



Quais os fatores que influenciam o desempenho de
jovens futebolistas em testes técnicos e táticos?

Projeto INEX

Lucas Gabriel da Costa Antony Moreira

Porto, 2021



Quais os fatores que influenciam o desempenho de jovens futebolistas em testes técnicos e táticos? Projeto INEX

Dissertação apresentada à Faculdade de Desporto da Universidade do Porto, com vista a obtenção do grau de Mestre em Ciências do Desporto, com especialização em Treino Desportivo para Jovens (Decreto lei nº 74/2006, de 24 de Março, alterado pelo decreto lei nº107/2006 de 25 de Junho e pelo decreto lei nº 230/2009 de 14 de Setembro)

Orientador: Professor Doutor Daniel Barreira

Coorientador: Professor Doutor João Cláudio Machado

Lucas Gabriel da Costa Antony Moreira

Porto, 2021

Ficha de Catalogação

Moreira, L. G. (2021). *Quais os fatores que influenciam o desempenho de jovens futebolistas em testes técnicos e táticos? Projeto INEX*. Porto: L. G. Moreira. Dissertação para obtenção do grau de Mestre em Treino de jovens, apresentada à Faculdade de Desporto da Universidade do Porto.

Palavras-chave: PERFORMANCE INDIVIDUAL; FUTEBOL; AVALIAÇÃO; TESTES; JOVENS

Agradecimentos

Tenho sangrado demais, tenho chorado pra cachorro. Ano passado eu morri, mas esse ano eu não morro!

Agradeço, primeiramente, a Deus e a Nossa Senhora, por me possibilitarem estar vivo, com saúde e lutando pelos meus sonhos.

Aos meus pais, por tudo. Vocês são tudo para mim. Minha base, minha força.

À minha tia Das Dores, por tudo. O mundo seria melhor se as pessoas tivessem um pouco da sua bondade.

À Karina por todo companheirismo, afeto e carinho. Foram tempos difíceis e, juntos, continuamos a superar as dificuldades. Cada momento ao teu lado é mágico e repleto de amor.

Ao Prof. Daniel Barreira, primeiro por ter aceitado o convite para me orientar nesse trabalho. Seus ensinamentos e conselhos, dentro e fora de sala, foram essenciais para minha formação pessoal, profissional e acadêmica. Consigo, saí da minha zona de conforto e fui buscando crescer cada vez mais. Obrigado pela paciência, disponibilidade e contributos para me guiar neste longo processo.

Ao Prof. João Cláudio, pela sua coorientação, mesmo após o fim da graduação. Sua alta exigência e cuidado ao revisar cada pormenor elevaram o nível deste trabalho, fazendo com que eu crescesse como acadêmico. Também ressalto a paciência que teve comigo durante o longo processo. Muito obrigado.

Ao Prof. Filipe Grilo, pela incrível humildade e disponibilidade para me guiar numa parte fundamental do trabalho. Sem a sua ajuda, não seria possível finalizar essa etapa, já que minhas dúvidas não acabavam nunca. Não sei nem como agradecer.

A Universidade do Porto, especificamente a FADEUP, onde pude ter aula com professores referências na minha área, participar de projetos, conviver com

diferentes culturas e aprender imenso. Fico feliz de ter estudado em uma das melhores universidades do mundo.

Aos meus amigos, os melhores, por partilharem todos os momentos comigo. Sejam eles de alegria, tristeza ou luta. O meu muito obrigado. É impossível citar todos, mas fica minha gratidão aos “soldados da resi”, os manauaras, os brasileiros que conheci por aqui e, também aos portugueses que me acolheram no país. Um agradecimento especial ao Rafa Marques, meu irmão. Viiiic, minha amiga, conseguimos!

Ao Rio Ave FC, por ter aberto suas portas, fazendo com que eu crescesse e aprendesse bastante. Um obrigado especial aos treinadores Eduardo Bragança e Francisco Barbosa, por terem me recebido tão bem na equipa técnica.

Ao AD Alcorcón (ESP), por haber confiado em mi trabajo, mismo cuando mi español no era el mejor. La oportunidad de convivir con gente tan inteligente, que ve fútbol de una forma diferente de la mía, fue sin duda in diferencial en mi formación. Muchíissimas gracias Josele, Víctor, Joni, Alex y a todos los entrenadores. Fue increíble. Hasta el último minuto, siempre.

Ao SC Braga, **por tudo**. Aos coordenadores, treinadores, membros do GOA, jogadores e todo staff do clube. O aprendizado é diário. Palavras são poucas para mostrar minha gratidão. Um agradecimento especial aos membros da minha equipa técnica: Fábio Santos, Francisco Oliveira, Rafael Pereira, João Miranda, Miguel Gonçalves e Ricardo Silva. Obrigado pela paciência, bem como o excelente ambiente que criamos para desenvolver o nosso trabalho.

Uma dedicação aos familiares e amigos que perdi nesses tempos para a covid-19. Especialmente à minha avó, Maria Costa, minhas tias Luíza, Chiquinha e Maninha, ao meu primo Alex. Vocês fazem parte disso.

Várias famílias no mundo todo, especialmente em Manaus, assim como eu, lidaram e lidam com a dor da perda a cada dia. Fiquem com minhas orações, meus sentimentos e meu luto.

