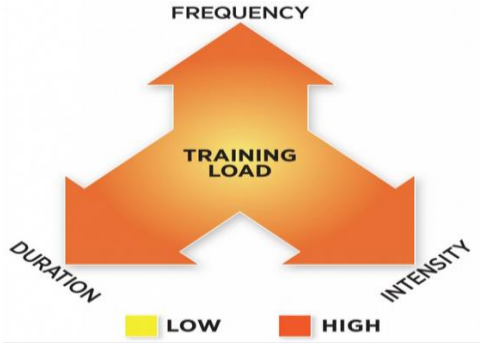
Low EA occurs below **30 kcal/kg FFM/day**. Impairment to physiological function is seen below this level

Loucks AB, Kiens B, Wright HH et al. (2011) *J Sports Sci.* **29**, 7-15.

Energy availability is reduced by…

- Increased exercise energy expenditure above energy intake

  Changes in training volume



- Inadvertent impacts on energy intakes

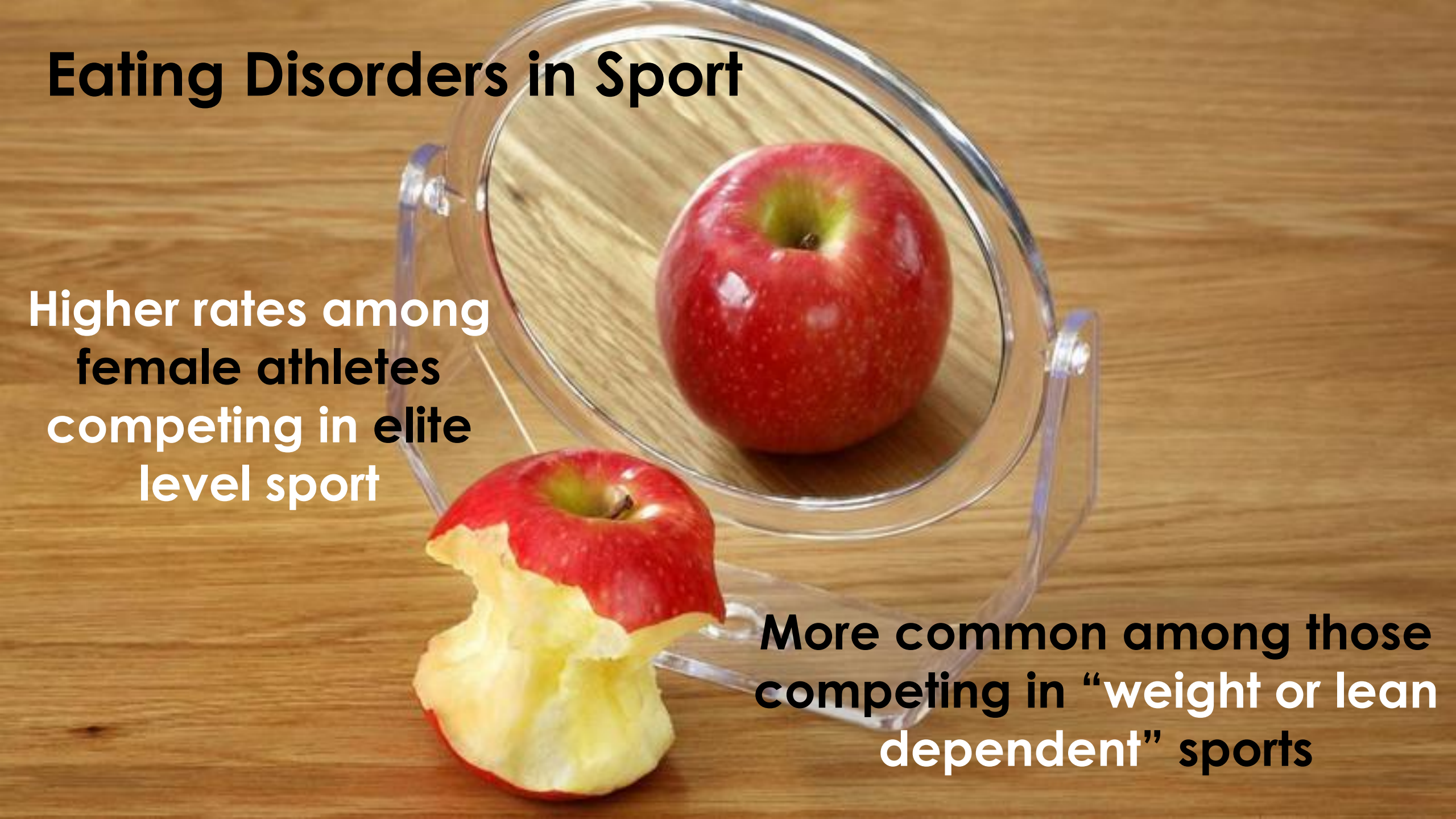
  Nutrition as an afterthought

  Timing of training session conflicting with eating opportunities

- Dysfunctional eating behaviours

  Dieting, sub-clinical and clinical eating disorders

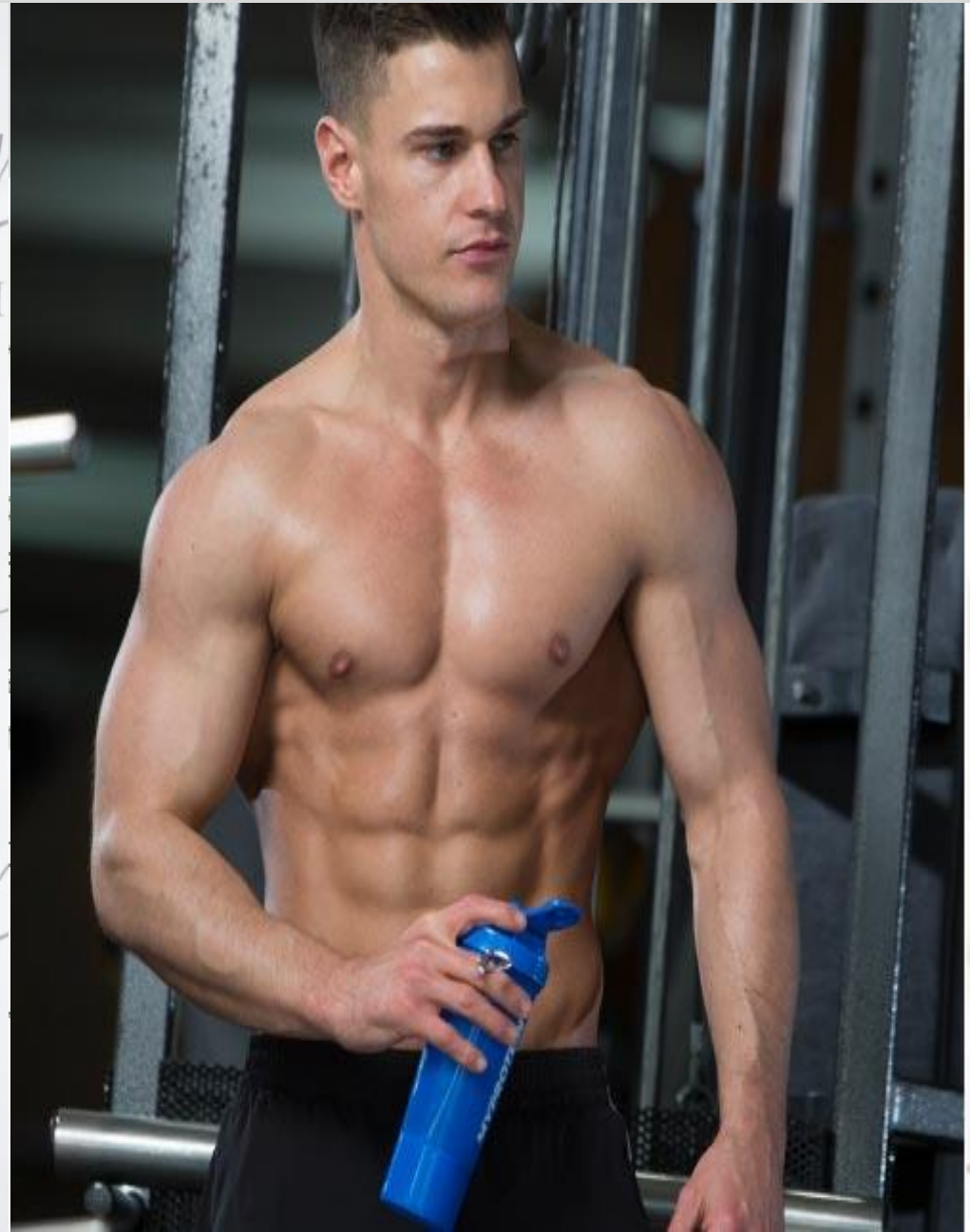
