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Applying the Current Acute-to-Chronic Workload Ratio Considerations to Running Related Injury Prevention

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References

Introduction

- Running related injury (RRI)
 - “Running-related (training or competition) musculoskeletal pain in the lower limbs that causes a restriction on or stoppage of running (distance, speed, duration or training) for at least 7 days or 3 consecutive scheduled training sessions or that requires the runner to consult a physician or other health professional.”¹
- Common running progressions fail to prevent RRIs.^{2,3}
- Acute to-chronic workload ratio (ACWR)
 - Sum weekly workload for 1 week over the average weekly workload of the last 4 weeks.^{4,5}

Purpose

- To synthesize the current body of literature surrounding ACWRs for a variety of sports to construct a working theory of ACWR for runners.

Methods

- Literature search done October 2020 on Pubmed and SPORTDiscus.
- Terms: “Acute:chronic workload ratio” OR “ACWR” AND “injur*”
- Inclusion and Exclusion Criteria:
 - Inclusion: Peer reviewed, after 2010; ACWR and injury
 - Exclusion: Traumatic injury, not in english, not accessible
- Quality Assessment:
 - National Heart, Lung and Blood Institute Quality Assessment Tool for Cohort Observational Studies used for quality assessment.⁶
 - “Good” >11, “Fair” 6-10, “Poor” <6
- Data Collection:
 - Collected data on study characteristics and ACWR agreement with International Olympic Committee (IOC).⁷ (Table 1)

Results

- Results yielded 9 studies with 5 being “good,” and 4 “fair” in quality. Overall quality of evidence was determined to be low-moderate. All of the reviewed studies were observational cohort with 4 being prospective and 5 retrospective.

Results

Figure 1: PRISMA

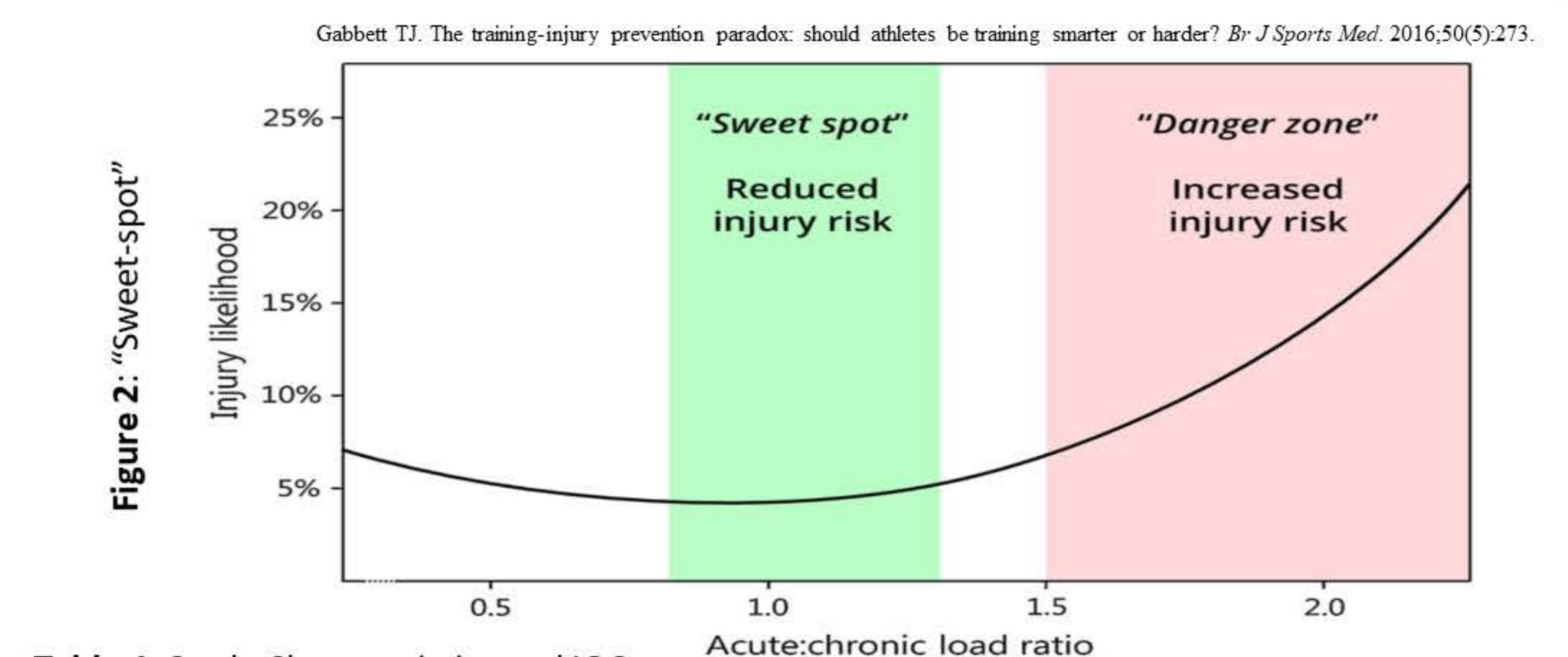
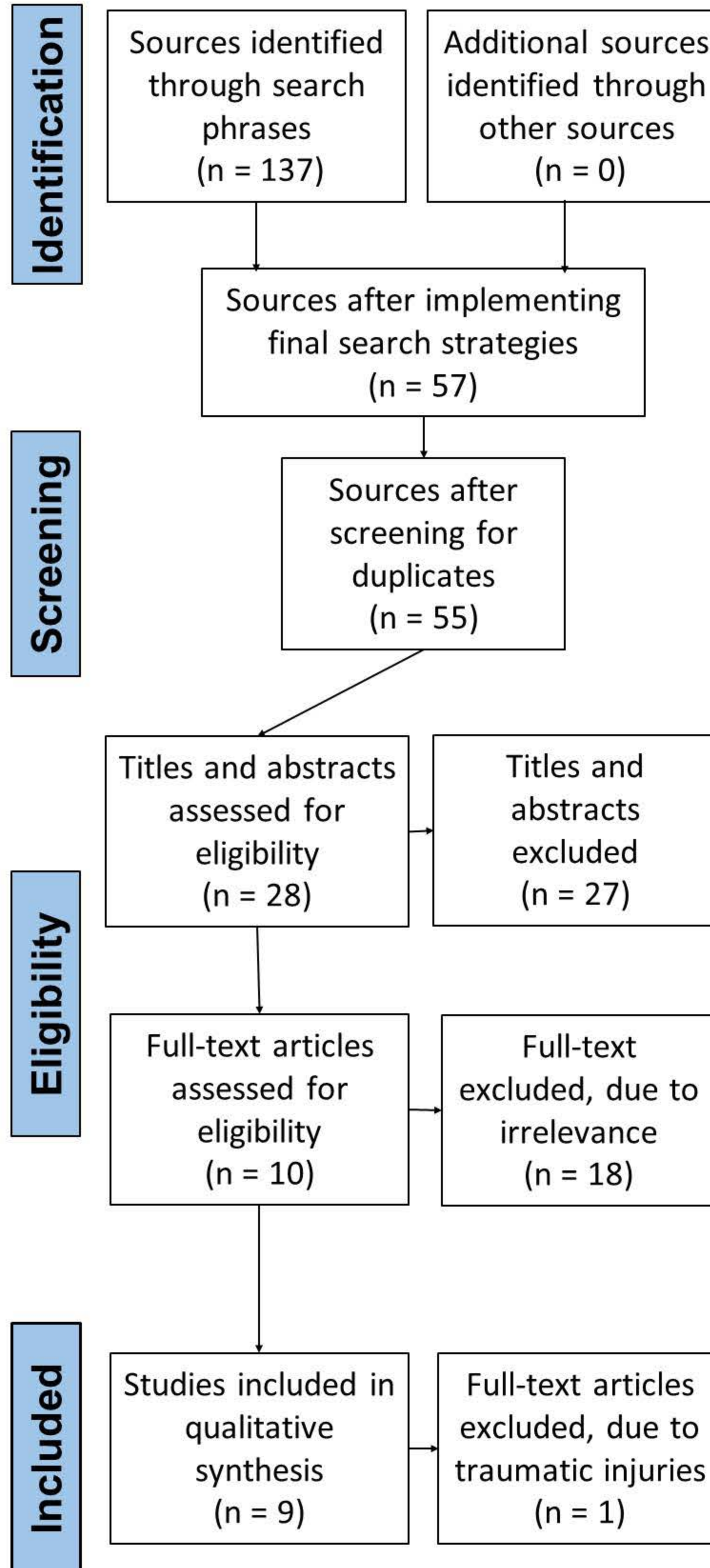


