Implementing Sports Science into a RTP Model

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RESEARCH · EDUCATION · DEVELOPMENT

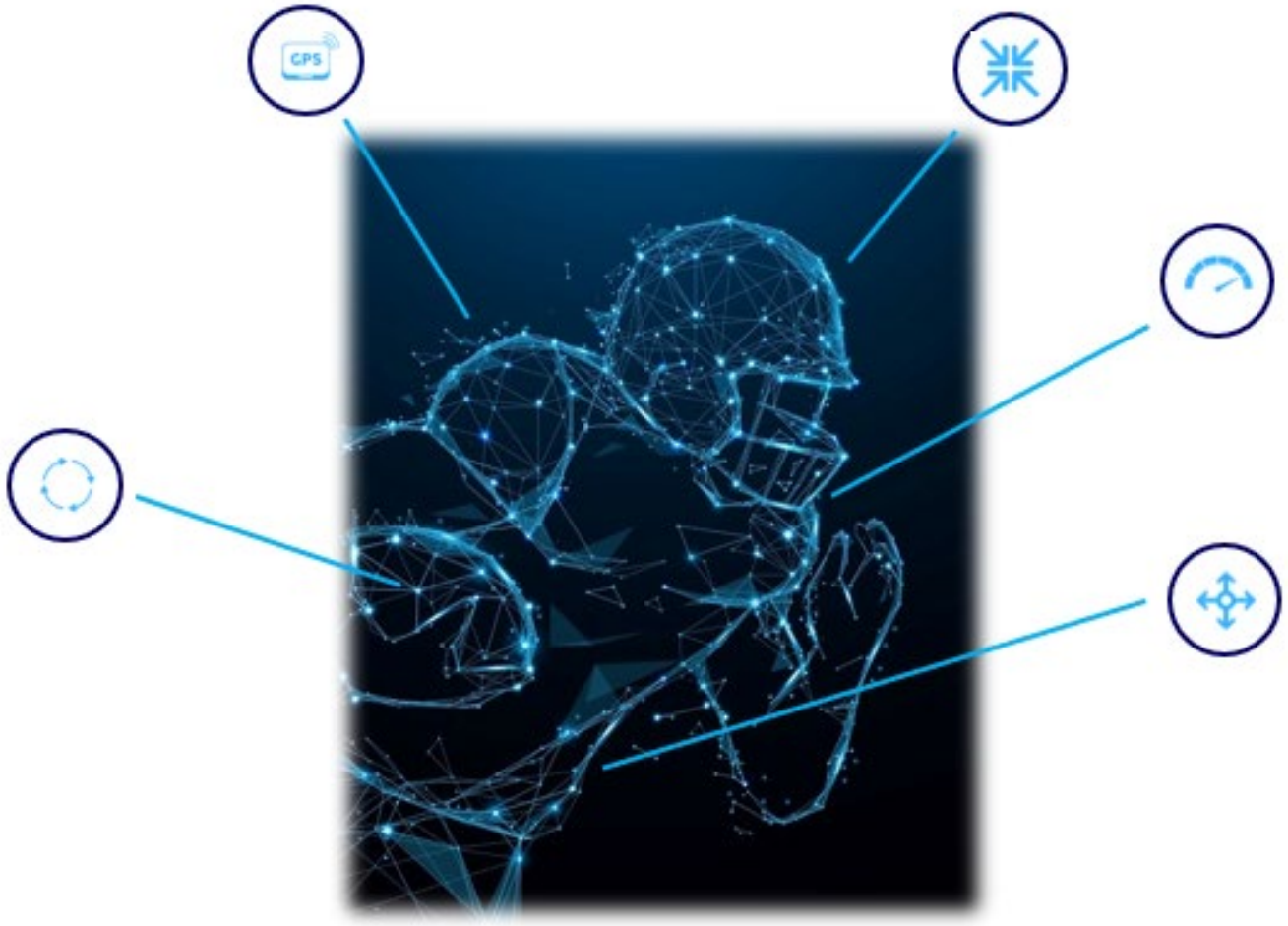
INCREDIWEAR

PFATS Foundation

- Sports Science – The What, How, and Why
- Process of Sports Science in RTP
- Implementing Tech and Metrics

Sports Science to Applied Sports Science

What?
Why?
How?