Eating Disorders in Sport

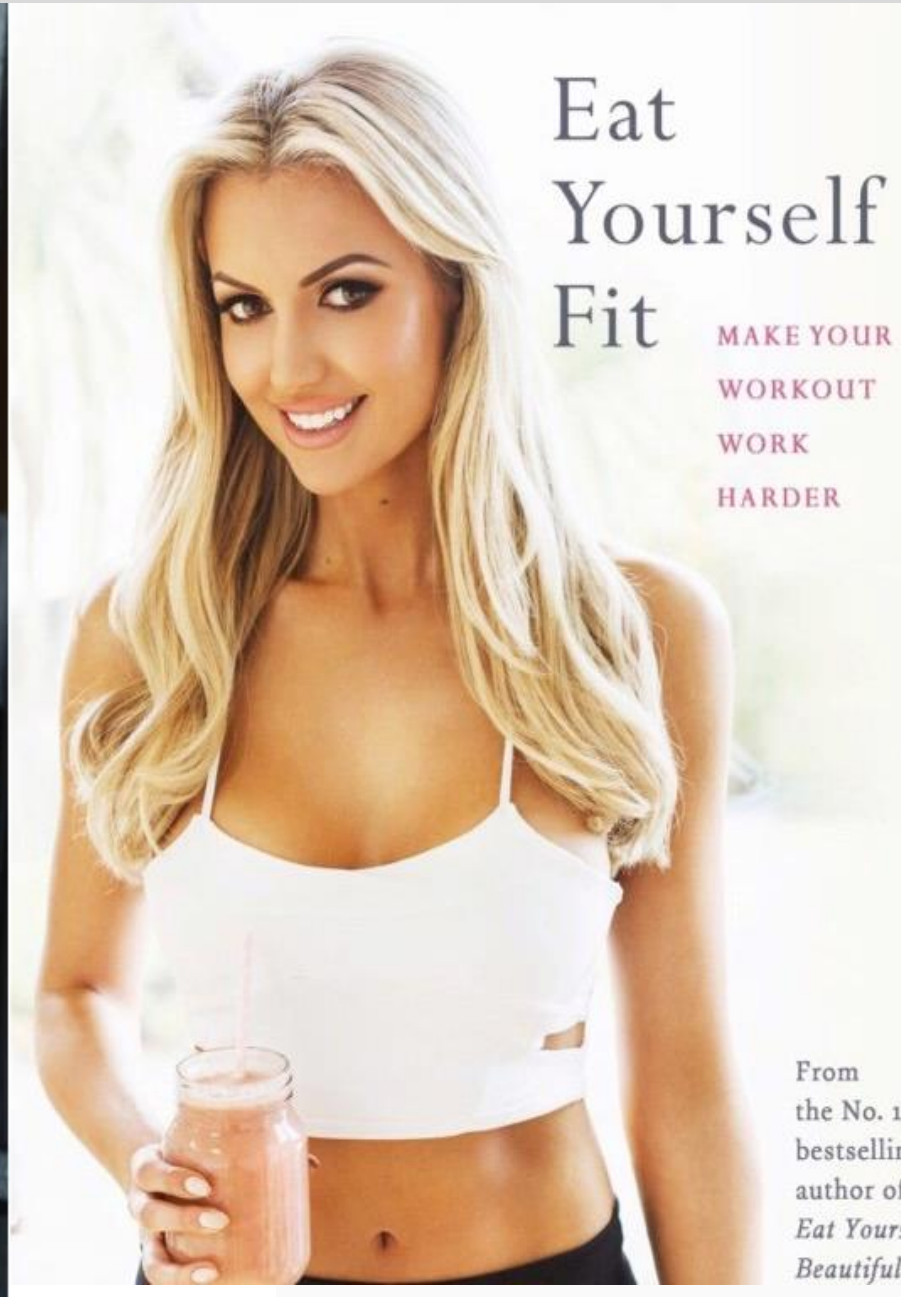


Higher rates among female athletes competing in elite level sport

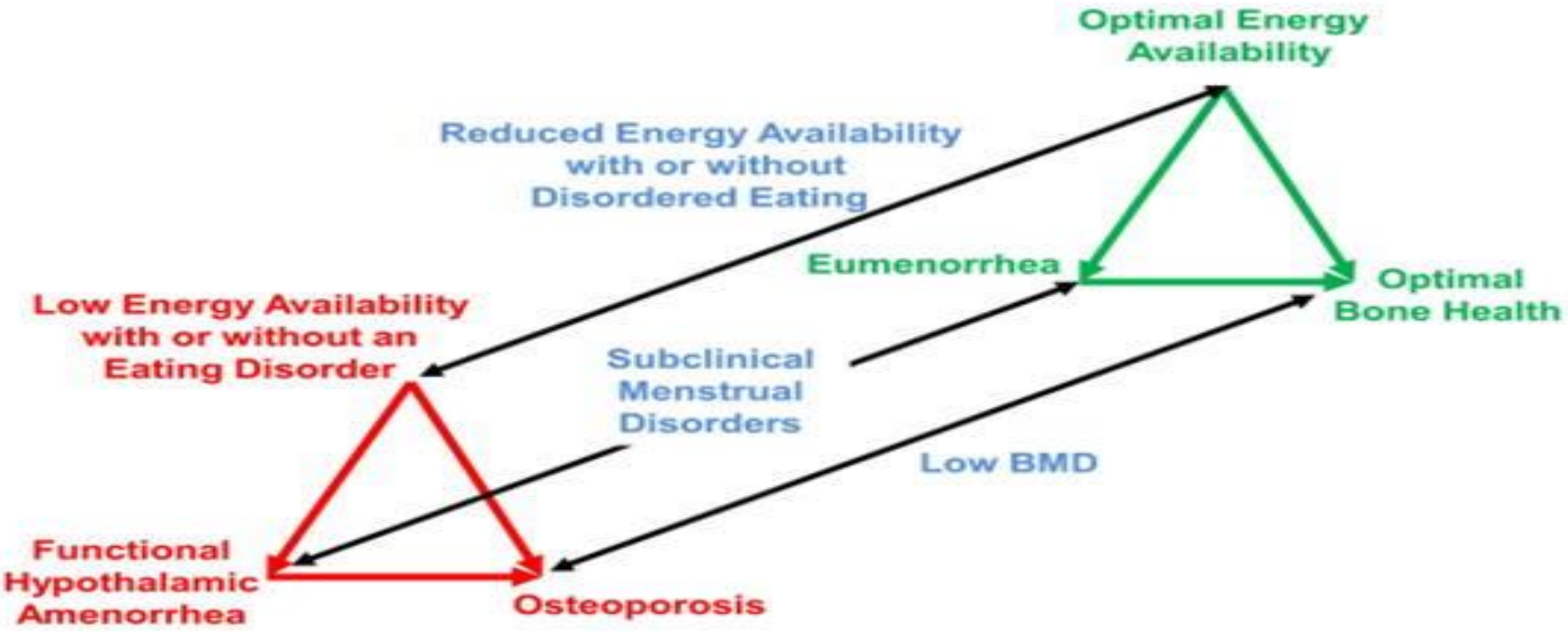
More common among those competing in “weight or lean dependent” sports

The Qualified vs Unqualified… Who is your buzzkill?