Table 1: Study Characteristics and IOC agreement

Author	Study Design and Quality	Sample	Length of Study	Method of ACWR	Agreement with IOC
Murray et al ⁵	OC Prospective Good	n = 59 Pro Rugby	2 seasons	RA	Agree
Enright et al ⁸	OC Retrospective Fair	n = 192 Pro Soccer	28 days	RA EWMA	Disagree
Jaspers et al ⁹	OC Prospective Good	n = 35 Pro soccer	2 seasons	RA	Divergent
Malone et al ¹⁰	OC Prospective Fair	n = 48 Pro soccer	1 season	RA	Agree
Stares et al ¹¹	OC Retrospective Good	n = 70 Pro rugby	4 seasons	N/A	Agree
Colby et al ¹²	OC Prospective Good	n = 70 Pro rugby	4 seasons	RA	Divergent
Sampson et al ¹³	OC Retrospective Fair	n = 52 Collegiate AF	1 season	RA EWMA	Agree
Dijkhuis et al ¹⁴	OC Retrospective Good	n = 23 Club running	24 months	RA	Disagree
Johnston et al ¹⁵	OC Retrospective Fair	n = 95 Endurance	52 weeks	RA EWMA	Agree

IOC = International Olympic Committee, OC = observational cohort, AF = American football, RA = rolling average, EWMA = exponentially weighted moving average

Discussion

Five articles agreed,^{5,10,11,13,15} two disagreed,^{8,14} and two expressed divergence^{9,12} with the IOC’s recommendation that an ACWR of 0.8-1.3 reduces injury risk.⁷

There were many different ways to calculate workload throughout the available research involving both volume and intensity which included rating of perceived exertion, heart rate, distance, duration, velocity, and various forms of technology. **The authors recommend using session rating of perceived exertion (SRPE) x duration for workload calculation in runners as this method is most practical, and is best in line with the IOC recommendation.**

Limitations

The quality assessment tool did not provide the authors with proper scoring cutoffs which may increase bias. All included articles were observational cohort studies, therefore, the strength of evidence is low-moderate. Sixteen full-text articles were excluded due to lack of access by the authors creating an additional increased risk for bias.

Clinical Relevance

If clinicians, coaches, and runners are looking to implement ACWR into their training regimen they could cautiously apply this ACWR range to reduce the risk of developing a running-related injury.

Conclusion

There is reasonable evidence to support using ACWR for RRI prevention in runners, however, more research is needed. Monitoring ACWR is just one piece of the injury prevention puzzle because injury prevention must consider all variables unique to each runner.