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Resumo

O presente estudo teve como objetivo por objetivo geral investigar quais fatores influenciam o desempenho de jovens futebolistas em testes técnicos e táticos, Para a concretização dos objetivos, a dissertação foi organizada em dois capítulos. No estudo 1, o objetivo específico foi identificar se a maturação biológica e o tempo de prática afetavam o desempenho de jovens futebolistas, em testes técnicos e táticos. Ao total, 203 futebolistas portugueses, entre 11 e 14 anos, estiveram no estudo. O desempenho técnico foi avaliado através do Protocolo de Avaliação de Habilidades no Futebol da Universidade de Queensland. Para a avaliação do comportamento tático do jogador, foram utilizados dois instrumentos: o Sistema de Avaliação Tática no Futebol (FUTSAT) e a fórmula Golden Index, em um jogo reduzido de GR+4v4+GR, durante 20 minutos (10min+10min). A maturação biológica foi capaz de prever o teste de drible em velocidade e passe longo 35m no escalão U12 e U13, respectivamente. Já o tempo de prática foi capaz de prever o teste de passe dinâmico, no ângulo de 90 graus no escalão U12, o teste de passe longo 35m e teste de toques no escalão U13, além do teste de passe curto 20m no escalão U14. No teste tático, o tempo de prática foi capaz de prever o desempenho na ferramenta de avaliação FUT-SAT. Já no segundo artigo, o objetivo específico foi compreender o tempo necessário para que os jogadores apresentassem todo seu potencial tático, apenas utilizando os testes táticos citados no artigo 1 Ao todo, 104 jovens futebolistas portugueses foram avaliados ($14,64 \pm 0,27$), também em um jogo reduzido nos moldes do artigo 1. Os 20 minutos foram divididos em 5 partes de 4 minutos cada (4, 8, 12, 16 e 20 minutos). Não foi possível encontrar o momento perfeito para avaliar jogadores, visto que a performance não estabiliza. Inúmeros fatores parecem afetar o desempenho durante as avaliações, pelo que emerge a necessidade dos treinadores em entender o contexto e avaliá-los com intuito de desenvolvê-los, e não utilizar as avaliações para excluir jogadores do processo.

PALAVRAS-CHAVE: PERFORMANCE INDIVIDUAL; FUTEBOL; AVALIAÇÃO; TESTES; JOVENS

Abstract

This study aimed to investigate which factors influence the performance of young soccer players in technical and tactical tests. To achieve the objectives, a dissertation was organized in two chapters. In study 1, the specific objective was to identify whether biological maturation and time practice affected the performance of young soccer players in technical and tactical tests. In total, 203 Portuguese footballers, between 11 and 14 years old, were in the study. Technical performance was assessed using the University of Queensland Football Skills Assessment Protocol. To assess the player's tactical behavior, two instruments were used: the Soccer Tactical Assessment System (FUT-SAT) and the Golden Index formula, in a small-sided game of GK+4v4+GK, for 20 minutes (10min+10min). Biological maturation was able to predict the dribble test in speed and 35m long pass in U12 and U13 categories, respectively. The time practice was able to predict the dynamic pass test, at a 90-degree angle in the U12 category, the 35m long pass test and the juggling test in the U13 category, in addition to the 20m short pass test in the U14 category. In the tactical tests, time practice was able to predict performance in the FUT-SAT assessment tool. In the second article, the specific objective was to understand the time needed for players to present their full tactical potential, only using the tactical tests mentioned in article 1. In all, 104 young Portuguese footballers were evaluated (14.64 ± 0.27), also in a small-sided game along the lines of article 1. The 20 minutes were divided into 5 parts of 4 minutes each (4, 8, 12, 16 and 20 minutes). It was not possible to find the perfect moment to evaluate players, as the performance does not stabilize. Numerous factors seem to affect performance during assessments, so that coaches need to understand the context and assess them in order to develop them, and not use assessments to exclude players from the process.

KEYWORDS: INDIVIDUAL PERFORMANCE; SOCCER; ASSESSMENT TESTS; YOUTH.

“É necessário sempre acreditar que o sonho é possível. Que o céu é o limite e você, truta, é imbatível. Que o tempo ruim, vai passar, é só uma fase. **Que o sofrimento alimenta mais a sua coragem**”

Capítulo 1

Introdução Geral

Introdução Geral

Podemos entender e tratar o futebol como uma visão sistêmica, com suas partes interagindo entre si de maneira não-linear, em diferentes níveis, permitindo-nos classificá-lo como um fenômeno complexo (Morin, 1995; Garganta & Silva, 2000; Capra, 2001). Portanto, as equipes de futebol podem ser consideradas sistemas dinâmicos, pois possuem comportamentos coletivos com um objetivo de conservar a bola, criar situações de finalização e marcar gols, e em constante relação de cooperação e oposição ao adversário (Queiroz, 1983; Von Bertalanffy, 1968; Garganta & Pinto, 1998; Duarte et al., 2013).

Por se tratar de desporto de sistema aberto (Castelo, 1992), no qual a ação desencadeada pelos intervenientes muda a relação entre os diferentes subsistemas, Garganta (1995) defende a adoção de uma permanente atitude tática, priorizando comportamentos adequados e em função dos diferentes problemas que o jogo apresenta. A tática gera e conduz todo o processo de jogo, desse modo, os jogadores e equipes encontrarão problemas de natureza tática. Logo, a tática não deve ser entendida através de uma lógica reducionista, pelo contrário, é a dimensão unificadora que dá sentido e lógica às outras dimensões (Oliveira, 2004).

A abordagem da dinâmica ecológica integra a teoria dos sistemas dinâmicos e da psicologia ecológica, ao classificar a aprendizagem motora como uma escala ecológica (Seifert et al., 2019). De acordo com a abordagem, é importante perceber de que maneira as restrições de ambiente modelam o acoplamento informação-ação durante a aprendizagem no decorrer do processo (Davids et al., 2017). Para Araújo et al., (2005), o êxito está quando o indivíduo, com suas restrições de percepção e capacidade de ação, consegue entender as informações no ambiente e selecionar as ações corretas, cumprindo seu objetivo.