Low energy availability and the Female Athlete Triad



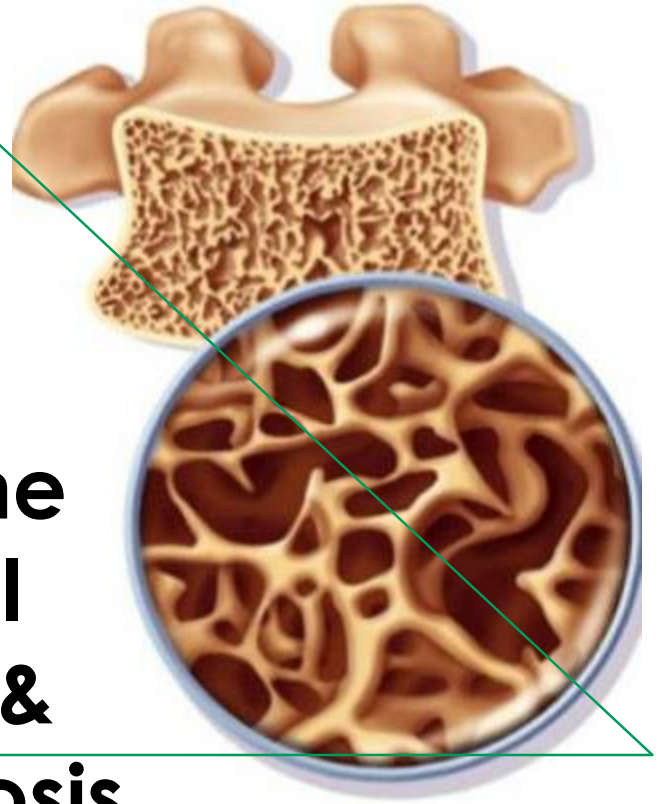
Unhealthy conditions. Low energy availability impairs bone health indirectly by inducing amenorrhea and removing estrogen 's effect on bone formation. Overtime, bone mineral accrual is slowed and BMD is below average for age.

