

SPECIAL ARTICLE

RETURN TO PLAY: Where are we going? It is not a guessing game



Ricard Pruna

F.C. Barcelona Medical Services, Barcelona, Spain

Received 14 December 2015; accepted 11 January 2016

Available online 26 March 2016

KEYWORDS

Return to play;
Recovery process;
Injury

Abstract Return to play is one of the most important key points within the recovery process of the injured player. It is essential to understand the RTP as a constant decision making process. RTP has to be understood as a dynamic and personalised process. The main objective has to be the absence of further re-injuries but not to exactly predict the RTP time.

There are a series of basic key points to fulfil within the process.

A correct diagnosis: A good diagnosis is the most relevant step in getting a correct RTP, it is really the first cornerstone.; Today in sports medicine practice many variables are still not taken into account when we talk about these injuries.

Strict control of workloads: Sport medicine doctors, are still using different concepts to define the RTP, without any consensus, although the most appropriate concept is the full availability for matches, because the training phase has to be understood as a part of the recovery process.

Apart from clinical exploration or MRI, a test on field assessed by GPS starts to be considered important by the medical and technical staff in personalising the progress of the injury and obtaining a trusted framework to validate the RTP and in the assessment, monitoring and management of workloads.

The objective is to acquire the INDIVIDUAL FIT PROFILE.

Intelligent management of modifiers: The rules of sports have a high influence and affect the return to play. Doctors have to be involved in the sport they are working in and have a deep knowledge of the environment to be able to manage intelligently the decisions made with a player, technical staff and coach.

Where are we going?: The BIG DATA concept is going to help us in future, because we will be able to share the medical experience between the doctors from different countries and use it to improve our knowledge specially in RTP criteria.

© 2016 Consell Català de l'Esport. Generalitat de Catalunya. Published by Elsevier España, S.L.U. All rights reserved.

E-mail address: ricard.pruna@fcbarcelona.cat

<http://dx.doi.org/10.1016/j.apunts.2016.01.001>

1886-6581/© 2016 Consell Català de l'Esport. Generalitat de Catalunya. Published by Elsevier España, S.L.U. All rights reserved.

PALABRAS CLAVE

Regreso al terreno de juego;
Proceso de recuperación;
Lesión

REGRESO AL TERRENO DE JUEGO: ¿hacia dónde nos dirigimos? No se trata de un juego de adivinanzas

Resumen El regreso al terreno de juego es uno de los aspectos más importantes dentro del proceso de recuperación del jugador lesionado. Es esencial comprender dicho regreso como un proceso constante de la toma de decisión. Debe entenderse como un proceso dinámico y personalizado. El principal objetivo ha de ser la ausencia de nuevas lesiones adicionales, no prediciendo de manera exacta el momento del regreso.

Existen una serie de puntos clave básicos, que hay que satisfacer dentro del proceso.

Diagnóstico correcto: El buen diagnóstico constituye el paso más importante a la hora del regreso, y es el concepto básico. Actualmente, en la práctica de la medicina deportiva siguen existiendo muchas variables que no se tienen en cuenta al hablar de dichas lesiones.

Control estricto de las cargas de trabajo: Los doctores en medicina deportiva continúan utilizando diferentes conceptos para definir el regreso al terreno de juego, sin consenso alguno, aunque el concepto más adecuado es la plena disponibilidad para la competición, ya que la fase de entrenamiento debe entenderse como parte del proceso de recuperación.

Aparte de la exploración clínica o la RM, el equipo médico y el técnico comienzan a dar importancia a la prueba in situ dirigida por GPS, para personalizar el progreso de la lesión y obtener un marco de confianza que valide el regreso al terreno de juego, y evaluar, supervisar y gestionar las cargas de trabajo.

El objetivo es adquirir el PERFIL INDIVIDUAL DE FORMA FÍSICA.