Afinal, por estar presente em uma modalidade de alta imprevisibilidade e alternância nas ações, onde são tomadas inúmeras decisões durante o jogo (Garganta, 2009), o desenvolvimento de talentos é entendido como um processo dinâmico. Nele, os atletas e o ambiente estão intimamente conectados através de constantes interações, em que o jogador terá de se adaptar a um conjunto dinâmico de restrições para alcançar os objetivos da tarefa (Davids et al., 2017)

Ainda do ponto de vista individual, o jogador deve explorar um conjunto de constrangimentos para melhor ajustar suas ações aos problemas que emergem no

jogo (Araújo & Davids, 2016). E por se tratar de sistemas dinâmicos, as equipes são consideradas sistemas sociais, com elevado número de partes interagindo entre si (Woods et al., 2020). Possuem capacidade de espontaneidade e auto-organização e, ao coordenar seus movimentos, que emergem de forma dinâmica com o ambiente, a tarefa e os indivíduos, geram possibilidades de ação (*affordances*), surgindo e desaparecendo infinitas vezes ao longo do jogo (Araujo & Davids, 2011; Aquino et al., 2019).

A detecção, seleção e desenvolvimento de talentos é um tema debatido no mundo inteiro (Paoli & Soares, 2008), no campo acadêmico ou profissional. Nesse sentido, o jogador talentoso é compreendido como um jogador que possui habilidades motoras, técnicas, físicas, intelectuais e emocionais acima da média. Na mesma linha de pensamento, Weineck (1999) e Lanaro Filho e Bohme (2001) alertam para o fato de que o talento necessita de um ambiente propício para que ele possa se desenvolver, principalmente através dos estímulos durante o treino.

Acredita-se que o desenvolvimento do talento é atualizável e que depende de inúmeras condicionantes que vão além do treino, como oportunidades de prática e o bom relacionamento com a comissão técnica (Henriksen, Stambulova & Roessler, 2011; Larsen et al., 2013). Côté, Baker e Abernethy (2003) vão além, e defendem que a prática de outras modalidades trará um *transfer* positivo para a modalidade escolhida no futuro, já que aumentará o repertório motor, a criatividade e a inteligência do indivíduo para solução dos problemas encontrados no jogo.

Em estágios iniciais da infância, os autores ainda alertam para a importância do jogar para as crianças se desenvolverem, através de jogos que proporcionem mais diversão, com a adaptação das regras feita por crianças ou adultos, de esportes. Já uma maior motivação para a prática (Côté, 1999; Côté & Hay, 2002). Os jogos desportivos coletivos, de acordo com Garganta (1995), são um ambiente com múltiplas oportunidades para seus praticantes, estimulando o desenvolvimento de uma formação global, ao trabalhar componentes táticas, técnicas, físicas e psicológicas de maneira integrada.

São inúmeros os estudos encontrados na literatura acerca da identificação e promoção de talentos (Deprez et al., 2015; Menegassi et al., 2015; Rossing, Nielsen & Karbing, 2016; O'Connor, Larkin & Williams, 2016; Till & Baker, 2020). No entanto, a temática abrange diversos aspectos que acabam por ser privilegiados. Johnson,

Farooq & Whiteley (2017) identificaram que a maturação biológica está associada com a escolha de jogadores considerados mais talentosos em academias de elite na Inglaterra e no Catar. Na mesma linha de pensamento, Deprez et al., (2015) investigaram jogadores considerados de alto nível dos 8 aos 18 anos e atentaram para o fato de que até os 17 anos, os que apresentam capacidades físicas superiores são selecionados para posições ofensivas.

Todavia, Emmonds et al., (2016) atentam para as descobertas de seu estudo, ao estudar jogadores ingleses de academias de elite que assinam contrato profissional, em relação aos que não assinam, perceberam que a diferença entre eles em testes de velocidade e resistência utilizados para os diferenciar existe, mas é mínimo

Com intuito de avaliar, classificar e identificar jovens talentos, muitas federações e equipes pelo mundo utilizam protocolos multidisciplinares, com ênfase na componente técnica e física (Vaeyens et al., 2006; LeGall et al., 2010; Huijgen et al., 2014; Honer et al., 2015; Aquino et al., 2017). Porém, muitas das vezes, sobrevalorizando o desempenho técnico realizado de forma analítica.

Isolando a variável técnica, realizaram uma bateria de testes que avaliavam a precisão do passe longo de maneira analítica para distinguir 21 jogadores considerados de elite em relação a 7 jogadores que não eram considerados de elite. O resultado comprovou que o desempenho dos identificados como de elite foi superior. Por sua vez, Wilson et al., (2016), ao criarem uma bateria de testes técnicos e aplicá-los com 40 jogadores entre 13-18 anos de uma academia, perceberam que o desempenho evolui de acordo com a idade nos escalões, mas que não eram diferenças significativas. Portanto, é possível fazer a identificação de talentos de quem apresenta resultados acima da média geral dos jogadores.

O grande problema é que, na maioria dos protocolos, a lógica interna do jogo é desrespeitada. Bateria de testes técnicos analíticos com exercícios pouco representativos para o futebol, a utilização das medidas para explicar o desempenho como algo objetivo, fechado, desrespeitando a complexidade e o contexto das ações realizadas pelo jogador (Ali, 2011; Bergkamp et al., 2019) são uma das maiores críticas. Por se tratar de uma modalidade de alta imprevisibilidade e aleatoriedade, em que as ações não podem ser estandardizadas, não existem valores pré-determinados para se atingir, em contraste a modalidades individuais de cadeia

fechada, como a natação e o atletismo (Garganta, 1999; Reilly, Williams & Frank, 2000). Por fim, os jogos reduzidos têm se mostrado uma ferramenta mais fidedigna para a identificação de talento, pois são um ambiente mais próximo ao encontrado no jogo (Fenner, Iga & Unnithan, 2016; Bennet et al., 2017; Sorensen, Sorensen & Dalen, 2021).

