5 Things Every Hockey Analyst Should Know About Athlete Performance Data

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Brad Stenger
Kevin Dawidowicz

1. Stress

2015-16	Miles	B-to-B
San Jose Sharks	50362	14
Edmonton Oilers	49401	9
Dallas Stars	48419	12
Calgary Flames	48341	12
Vancouver Canucks	45711	13
Anaheim Ducks	44653	11
Los Angeles Kings	43750	13
Colorado Avalanche	42901	10
Winnipeg Jets	42380	12
Florida Panthers	41891	14
Carolina Hurricanes	41558	16
Minnesota Wild	40976	15
Tampa Bay Lightning	40974	13
St. Louis Blues	40649	12
Arizona Coyotes	40504	15
Montreal Canadiens	39947	16
Chicago Blackhawks	39332	13
Ottawa Senators	38796	14
Boston Bruins	38236	11
Columbus Blue Jackets	37602	18
Nashville Predators	36971	12
New Jersey Devils	36271	12
New York Rangers	36089	17
Washington Capitals	35487	13
New York Islanders	35015	15
Philadelphia Flyers	34811	15
Buffalo Sabres	34201	15
Toronto Maple Leafs	33880	16
Pittsburgh Penguins	33660	17
Detroit Red Wings	33487	17

source: On the Forecheck blog, Dirk Hoag

- Stress is Everywhere
- Stress in Necessary for Improvement
- Stress is Unevenly Distributed
- Stress Affects Each Athlete Differently
- Stress is Something to Account For
- “Load” is the term used to quantify athletes' work
- “Recovery” offsets “Load” + Stress

2. Fatigue

Weekly Game Load Affects Win/Loss

Weekly Avg. Practice Load < 900

Win % = .800

Weekly Avg. Practice Load > 900

Win % = .428

source: Catapult Sports

- Intra-game, Intra-week, Intra-season
- Fatigue Leads to Poor Performance
- Fatigue = Overwork + Lack of Recovery
- Fatigue is a Choice

3. Data Capture

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OPEN ACCESS

Monitoring the athlete training response: subjective self-reported measures trump commonly used objective measures: a systematic review

Anna E Saw,[1] Luana C Main,[2] Paul B Gastin[1]

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[1]Centre for Exercise and Sport Science, Deakin University, School of Exercise and Nutrition Sciences, Burwood, Victoria, Australia
[2]Centre for Physical Activity and Nutrition Research, Deakin University, School of Exercise and Nutrition Sciences, Burwood, Victoria, Australia

Correspondence to
Anna E Saw, School of Exercise and Nutrition Sciences, Deakin University, 221 Burwood Highway, Burwood, VIC 3125, Australia;
anna.saw@deakin.edu.au

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ABSTRACT

Background Monitoring athlete well-being is essential to guide training and to detect any progression towards negative health outcomes and associated poor performance. Objective (performance, physiological, biochemical) and subjective measures are all options for athlete monitoring.

Objective We systematically reviewed objective and subjective measures of athlete well-being. Objective measures, including those taken at rest (eg, blood markers, heart rate) and during exercise (eg, oxygen consumption, heart rate response), were compared against subjective measures (eg, mood, perceived stress). All measures were also evaluated for their response to acute and chronic training load.

Methods The databases Academic search complete, MEDLINE, PsycINFO, SPORTDiscus and PubMed were searched in May 2014. Fifty-six original studies reported concurrent subjective and objective measures of athlete well-being. The quality and strength of findings of each study were evaluated to determine overall levels of evidence.

Results Subjective and objective measures of athlete well-being generally did not correlate. Subjective measures reflected acute and chronic training loads with superior sensitivity and consistency than objective measures. Subjective well-being was typically impaired with an acute increase in training load, and also with chronic training, while an acute decrease in training load improved subjective well-being.

Summary This review provides further support for practitioners to use subjective measures to monitor changes in athlete well-being in response to training. Subjective measures may stand alone, or be incorporated into a mixed methods approach to athlete monitoring, as is current practice in many sport settings.

INTRODUCTION

Training imposes stress on an athlete, shifting their physical and psychological well-being along a continuum that progresses from acute fatigue to overreaching, and ultimately overtraining syndrome.[1 2] While overreaching may be carefully incorporated into a periodised training plan, progression towards overtraining syndrome is undesirable. Athletes should be closely monitored to ensure training elicits the desired effects on athlete well-being and performance.[1–10]

Performance, physiological, biochemical and subjective measures are all options for athlete monitoring. There is currently a relatively poor understanding of which measures are most appropriate.[2] Performance is the ultimate indicator of physical and psychological well-being and the athlete's readiness to compete, yet it is impractical to test athletes daily via performance tests.[11]

A considerable body of research has investigated potential physiological mechanisms underlying the progression towards overtraining syndrome.[12–16] Hormonal, immune, inflammatory and haematological parameters along with cardiovascular responses have been proposed as markers of these mechanisms, however findings have been inconsistent. This has been attributed to factors such as intra-assay and interassay variability, intraindividual and interindividual variability, the influence of circadian and pulsatile rhythms, nutrition and hydration status, climate, psychosocial factors and particular exercise characteristics.[12 14 17–19] Whether markers are elevated or depressed may also depend on the position along the athlete well-being continuum, with proposed physiological mechanisms involving an initial heightened response that later becomes exhausted.[13–16]

While there remains debate on the specific physiological mechanisms underlying the progression towards overtraining syndrome, there is agreement that progression is associated with psychological signs such as mood disturbances and symptoms similar to clinical depression.[5 20] These signs and symptoms may be self-reported by athletes as perceived physical and psychological well-being, collectively termed 'subjective measures'. Subjective measures for routine athlete monitoring are also relatively cheap and simple to implement compared to objective measures. However, it is unknown whether subjective measures accurately reflect changes in athlete well-being, and how they can be effectively integrated into applied practice.[3]

Therefore, we systematically reviewed whether subjective measures accurately reflected changes in athlete well-being (as objectively measured by performance, physiological and biochemical indicators) and whether subjective measures were responsive to acute changes in training load, and chronic training.

METHODS

Search strategy

An electronic search was conducted using the Academic search complete, MEDLINE, PsycINFO, SPORTDiscus and PubMed databases. The complete search strategy is presented in table 1. Databases were searched from the earliest available record up to 5 May 2014, with results limited to humans and English language.

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source: British Journal of Sports Medicine

- Low Fidelity <=> High Fidelity
- Subjective <=> Objective
- What Matters: Well-being
- What Matters: Health
- What Matters: Readiness

4. Collaboration

Table 1

Incidence of injuries in men's and women's NCAA hockey players, from 2000/01 to 2006/07

	Group; incidence per 1000 athlete-exposures	
Time and setting of injury	**Men**	**Women**
Preseason practice	4.13	3.68
In-season practice	1.66	4.36
Postseason practice	0.80	1.07
Preseason game	21.03	8.35
In-season game	18.22	11.01
Postseason game	10.34	7.71

NCAA = National Collegiate Athletic Association.

source: Canadian Journal of Surgery, 2010 October; 53(5): 319–323

- Practice Injuries > Other Sports
- Athlete Compliance
- Habits
- Culture

5. Player Development = Injury Prevention

What is the performance cost of injury?

Over the past six years, teams with fewer injuries win more games.

source: Catapult Sports

- Injured Players Cannot Improve
- Recovery ~~Timeframes~~, Return to Play
- Player Development => Team Development