Health consequences associated with low energy availability

↑ Cholesterol
↓Blood pressure
↓Glucose
↓RMR

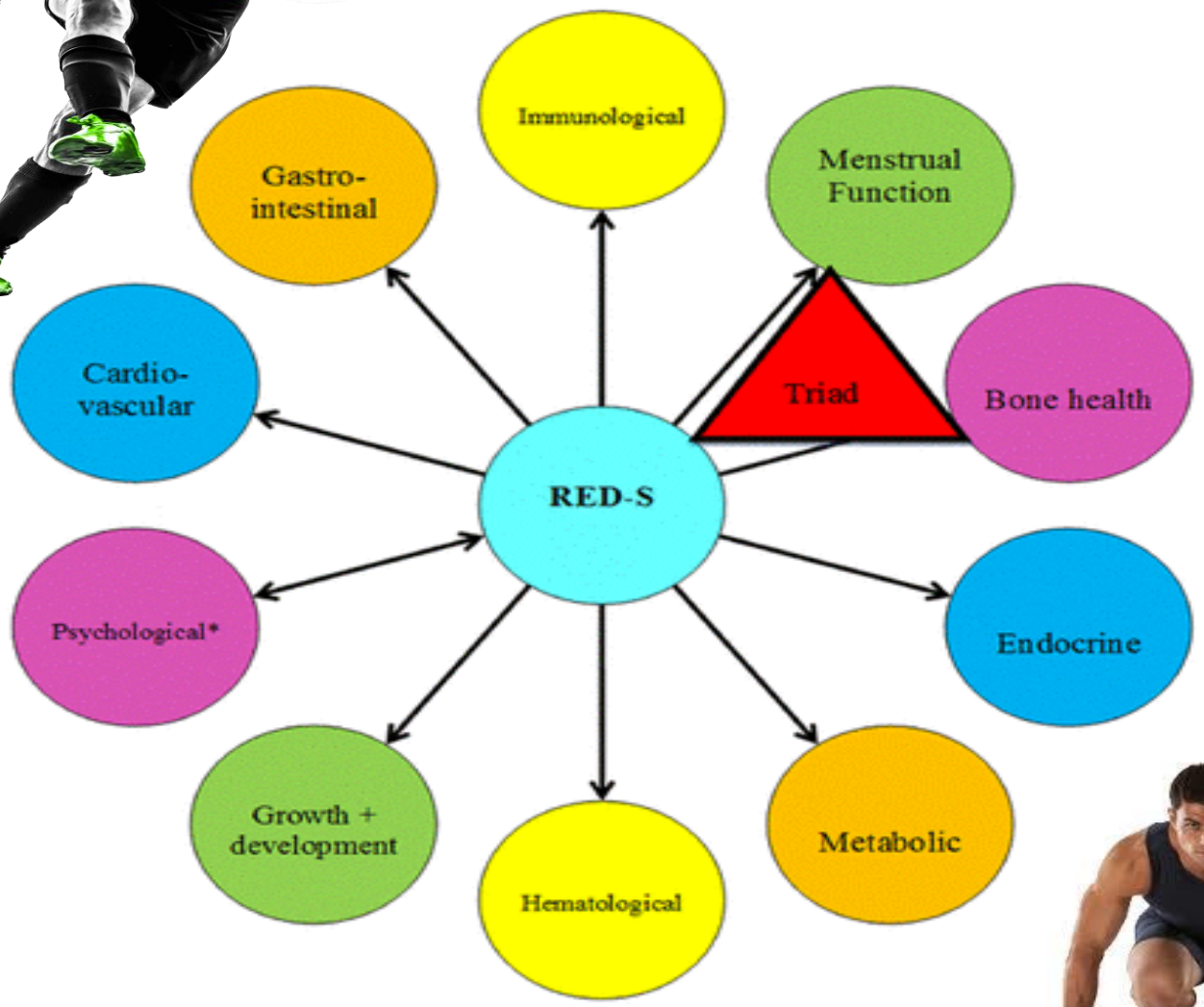
Menstrual dysfunction & FHA

Low bone mineral density & osteoporosis

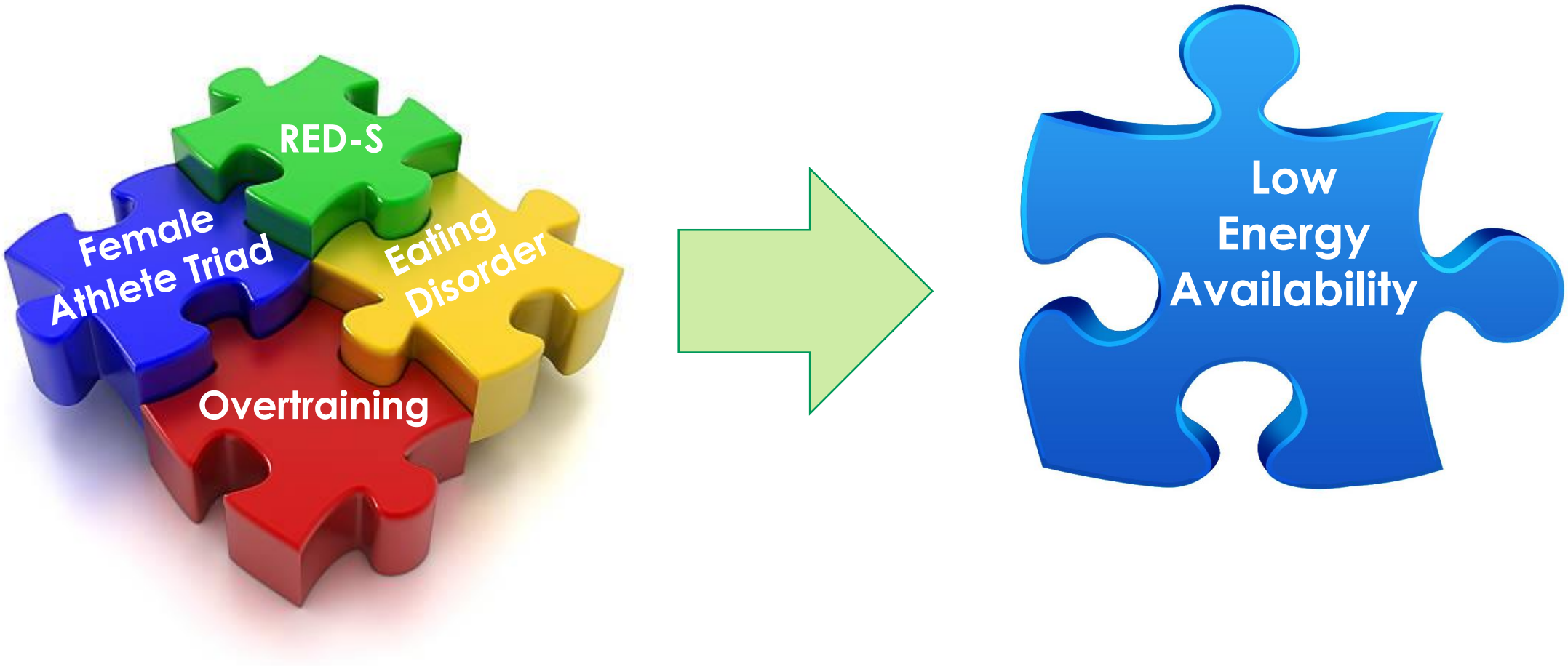


Melin A, Tornberg A, Skouby S et al. (2014) *Br J Sports Med*. **7**, 540-545.

Relative energy deficiency in sports



Low energy availability




RISK

Low energy availability risk

Female Recreational Exercisers at Risk for Low Energy Av...

Slater J, McLay-Cooke R, Brown R, Black K.

Abstract

L... ...on in normal phys...

c... ...e of endocrine adaptations...

p...

We need to know the extent of this problem...