Ao avaliar a componente tática, pesquisadores buscaram alternativas para compreender a performance dos jogadores em jogo. Com objetivo de dar informações mais fidedignas aos treinadores, Teoldo et al., (2010) criaram o Sistema de Avaliação Tática no Futebol (FUT-SAT) para avaliar os princípios táticos operacionais em um jogo reduzido de 3v3, possibilitando o entendimento do comportamento do jogador. Através do FUT-SAT, Gonçalves, Rezende & Teoldo (2015) identificaram que defensores e meio campistas da categoria sub17 possuem maior conhecimento tático processual ofensivo do que defensivo.

Wilson et al., (2021) também em um 3v3, criaram uma métrica com os gols marcados por cada jogador, gols marcados por companheiros de equipe, gols sofridos e gols líquidos por jogo para avaliar os jogadores. Pereira, Ribeiro, Grio & Barreira (2019) desenvolveram a fórmula *Golden Index*, com intuito de mensurar o nível de importância do jogador para sua equipe em fase ofensiva, através de métricas individuais e da análise de redes para jogos oficiais. Por fim, Ferreira et al., (2020) desenvolveram o *Defensive Golden Index*, com intuito de perceber o nível de importância do jogador para sua equipe em fase defensiva. Ambos idealizados para jogos oficiais, sem terem sido utilizados para identificação de talentos. Portanto, é essencial que a ecologia dos testes seja respeitada.

1.1. Problema

Partindo do pressuposto que inúmeras variáveis influenciam a formação de jovens futebolistas, principalmente em idades mais jovens, o olhar do treinador pode ser enviesado. Questões como maturação biológica, efeito da idade relativa, tempo de prática, vivência em outros esportes, apoio familiar, entre outros, afetam diretamente o desenvolvimento destes jovens futebolistas fazendo com que ganhem maior, ou menor atenção dos treinadores, tenham mais minutos em jogos oficiais ou até sejam identificados para jogarem em outros clubes. Portanto, inúmeros atletas acabam por

ficar pelo caminho, já que o processo de formação não é linear, sendo preteridos pelos que estão em um estágio de desenvolvimento a frente. Inúmeras federações, clubes e escolas de futebol enfrentam o problema, já que mesmo em idades mais jovens, muitas vezes o ganhar fica na frente do formar, não oportunizando suficientemente todos os jogadores.

1.2. Objetivos

O objetivo deste trabalho visou investigar sobre o processo de formação de jovens futebolistas e a importância, ou não, dos testes para compreender o estágio de desenvolvimento deles. Portanto, o objetivo geral da dissertação buscou investigar quais fatores que interferem nos resultados dos testes técnicos e táticos, e os objetivos específicos:

- Analisar se os resultados testes técnicos e táticos são influenciados por fatores maturacionais e tempo de prática;
- Analisar qual o melhor momento, em testes táticos, para avaliar todo o potencial tático dos jogadores.

1.3. Estrutura da dissertação

Essa dissertação foi dividida em 6 capítulos:

- 1) O primeiro capítulo será composto pela Introdução Geral, sendo realizada uma revisão geral e sucinta da literatura, reforçando a importância dos temas levantados na problemática da pesquisa.
- 2) No segundo capítulo, serão inseridos os estudos apresentados em formato de artigo científico. O primeiro estudo busca entender como o efeito da maturação biológica e o tempo de prática afetam o desempenho de jovens futebolistas, de diferentes idades, em testes técnicos e táticos.
- 3) No terceiro capítulo e no segundo artigo desta dissertação, buscamos perceber qual o melhor momento para avaliar o potencial tático total dos jogadores.
- 4) No quarto capítulo, emerge a necessidade da discussão geral, apresentando os principais achados deste trabalho, oriundo dos dois artigos,

fundamentando o debate sobre a importância da avaliação no processo de desenvolvimento de jovens futebolistas.

5) No quinto capítulo, apresentaremos as conclusões e principais achados deste trabalho, bem como sua aplicabilidade prática e limitações.

6) No sexto capítulo, serão apresentadas as referências.

Tabela 1. Capítulos da dissertação

1	Introdução, Problema, objetivos e estrutura da dissertação
2	Estudo 1: Do time of practice and biological maturation affect influence youth soccer players' tactical and technical performance using different assessment tools? The INEX Project
3	Estudo 2: Is it possible to find the perfect moment to assess players, using different assessment tools in a Small-Sided Game? - The INEX Project
4	Discussão Geral
5	Conclusões, aplicabilidade prática e limitações do estudo
6	Referências

“Eu sei, **cansa**, quem morre ao fim do mês, **nossa grana ou nossa esperança?**
Delírio é equilíbrio, entre nosso martírio e nossa fé. Foi **difícil** contar migalhas nos
escombros, lona preta esticada, enxada no ombro e nada vim, nada, enfim, recria,
sozinho, com a alma cheia de mágoa e as panelas vazias”

Capítulo 2

Artigo I

Estudo 1

Do time of practice and biological maturation influence soccer players' tactical and technical performance in different assessment tools? The INEX Project

Autores

Lucas Gabriel Moreira; João Cláudio Machado,

Daniel Barreira; Outros autores a definir.