What We Think We Want

Sports Science Definition:

Sports science is the practice of using scientific methodology to gather information, analyze data, and implement interventions through a gained understanding to guide decisions that optimize player health and performance.

Sports Science Process

Review

Strategic Assessment of Risk and Risk Tolerance (StARRT) framework for return-to-play decision-making

Ian Shrier

Ian Shrier - 2021

Rehabilitation and Return to Sport in Athletes

The Return-to-Sport Clearance Continuum Is a Novel Approach Toward Return to Sport and Performance for the Professional Athlete

Pete Draovitch, D.P.T., S.C.S., Snehal Patel, M.P.T., S.C.S., William Marrone, D.P.T., S.C.S., M. Jake Grundstein, D.P.T, M.B.A., Reg Grant, C.A.T(C)., R.S.C.C.*E., Adam Virgile, M.S., C.S.C.S., Tom Myslinski, Asheesh Bedi, M.D., James P. Bradley, M.D., Riley J. Williams III, M.D., Bryan Kelly, M.D., and Kristofer Jones, M.D.

Pete Draovitch et al - 2021

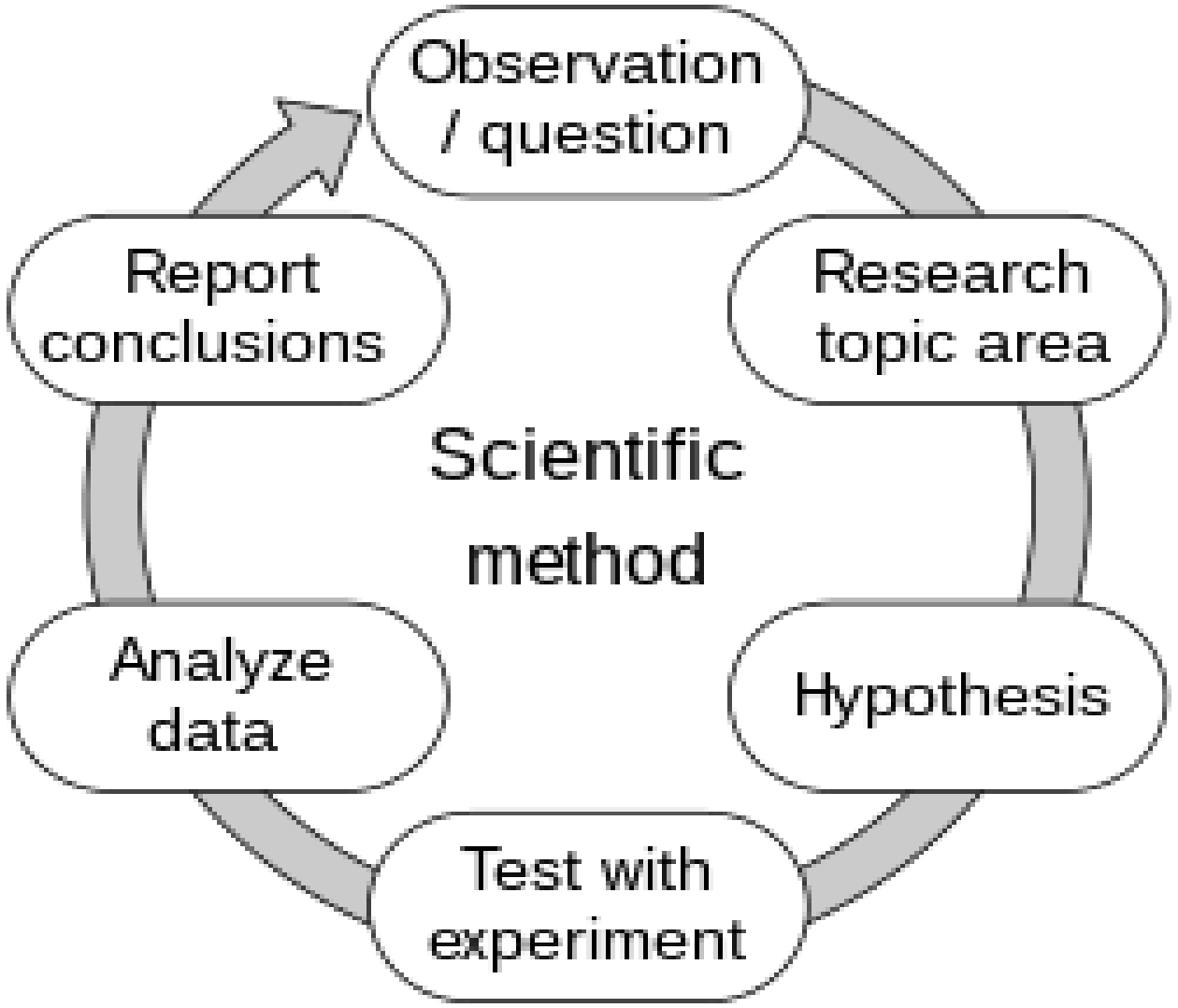
Br J Sports Med. 2019 Sep; 53(18): 1132–1136. PMCID: PMC6818668
Published online 2019 Feb 8. doi: 10.1136/bjsports-2018-100157 PMID: 30737202