SPORT IRELAND INSTITUTE

45 %

...thlete Triad

...Janse van Rensberg[1]

Aim: to determine LEA risk in active females in Ireland

Method:

Online questionnaire

LEAF-Q

Q. Does your menstruation change when exercise intensity increases?

SCORE OF ≥8 = AT RISK

- Menstrual function
- Contraceptive use
- Injuries
- GI function

Q. How many days were you absent from training/competition due to injuries?

Sensitivity (78%) & Specificity (90%)

Melin A, Tornberg A, Skouby S et al. (2014) *Br J Sports*

Distributed online: December 2016 - March 2017

Completed Questionnaires **900**

Total Sample 833

Excluded **67**

Results:

International
162

Provincial/county
155

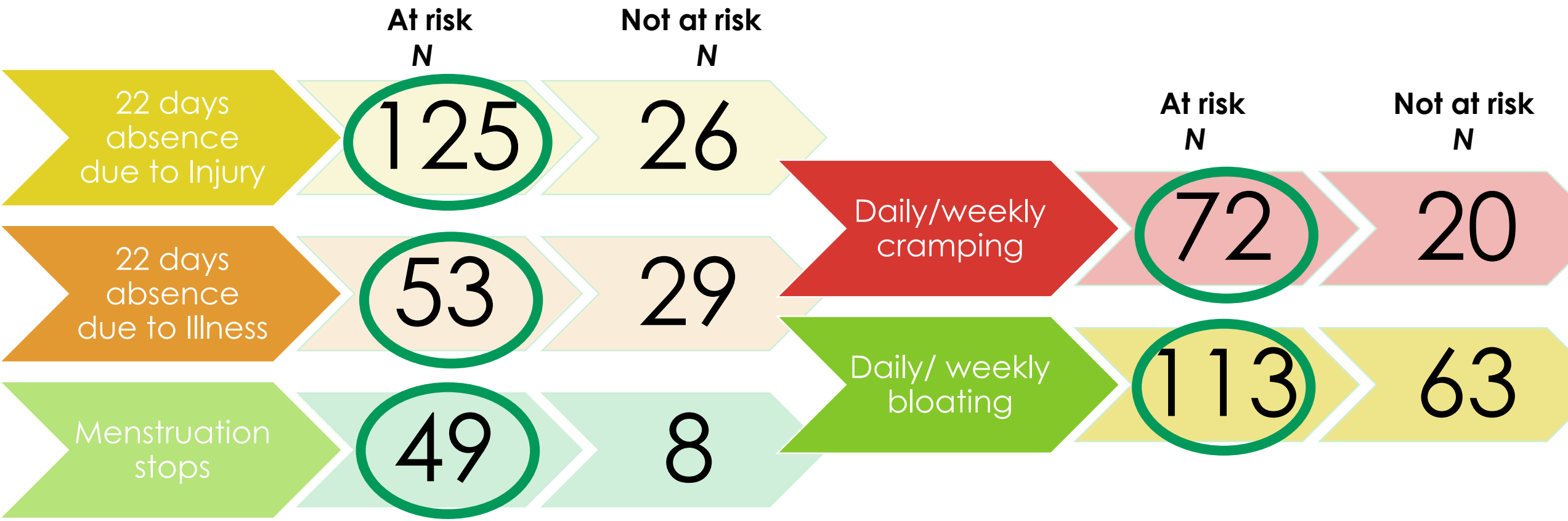
Competitive in Sport at club level
281

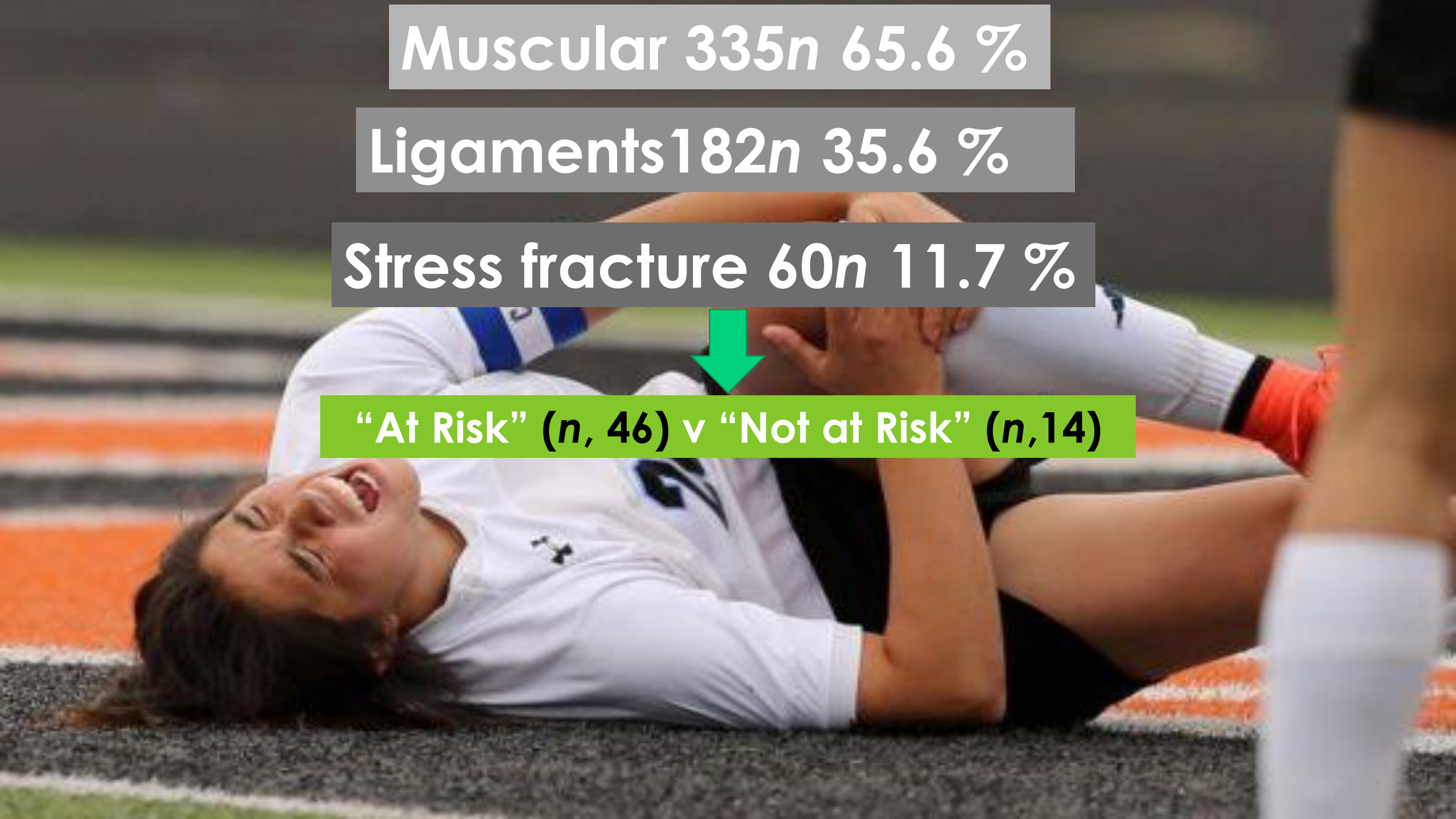
Recreational
235


Low energy availability risk in Ireland:
40%


International
1.68
Inter-county
1.83
Competitive
in sport
1.28
Reference:
Recreational
LEA
Risk

Health outcomes associated with low energy availability risk




Muscular 335n 65.6 %
Ligaments182n 35.6 %
Stress fracture 60n 11.7 %
“At Risk” (n, 46) v “Not at Risk” (n,14)

Dietary patterns of participants

Low carbohydrate

47 %

Paleo diet

17 %

41 %

22 %

Dairy free diet

21 %

Conclusions

1. 40% of low energy availability risk among females in Ireland
2. Higher risk among females competing competitively in sport

Significant associations between:

*Risk and missing more than 22 days of training due to injury

*Risk and stress fractures

Need for screening in sport

Take Home Messages for the Athlete

1. Education on RED-s, healthy eating, nutrition, EA, the risks of dieting and how these affect health and performance

2. Reduction of emphasis on weight, emphasising nutrition and health as a means to enhance performance

3. Development of realistic and health promoting goals related to weight and body composition

4. Avoidance of critical comments about an athlete's body shape/weight

5. Use of sound sources of information

6. Encouragement and support of appropriate, timely and effective treatment

Take Home Messages for the Healthcare Professional

1. Exclude possibility of an Eating Disorder; BEDA-Q and EDE-16

2. Determine if food restriction is deliberate in order to lose weight or is secondary to other situations; problematic relationships, lack of time or money, gastrointestinal pathology etc.

3. Screen for symptoms in sport: LEAF-Q

4. Increase energy intake!

   Dietary supplementation can be a partial solution to an inadequate diet – reduce EEE

5. Educate athletes on the importance of adequate energy intake, RED-S, the Triad

Thank you, any questions?