A submeter

A definir

Study I: Do time of practice and biological maturation effect youth soccer players' tactical and technical performance using different assessment tools? The INEX Project

Abstract

This study aimed to investigate if and how the time of practice and biological maturation affects youth players' performance using different technical and tactical assessment tools. In total, 203 Portuguese youth soccer players participated in the study (U15: 57; U14: 54; U13: 53; and U12: 39 players). To assess the technical performance the University of Queensland Soccer Skills Assessment Protocol was used, and the System of Tactical Assessment in Football (FUT-SAT) and the Golden Index formula were used to evaluate players' tactical performance in a Gk+4x4+Gk Small-Sided Game (SSG). A multiple linear regression analysis was performed to perceive if the variables time of practice and biological maturation were able to predict players' technical and tactical performance. We adopted $p < .05$ as level of significance. It was possible to observe that the biological maturation was able to predict the performance in the ball speed (U12: $p = .02$) and 35m long pass (U13: $p = .03$) tests. The time of practice was able to predict the players' performance in short pass with reception at 90° (U12: $p = .03$), in 35m long pass (U13: $p = .00$), in juggling (U13: $p = .03$) and in pass 20m tests (U14: $p = .05$). Time of practice was also able to predict players' tactical performance in the SSG ($p = .01$). We concluded that the time of practice and biological maturation influence players' technical performance in tests that require greater ball control, accuracy, and speed, not influencing in tests that require strength and corporal profiling. Then, time of practice affects players tactical performance in representative game environment.

Keywords: Soccer, Small-sided games, Individual Performance, Time of practice, Biological Maturation; Assessment tools

Introduction

Talent identification is the process of recognizing players considered to have the potential to become elite players and is a topic of considerable relevance in the literature, even though the definition of the term “talent” is still controversial over sport and academic experts (Larkin & Reeves, 2018). In this perspective, talent identification can be understood as the ability to predict a possible future success for youth players based on their current performance, understanding that is a long process of development, consisting of a continuous process of adaptations to improve the success of motor behavior (Deprez et al., 2015; Vaeyens, Lenoir & Williams, 2008, Savelsbergh & Wormhoudt, 2019). To Sarment et al., (2018), talented players tend to be taller, heavier, more advanced skeletal maturation and scored better in tests and present more tactical skills. In young players, researchers seek to better understand which factors lead to the development of youth players, to help them to improve their performance and achieve excellence in soccer (Clarke et al., 2018; Hoare & Warr, 2000; Unnithan et al., 2012; Williams & Reilly, 2000). In addition, soccer clubs and youth academies are in constant searching for knowledge that contributes to the identification and monitoring of promising soccer players, since those players can generate economic returns in future sales (Mann, Dehghansai, & Baker, 2017).

Identifying promising players is important, but it is also necessary to provide training environment to improve their performances (Davids et al, 2013; Davids et al., 2017). According to ecological dynamics theoretical approach, since talent is considered as a complex adaptive system that will develop through a dynamic and nonlinear process, it is crucial to better understand how individual, tasks and environmental constraints affects players capacity to solve game problems in a functional way (Davids et al., 2015; Sarmento et al., 2018; Seifert et al., 2018). These information might help coaches to better design and evaluate training environments in an attempt to enhance players learning and performance. In this perspective, several performance assessment tools were proposed to better monitor players performance during the long pathway to achieve higher performance in soccer, even without the lack of evidence that is necessary to specialization before puberty for most sports (Jayanathi et al., 2013). Ribeiro et al., (2021) warn us about the term talent

identification or development, and if we insist on identifying, it is necessary to look for ways to identify in children, so that they can be developed.

Understanding the importance of technical and tactical development, it is possible to find in literature several protocols to assess players' technical and tactical performance (Vaeyens et al., 2006; Wilson et al., 2016; Rowat, Fenner & Unnithan, 2016; Menegassi et al., 2018). Therefore, much of these assessment tools have been used through players' development process in an attempt to identify and monitor promising players. However, it is necessary to better understand how some factors might affect players' performance in evaluations using these tests, as well as mask the findings, which can influence coaches and other agents decision-making concerning to the planning of training sessions and talent identification and selection.

In this perspective, several researches investigated how biological maturation and time of practice influence players' performance at training and competitive environments. According to Abarghoueinejad et al., (2021), these two variables have great impact on development of young players. Though, Rees et al. (2016) highlighted the importance of including biological maturation in talent identification and selection processes due to their relevance for performance. However, biological maturation needs to be analyzed carefully, since their changes during puberty are significant, making it difficult the forecast until adulthood (Pearson et al., 2006). In fact, it is a factor that can bias the selection process having a direct influence on players' choice and their positions on the field. Since some of the positional status probably require more strength, speed and agility, e.g. goalkeepers and central backs (Malina & Koziel, 2014; Ostojic et al., 2014; Deprez et al., 2015; Towlson et al., 2017), maturation can induce some preconceptions.

Moreover, time of practice emerges as an important indicator for superior performance in soccer. An early formal or informal practice, and even in other sports, induce advantages in achieving success in professional soccer, but it can also lead to over-use injuries and even abandonment of the sport. (Williams & Davids, 1995; Cotê, Baker & Abernethy, 2007; Ford et al., 2009; Haugaasen & Jordet, 2012; Hendry & Hodges, 2018; Ribeiro et al., 2021). Davids et al. (2017) highlighted two different pathways to achieve excellence in sport context, the early specialisation, which believes that the earlier he starts playing the sport in specific, the more beneficial it

will be; and the initial diversification that benefits of practicing several sports in both structured (i.e., adult-led activities) and unstructured (i.e., child-led activities) environments for achieving excellence in sport. However, regardless of the pathway to be used, the quantity and quality of accumulated practice throughout the players' development process is essential for them to achieve excellence in soccer. Hence the importance of stimulating deliberate play, diversification and physical literacy proposed by non-linear pedagogy at younger ages, to work on creativity, helping players to find different ways to solve problems during the game (Santos et al., 2016).

Therefore, this study aimed to investigate if time of practice and biological maturation affects youth players' performance in technical and tactical evaluations using distinct assessment tools. We consider as hypothesis in this study that the performance of younger players is affected by biological maturation and time of practice in technical and tactical tests. With this information, it will be possible to better manage the use of these instruments throughout players' development, as well as to better interpret the results that will substantiate the planning of the training sessions, as well as the talent identification and selection processes.