Gestión inteligente de los modificadores: Las reglas deportivas influyen y afectan grandemente al regreso al terreno de juego. Los doctores deben involucrarse en el deporte que manejan, y tener un amplio conocimiento del entorno, para poder manejar con inteligencia las decisiones tomadas por el jugador, el equipo técnico y el entrenador.

¿Hacia dónde nos dirigimos?: El concepto de GRANDES DATOS nos va a ayudar en el futuro, ya que podremos compartir la experiencia médica entre doctores de diferentes países, y utilizarla para mejorar nuestro conocimiento, especialmente en cuanto a los criterios del regreso al terreno de juego.

© 2016 Consell Català de l'Esport. Generalitat de Catalunya. Publicado por Elsevier España, S.L.U. Todos los derechos reservados.

Taking into account the latest scientific publications, the study of the RTP has made little progress, or even went in the wrong direction.¹⁻³ Today only few studies are addressing the situation properly and are focusing on the reality of football.^{4,5} Hence is mandatory to ask several questions:

In what way we are assessing the RTP today?

How should we understand the RTP process?

As a static step composed of a series of points to fulfil when the injured player reached the final injury recovery stage or as a constant decision making process?

To be honest the decisions we make from the beginning of the injury affects the final RTP criteria.⁶ The first decision conditions the next one and it turns into a network of decisions that imply a long process where the different variables interact. More specifically, which are these variables?

1. A correct diagnosis
2. A strict control of the workloads during the recovery process
3. An intelligent management of the sport risk modifiers and decision modifiers

Previously to describe in depth these variables, is important to state that RTP has to be understood as a dynamic and personalised process. The main objective has to be the absence of further re-injuries but not to exactly predict the RTP time, it is not a guessing game. During a dynamic process there are lots of different factors that interact modifying the final result.

A correct diagnosis

The biggest mistake in the RTP is the wrong diagnosis or misdiagnosis. It happens because of the incorrect and badly planned decisions about the injury and it has lots of influence in the final results.⁷

Let's analyse some aspects. What is the role of MRI in RTP?

It is agreed that MRI is not a useful tool in the final criteria of RTP,^{8,9} but it is very useful in the beginning.¹⁰ Related to sport medicine there are some injuries that have to be surgically treated immediately and if the clinicians are not skilled in interpreting the MRI and clinical symptoms, they will not be able to assure the correct healing of the injury and the final RTP prediction will be inaccurate.¹¹

A good diagnosis is the most relevant step in getting a correct RTP, it is really the first cornerstone. In sports medicine it is wrong to consider separating tools which are used in managing injuries. We cannot rely only on the MRI, or clinical symptoms or GPS separately, but what we need to do is, to consider all those as an important part in the decision making process. Otherwise each one loses importance when dealt with separately.

In reference to the diagnosis many variables are still not taken into account when we talk about these injuries. Anatomical variability or different healing processes of connective tissues^{12,13} (tendon, myotendon or fasciae¹⁴) are important factors to define a muscle injury.¹⁵

In this way has to be noted that the tendon healing¹⁶ occurs in a very different way to muscle repair.

Strict control of workloads

Today, so many concepts are used to define the RTP, several of them are:

- reaching a pre-injury level
- completion of a rehabilitation program
- full activity and availability for training selection

But the most appropriate concept in RTP definition¹⁷ is the full availability for matches, because the training phase has to be understood as a part of the recovery process.

Going further on the subject new questions arise.

What does the pre-injury level mean? Is it a point where one is 100% healthy?

Who can state that an individual in the pre-injury level was absolutely fine?¹⁸⁻²⁰

Often the pre-injury level was a part of a bad adaptation process that would mean that the player was already at risk.

Do we get injured because of the loss of strength? How does this loss occur?

Does it happen due to a training deficit? Wrong adjustment to competition? Or is it the preventive gym exercises an overload?