Progressing rehabilitation after injury: consider the 'control-chaos continuum'

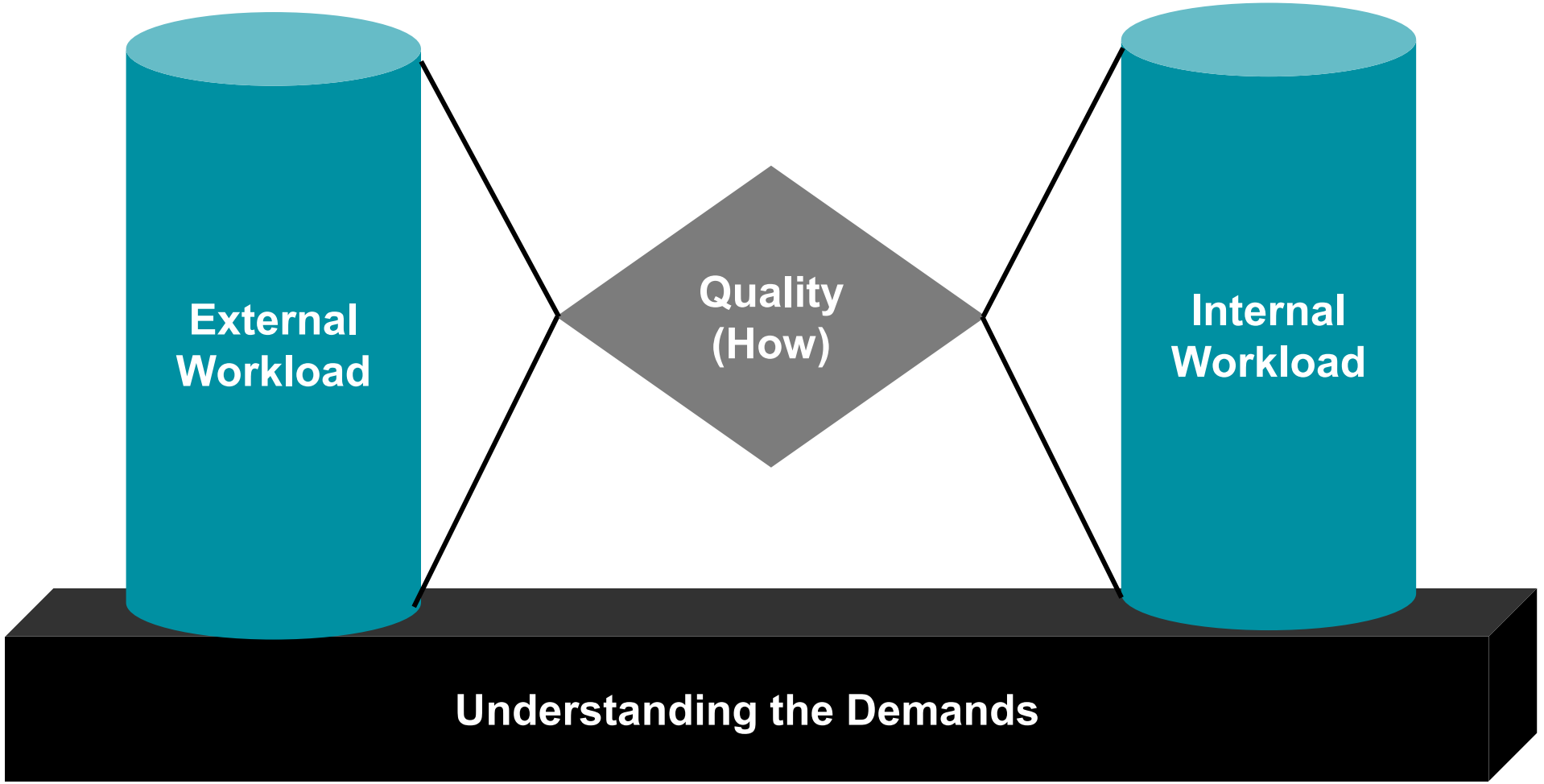
Matt Taberner,[1,2] Tom Allen,[3] and Daniel Dylan Cohen[4]