Methods

Participants

In total, 203 players participated in the study. In the technical tests, the sample consists of 203 players: U15 ($n=57$: $15,47 \pm 0,26$), U14 ($n=54$: $14,54 \pm 0,27$), U13 ($n=53$: $13,51 \pm 0,13$), and U12 ($n=39$: $12,50 \pm 0,38$). In the tactical tests, 57 players ($14,64 \pm 0,27$) were selected to play a GK+4x4+GK Small-Sided Game (SSG).

Data used in this study results from INEX project (In search of excellence: A mixed longitudinal study of young athletes), that was designed, organized, and implemented by the Centre of Research, Education, Innovation, and Intervention in Sport (CIFI²D), located in the Faculty of Sport at the University of Porto (FADEUP), Portugal. Selected participants were playing in Soccer clubs registered in Porto Football Association in competitions at regional level and must accomplished the following criteria to be included: (i) be involved in systematic soccer training programs

with at least three training sessions per week and (ii) not be injured or have been injured for less than three months. An explanation of the project was made to the directors and parents, who signed the free and informed consent, previously approved by the Ethics Committee in Research with Human Beings (N. 73222617.0.0000.5404). All the procedures of this research were in accordance with the Resolution of the National Health Council (466/2012) and the Declaration of Helsinki (2013).

Procedures

The seven participating teams were evaluated per day for four days. Teams arrived at the data collection infrastructures at early morning and performed the evaluations completing the following order: i) anthropometric measurements; ii) psychology surveys (first stage); iii) physical tests; iv) psychology surveys (second stage); v) technical and tactical tests in the football field. Resting times were respected according to each protocol.

Biological maturation

The biological maturation (BM) results were obtained using the maturation offset proposed by Mirwald et al. (2002). This procedure estimates the number in years that the individual is of the age at which his peak height velocity (PHV) occurs using a formula based on age, sex, height, sitting height and weight. Through this it is possible to estimate the number of years that the individual is at his peak height velocity (PVA), through a formula based on the variables standing and sitting, weight, age and sex. When the maturity offset indicates positive (+) it means the number of years that the individual is reaching his PVA, and when the result is negative (-), it means the number of years left to reach his PVA.

Time of practice

It is considered that the time of practice (TP) in the sport, either in structured and unstructured practice environments, increases the probability of a high performance and facilitates the learning process (Baker, 2003). The information is obtained after the players answer a specific survey, that contained an item that asked how long,

expressed in years, players were involved in soccer practice, both in adult-led and child-led environments.

Technical performance

In this study, the University of Queensland Soccer Skills Assessment Protocol (Wilson et al., 2016) was used to measure the technical performance of young soccer players. The protocol comprises eight tests: (1) passing accuracy (points/kick) over 20 m; (2) lofted passing accuracy (points/kick) over 35 m; (3) shooting accuracy (points/kick) over 20 m; (4) performance during a wall-pass accuracy (points/kick) test; (5) maximum dribbling speed (m/s); (6) average juggling ability (number/min); (7) dynamic passing (cycles/min) test using two rebound boards set at 90 angle; and (8) dynamic passing (cycles/min) test using two rebound boards set at 135 angle (to see details about the applied protocol please consult Wilson et al., 2016).

Tactical performance

A Gk+4x4+Gk small-sided game was applied during 20 minutes: 10 min + 10 min of effective practice and 2 minutes of interval for hydration. Field was adapted from 11 versus 11 to 5 versus 5 with a goalkeeper (Clemente et al., 2019), having 48 meters of length and 36 meters of width. For players' tactical performance assessment, 57 soccer players (14,64 ± 0,27 yrs.) were evaluated using the System of Tactical Assessment in Football (FUT-SAT) (Teoldo da Costa et al., 2011), and the Golden Index formula (Pereira, Ribeiro, Grilo & Barreira, 2018). Note that the smaller number of players who assessed the tactical test in comparison with the other tests does not affect the protocol, however we do not perform comparisons. Thus, players' tactical performance was calculated using two tests:

- 1) The System of Tactical Assessment in Football (FUT-SAT) (Teoldo da Costa et al., 2011) is based on the ten core tactical principles, divided into offensive: (i) penetration, (ii) offensive coverage, (iii) width and length, (iv) depth mobility and (v) offensive unity; and defensive: (vi) delay, (vii) defensive coverage, (viii) balance, (ix) concentration, (x) defensive unity. This system also considers the quality and location of the action performed on the playing field and the result of that action. The Tactical Performance Index (TPI) score is calculated using the following formula: $TPI = \sum \text{tactical actions (Realization of the principle} \times \text{Quality of}$

the action x Action location x Action result) / Number of tactical actions). Also, the Offensive TPI (OTPI) and Defensive TPI (DTPI) score were used, calculated by: OTPI = $\sum \text{tactical actions (Realization of the principle x Quality of the action x Action location x Action result) / Number of tactical actions}$; DTPI = $\sum \text{tactical actions (Realization of the principle x Quality of the action x Action location x Action result) / Number of tactical actions}$.

- 2) The Golden Index (GI) (Pereira et al., 2018) analyze the attacking key players, i.e., players with higher influence on the offensive organization of their teams. The GI cover variables such as passing, shooting, ball loss, dribbling, passes received, passes performed, crosses, assists, and goals. In addition, include networks analysis metrics' such as betweenness centrality, page rank and closeness centrality. Three matrices of global adjacency have been built to record all successful passing actions and were imported into SocNetV to collect the centrality metrics network. To standardize each variable, the statistical standardization technique was applied to all variables. After achieving all the standardized variables, each player GI calculation was completed using the following formula:

$$\begin{aligned} \text{Golden Index} = & 4.4615 * (\text{Assists/Time played}) + 4.3077 * (\text{Goals/Time played}) \\ & + 4.0769 * (\text{Successful Dribbles/Time played}) + 4.0769 * (\text{Positive Crosses/Time played}) \\ & + 3.9231 * (\text{Passes performed/Time played}) + 3.8462 * (\text{Shots/Time played}) \\ & + 3.7692 * (\text{Passes received/Time played}) + 3.6154 * (\text{Betweenness Centrality/Time played}) \\ & + 3.5385 * (\text{Page Rank Prestige/Time played}) - 3.4615 * (\text{Ball Losses/Time played}) \\ & + 3.4615 * (\text{IR: Closeness Centrality/Time played}) + 3.2308 * (\text{Running with ball/Time played}). \end{aligned}$$