Customising loads today is the second cornerstone.²¹

Football has been evolving in an amazing manner in the last 6 years, and players had to adapt to the "new sport" quickly. Some strategies have become outdated. Most of exercises, included as a secondary prevention, do not have preventive effect and most of the time overloading the muscles. We have to start changing the concept of prevention. The new one has to be "adaptation". Muscle strain injury should not be understood as a mechanical disruption of healthy tissue, but as series of aberrant adaptive responses that, over time, will not allow the tissue to adapt to the increased loads and stress.

A static assessment of a player's skills, regardless of the specific sport environment is the new challenge we have to face.

Apart from clinical exploration or MRI, a test on field assessed by GPS²²⁻²⁴ starts to be considered important by the medical and technical staff in personalising the progress of the injury and obtaining a trusted framework to validate the RTP and in the assessment, monitoring and management of workloads. Technology to control workloads provides us lots

of data and we have to validate which is useful in determining the FIT PROFILE, which is the profile obtained by collecting data from every training and match when the player is absolutely healthy and in an optimal state.

There are different profiles within the team: with predominant acceleration, deceleration, or combinations of both. This implies different RTP's depending on the specific skills of the player.

The variables collected daily from trainings and matches will configure the state of the player, which the most important are accelerations, decelerations, high speed running (HSR), HML, sprints, and step balance. In this way we are able to know which are the individual player's characteristics, then we will get the main objective: the INDIVIDUAL FIT PROFILE.

During the recovery process we work with adapted circuits focused on the objective we want to reach, which they will be different whether the objective is the speed or strength.

Intelligent management of modifiers

The rules of sports have a high influence and affect the return to play, it is not the same playing handball, basketball or football because the rules of the sport are different and talking about the RTP it allows the players to be back earlier or later, or even be used partially.^{25,26}

For this reason we can assume that RTP criteria could evolve in parallel with the possible new rules in a near future.

Doctors have to be involved in the sport they are working in and have a deep knowledge of the environment to be able to manage intelligently the decisions made with a player, technical staff and coach, and the doctors acquired experience will totally depend on this knowledge.

Which is the future of RTP making decision process?

The BIG DATA concept is going to help us in future, because we will be able to share the medical experience between the doctors from different countries and use it to improve our knowledge specially the items used in RTP criteria.

Conclusions

1. The RTP making decision process should to be understood as a dynamic process, focus on avoiding re-injuries and not predicting the exact RTP time.
2. Technology helps us a lot today, it personalises the process of decision-making, and will do it even more in the near future, but the clinical experience is still very valuable and the knowledge of the environment of the sport we are working in as well.
3. We have to start considering possible new rules in football that could have influence on the RTP decision-making process, the same way we consider the modifiers.

Conflict of interest

Author declares that he does not have any conflict of interests.