Journal Article

Matt Taberner et al - 2019



Foundational Components



External – Player Tracking

Technology/Metrics:

- GPS – (10Hz or higher)
- RFID – (12Hz or higher)
- Telemetry

- Matthias Hoppe et al – 2017 Aaron Coutts, Alan McCall, and Tim Gabbett

Concepts:

- Day and Week Progressions >15% increases injury risk
- Use sustained variables when possible
- Velocity Zones – Caution
- Notes: context of drill and identity of work

Change of Directions
Black Box Metrics

Acceleration Intensity
Deceleration Intensity
MPH
Accelerometers

MPH (sustained)
Distance
Efforts
Time
High Speed Yards

Validity and Reliability

External – Player Tracking

	Duration Min	Total Distance (yds)	Max Velocity	High Speed Dist (yds)	Accels	Decels
Full Practice	106	3337	17	125	7	9
75%	79	2503	13	94	5	7
50%	53	1668	9	63	3	5
Wed Team	57	1655	15	26	4	5
75%	43	1241	12	20	3	4
50%	28	828	8	13	2	3
7 on 7	11	329	12	6	0	0
75%	8	247	9	5	0	0
50%	5	164	6	3	0	0
Individual	11	462	11	1	2	2
75%	9	347	8	1	2	2
50%	6	231	6	1	1	1

Speed % Chart

	10 yds	15 yds	20 yds	25 yds	30 yds	35 yds	40 yds	45 yds	50 yds
7 mph	2.9	4.4	5.8	7.3	8.8	10.2	11.7	13.1	14.6
8 mph	2.5	3.8	5.1	6.4	7.7	8.9	10.2	11.5	12.8
9 mph	2.3	3.4	4.5	5.7	6.8	8	9	10.2	11.4
10 mph	2	3.1	4.1	5.1	6.1	7.2	8.2	9.2	10.2
11 mph	1.85	2.8	3.7	4.6	5.6	6.5	7.4	8.4	9.3
12 mph	1.7	2.55	3.4	4.3	5.1	6	6.8	7.7	8.5
13 mph	1.6	2.4	3.1	3.9	4.7	5.5	6.3	7.1	7.9
14 mph	1.5	2.2	2.9	3.65	4.4	5.1	5.8	6.6	7.3
15 mph	1.4	2	2.7	3.4	4.1	4.8	5.45	6.1	6.8
16 mph	1.3	1.9	2.55	3.2	3.8	4.5	5.1	5.75	6.4
17 mph	1.2	1.8	2.4	3	3.6	4.2	4.8	5.4	6
18 mph	1.1	1.7	2.3	2.8	3.4	4	4.5	5.1	5.7
19 mph	1.1	1.6	2.15	2.7	3.2	3.8	4.3	4.8	5.4
20 mph	1	1.5	2	2.6	3.1	3.6	4.1	4.6	5.1
21 mph	0.97	1.45	1.9	2.4	2.9	3.4	3.9	4.4	4.9