Statistical analysis

Komolgorov-Smirnov and Levene statistical tests were performed to verify the normality and homogeneity of the data variances, respectively. Then, a multiple linear regression analysis was performed to observe if time of practice and maturation offset were able to predict players' technical and tactical performances. SPSS 23.0 (SPSS, Inc., Chicago, IL) statistical software was used, applying a significance level of 5%.

Results

A multiple linear regression was performed to verify if the biological maturation and time of practice were able to predict the players' performance in the technical tests (Table 1). Biological maturation was able to predict U13 players' performance at the lofted passing accuracy over 35m test ($p=0.033$) and U12 players' performance at the maximum dribbling speed test ($p=0.024$). Regarding the time of practice, it was possible to observe that U12 players with higher amount of practice presented better results in the dynamic passing test using 90° angle ($p=0,031$). In the U13 age category, time of practice was able to predict players' performance in the lofted passing accuracy over 35m test ($p=0.005$) and average juggling ability test ($p=0.005$). Moreover, time of practice was also able to predict U14 players' performance in the passing accuracy over 20 m ($p=0.05$).

Table 1. Result of the tactical performance of 57 young footballers from U12, U13, U14 and U15 categories.

Age-Category	Dependent variable	Independent variable	p	B	R ² adjusted	SE	Mean (SD)	Min - Max
U12	90° pass	TP	0.03	-0.33	0.50	0.52	1.06 (1.06)	0.41 – 1.83
	Dribbling	BM	0.02	-0.45	0.91	0.36	2.19 (0.38)	1.83 – 2.60
U13	35m long pass	TP	0.00	0.38	0.15	1.29	2.05 (0.63)	0.24 – 3.49
		BM	0.03	0.35				
	Juggling	TP	0.00	0.39	0.10	25.5	68.3 (10.6)	42.6 – 88.6
U14	20m pass	TP	0.05	0.27	0.04	1.48	4.73 (4.73)	3.70 – 5.62

*Statistically significant differences ($p<0.05$); ** ($p <0.01$). SE = standard error; SD = standard deviation; Min - Max = Minimum and Maximum; TP = Time of practice (years); BM = Biological maturation

Regarding players' performance in SSG, it was possible to observe that time of practice was able to predict players' tactical performance ($p=0.01$), since players with higher volume of practice accumulated presented better TPI (Table 2).

Table 2. Players' tactical performance from U12, U13, U14 and U15 age categories.

Dependent variable	Independent variable	P	B	R ² adjusted	SE	Mean (SD)	Min - Max
GI Score	TP	0.64	0.06	0.12	3.65	-1.61 (0.93)	-3.7 – 0.1
	RAE	0.13	0.22				
	BM	0.12	-0.21				
TPI	TP*	0.01*	0.32	0.10	4.42	37.97	32.69 – 41.57
	RAE	0.43	-0.10				
	BM	0.15	0.19				
OTPI	TP	0.15	0.2	-0.08	9.2	47.3 (1.97)	42.2 – 51.05
	RAE	0.73	0.04				
	BM	0.58					
DTPI	TP	0.24	0.16	0.33	7.15	28.61 (2.12)	23.1 – 32.09
	RAE	0.16	-0.20				
	BM	0.24	0.14				

0.07

*Statistically significant differences ($p < 0.05$), ** ($p < 0.01$); SE = standard error; SD = standard deviation; Min and Max = Minimum and Maximum; GI: Golden Index Score; TPI: Tactical Performance Index; OTPI: Offensive Tactical Performance Index; DTPI: Defensive Tactical Performance Index; TP: Time of practice; BM: Biological Maturation.

Discussion

The aim of this study was to investigate if time of practice, relative age effect and biological maturation affects technical and tactical performance of young soccer players applying different assessment tools. The general results found in the technical and tactical assessments show that the tests used to evaluate players' technical and tactical need to be used with maximum objectivity and attention, in particular considering players' age, biological maturation and skills' level.

Biological maturation in youth was found as an important predictor of players' performance in specific technical tests, in particular those that requires not only technique, but extra physical skills. For example, in running with the ball and long passing tests players need to use maximum speed and agility, and inferior members strength, respectively. Players evidencing soccer less experience, tests that implicate speed such as running with ball tend to be more affected by maturational status, since it accentuates the performance in young soccer players between 7 and 10 years old (Votteler & Honer, 2014; Prado et al., 2020). Using a different technical assessment protocol, Huijgen et al. (2014) were able to perceive that the dribbling

speed managed to correctly select 69% of talented Dutch players compared to nonselected players. In order to better understand the effects of biological maturation in the technical tests, Rowat, Fenner and Unnithan (2017) found that they were able to predict the players' 16 to 18 yrs performance in dribbling and passing. In turn, in a longitudinal study of German players, Honer et al. (2015) recognize that the test of dribbling can differentiate 12 to 15 yrs players' skills level. However, different results were found by Sieghartsleitner et al. (2019), when it was realized that biological maturation was not able to predict the variables of running with the ball, juggling ability and shooting in players between 13 and 14 years old.