References

1. Matheson GO, Shultz R, Bido J, Mitten MJ, Meeuwisse WH, Shrier I. Return to play decisions: are they the team physician's responsibility. *Clin J Sport Med.* 2011;21:25–30.
2. Creighton DW, Shrier I, Shultz R, Meeuwisse WH, Matheson GO. Return to play in sport: a decision-based model. *Clin J Sport Med.* 2010;20:379–85.
3. Miller MD, Arciero RA, Cooper DE, Johnson DL, Best TM. Doc, when can he go back to the game? *Instr Course Lect.* 2009;58:437–43.
4. Delvaux F, Rochcongar P, Bruyère O, Bourlet G, Daniel C, Diverse P, et al. Return to play criteria after hamstring injury: actual medicine practice in professional soccer teams. *J Sports Sci Med.* 2014;13:721–3.
5. Pedret C, Balius R. Lesiones musculares en el deporte. Actualización de un artículo del Dr. Cabot, publicado en *Apuntes de Medicina Deportiva en 1965.* *Apunts Med Esport.* 2015;50:111–20.
6. Orchard J, Best TM, Verrall GM. Return to play following muscle strains. *Clin J Sport Med.* 2005;15:436–41.
7. Heiderscheidt BC, Sherry MA, Silder A, Chumanov ES, Thelen DG. Hamstring strain injuries: recommendations for diagnosis, rehabilitation, and injury prevention. *J Orthop Sport Clin Ther.* 2010;4:67–81.
8. Petersen J, Thorborg K, Nielsen MB, Skjødt T, Bolvig L, Bang N, et al. The diagnostic and prognostic value of ultrasonography in soccer players with acute hamstring injuries. *Am J Sports Med.* 2014;42:399–404.
9. Moen MH, Reurink G, Weir A, Tol JL, Maas M, Goudswaard GJ. Predicting return to play after hamstring injuries. *Br J Sports Med.* 2014;48:1358–63.
10. Reurink G, Brilman EG, de Vos JR, Maas M, Moen MH, Weir A, et al. Magnetic resonance imaging in acute hamstring injuries: can we provide a return to play prognosis. *Sports Med.* 2015;45:133–46.
11. Reurink G, Goudswaard GJ, Tol JL, Almusa E, Moen MH, Weir A, et al. MRI observations and return to play of clinically recovered hamstring injuries. *Br J Sport Med.* 2014;48:1370–6.
12. Järvinen TA, Kääriäinen M, Järvinen M, Kalimo H. Muscle strain injuries. *Curr Opin Rheumatol.* 2000;12:155–61.
13. Danna NR, Beutel BG, Campbell KA, Bosco JA III. Therapeutic approaches to skeletal muscle repair and healing. *Sports Health.* 2014;6:348–55.
14. Silder A, Heiderscheidt BC, Thelen DG, Enright T, Tuite MJ. MR observations of long-term musculotendon remodeling following a hamstring strain injury. *Skeletal Radiol.* 2008;37:1101–9.
15. Garrett WE Jr. Muscle strain injuries. *Am J Sport Med.* 1996;24:S2–8.
16. Voleti PB, Buckley MR, Soslowsky LJ. Tendon healing: repair and regeneration. *Annu Rev Biomed Eng.* 2012;14:47–71.
17. Hallén A, Ekstrand J. Return to play following muscle injuries in professional footballers. *J Sport Sci.* 2014;32:1–8.
18. Müller U, Krüger-Franke M, Schmidt M, Rosemeyer B. Predictive parameters to return to pre-injury level of sport 6 months following anterior cruciate ligament reconstruction surgery. *Knee Surg Sports Traumatol Arthrosc.* 2014 [Epub ahead of print].
19. Tol JL, Hamilton B, Eirale C, Muxart P, Jacobsen P, Whiteley R. At return to play following hamstring injury the majority of professional football players have residual isokinetic deficits. *Br J Sports Med.* 2014;48:1364–9.
20. Askling C, Saartok T, Thorstenson A. Type of acute hamstring strain affects flexibility, strength, and time to return to pre-injury level. *Br J Sport Med.* 2006;40:40–4.
21. Opar DA, Williams MD, Shield AJ. Hamstring strain injuries: factors that lead to injury and re-injury. *Sports Med.* 2012;42:209–26.
22. Dogramac SN, Watsford ML, Murphy AJ. The reliability and validity of subjective notational analysis in comparison to global positioning systems tracking to assess athlete movement patterns. *J Strength Cond Res.* 2011;25:852–9.
23. Reid LC, Cowman JR, Green BS, Coughlan GF. Return to play in elite rugby union: application of global positioning systems technology in return to play running programs. *J Sport Rehabil.* 2013;22:122–9.
24. Dellaserra CL, Gao Y, Ransdell L. Use of integrated technology in team sports: a review of opportunities, challenges, and future directions for athletes. *J Strength Cond Res.* 2014;28:556–73.
25. Waters E. Suggestions from the field for return to sports participation following anterior cruciate ligament reconstruction: basketball. *J Orthop Sports Phys Ther.* 2012;42:326–36.
26. Verstegen M, Falsohne S, Orr R, Smith S. Suggestion from the field for return to sports participation following anterior cruciate ligament reconstruction: American football. *J Orthop Sports Phys Ther.* 2012;42:337–44.