Times are in seconds

External – Force Plates

Technology/Metrics:
- Vald Force Decks
- Hawkins Dynamics
- Pasco
- Insoles

Jake Schuster et al - 2020 Chris Bishop et al – 2023 and Daniel Cohen.

Concepts:
- Program and Asymmetry Assessments
- Fatigue Testing – RSI and Ecc Duration
- RTP Testing - Specific to phase
- Biofeedback

Injury Legacy

Rate of Force Development
Peak vs. Avg.

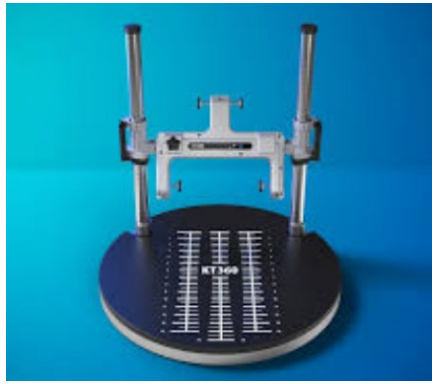
Force
Impulse
Eccentric Impulse
RSI
Peak Landing Force

Validity and Reliability

External – Isometrics

Technology/Metrics:
- Dynomometer
- Vald Force Frame
- Kanga Tech

Concepts:
- Body Part Specific Assessment
- Consistent Testing Design



Injury Legacy

Rate of Force Development
Peak vs. Avg.

Force
Impulse

Validity and Reliability

Quality

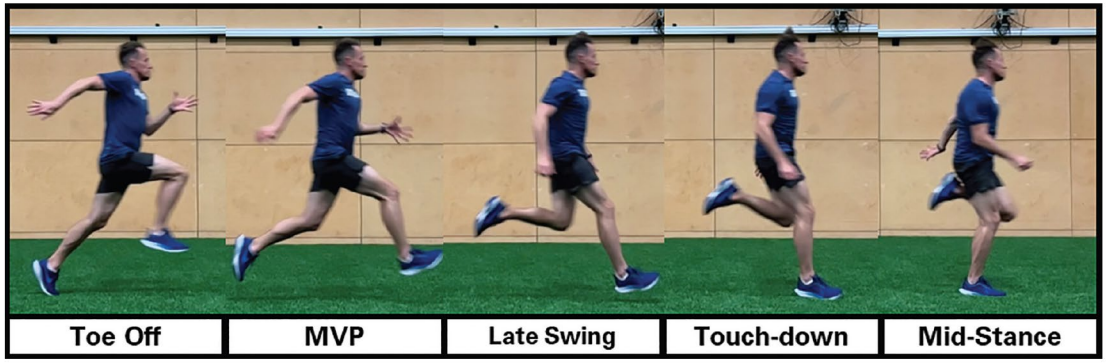
Technology/Metrics:

- Motion Capture
- Vue Motion
- Iphone and Go Pro

- Christopher Bramah - 2024

Concepts:

- ROM Assessment
- Understand the How (Kinematics)



Change of Directions

Acceleration
Linear Movements
Gross Movement Patterns

Biomechanical Assessments

Validity and Reliability

Internal Workload

Technology/Metrics:
- Polar
- Oura Ring
- HR and HRV

Foster et al. RPE and workload. Flatt et al.

Concepts:
- Understand effect of dose
- Create Data (RPE Workload and Communication of Soreness trends)

Time x RPE = Training Load

Energy Expenditure

Sleep Stages
Timing of HRV

Sleep Times
HR
HRV

Validity and Reliability

Take Home

- Start with Question
- Simple and Consistent Process
- What was performed, What was the Response, and How was it Performed.
- Refine Process

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