In regards of tactical performance, similar results were found by Borges et al (2018), i.e. biological maturation is not related to players' tactical performance. Through the data of somatic maturation, Reis and Almeida (2020) realized that nonmatured players have greater tactical variability, but not a superior tactical efficiency, since they have to find more creative solutions in the game. However, Gonçalves et al. (2020) identified that biological maturation can be an indicator that positively affects players' tactical behavior, as well as Clemente et al. (2016) when they found an association between physical and tactical indicators. At early ages in soccer practice, Towlson et al. (2017) advise that this variable seems to influence the selection of players' positional status, as it enables them to benefit from greater muscle strength and speed to win games and may negatively interfere with the development of young soccer players. Therefore, it is possible to affirm, through the studies mentioned above, that in tests that demand more muscle strength and power, biological maturation influence players' performance.

Concerning to time of practice, literature suggest its influence on the player's expertise, in addition to contributing to the development of the motor repertoire (Banks & Millward, 2007; Giacomini et al., 2011; Irokawa et al., 2011). Ford et al., (2012) remind us about the importance of high amounts of soccer-especific practice and play in countries like Brazil, England, France and Portugal to develop players. Based on the findings of Abarghoueinejad et al., (2021) and considering ball speed, it is possible to corroborate Huijgen et al. (2010), in which the authors identified that the time of practice was a factor that contributes to the performance in this task, however emphasizing that there is a significant evolution of the players' performance

in this test only after the age of 16 yrs. Considering the relationship between the accumulated time of soccer practice and the development of fundamental motor skills, researchers identified that time of practice influences the dribbling and shooting tests (Junior, Gaion & Vieira, 2010). In turn, the study of Gouvêa et al. (2017) suggest that there is evidence to relate the time of practice with the performance in ball speed tests.

Playing an important role in the development of young soccer players, early engagement in the sport, through both structured and unstructured practices, seems to be a favorable factor to superior performances, in addition to increasing the possibility of reaching the top level while senior players (Ford et al., 2012; Ford & Williams, 2012). According to Haugaasen et al. (2014), to achieve the professional level it seems fundamental at younger ages, more than finding a formal training process, to have training quality under the supervision of a coach. It is also important to emphasize the benefits of practicing in non-structured learning contexts, such as street football, in addition to the involvement in other sports, since it helps the development of the players' intelligence and creativity (Côté, Baker, & Abernethy, 2003; Scaglia, 2011; Machado et al., 2019).

In the tactical tests, only the time of practice was able to predict the performance in SSG, considering FUT-SAT assessment tool. Different from Golden Index, that essentially evaluates the players' attacking actions in both technical and tactical behaviors, the FUT-SAT evaluate players' completion of the game principles, with and without the ball, thus requiring greater attention of the player to make him capable to interpret the events of the game, consequently performing better decisions.

One of the limitations of the study is the number of players who were assessed by the tactical tests. Another limitation is the competitive context of the clubs, most of them only competing at a regional level. So, increasing the sample size and analyzing elite clubs and player, the results might be different.

Conclusion

From the results found in this study, it was possible to conclude that biological maturation seems to affect players in younger age categories, in tests that require muscle strength and power. Accumulated time of practice seems to effect specific tests and players' performance in the game, requiring open skills from the player who needs to adapt, towards the environment that is continually changing.

This study is crucial because helps to understand that, regardless of the test or the protocol chosen to assess players, it is important that clubs, coaches, and staff be aware that several factors can affect players' performance. So, more rigor and objectivity may be applied when using assessments protocols to better control players' maturation and technical and tactical skills level. Moreover, we support that the use of the assessment results is not a value to exclude players but helps them to improve their performance.

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Capítulo 3

Artigo II

Estudo 2

Is it possible to find the perfect moment to assess players, using different assessment tools in a Small-Sided Game? The INEX Project

Autores

Lucas Gabriel Moreira; João Cláudio Machado
Filipe Grilo; Daniel Barreira; Outros autores a definir

Artigo submetido**na Revista**

A definir

Study II: Is it possible to find the perfect moment to assess players, using different assessment tools in a Small-Sided Game? The INEX Project

Abstract

This study aimed objective was to understand the time needed for players to present their full tactical potential, through a Small-Sided Game (SSG), using different assessment tools. In total, 104 Portuguese youth players ($14,64 \pm 0,27$) participated in the study. To assess the tactical performance, the System of Tactical Assessment in Football (FUT-SAT) and the Golden Index Formula were used in a Gk+4x4+Gk SSG. A linear regression analysis was performed to perceive if 4 minutes and 8 minutes were able to predict players' performance at 20 minutes, the end of the match. We adopted $p < .05$ as level of significance. It was possible to observe that 4 and 8 minutes are not able to predict the performance at 20 minutes. We concluded that players' tactical performance has changed from the beginning to the end, during the SSG, even using two different protocols, being extremely important to coaches and scouts be aware during all process of assessment.

Keywords: Soccer, Small-sided games, Tactical Performance; Assessment tools; Talent Development.

Introduction

Predicting the future performance of an athlete is complex, due to the numerous factors and aspects that will influence their development (Williams & Reilly, 2000; Bergkamp et al., 2019). However, football clubs and academies seek to identify promising young people at an earlier age with the aim of developing them to achieve maximum performance (Farahani, Soltani & Rezlescu, 2020). Therefore, with the aim of helping coaches during the selection process, researchers over the years have developed protocols to assess players, increasing the number of studies in the area (Relvas et al., 2010; Baker et al., 2017; Thomas et al., 2017; Thomas et al., 2021). Protocols are diverse and can focus on one or more aspects of performance.

However, note that many of these studies use their assessment protocols to include or exclude players from the process of players' development, classifying them as more or less skilled. The major problem is that, in most cases, the game ecology is disrespected, not representing the features of competitive environment (Ali, 2011; Bergkamp et al., 2019). For this reason, SSG have become a great alternative for assessing players, as they are more representative in relation to the formal game.

To assess tactical performance, whether declarative or procedural, it's possible to find in literature numerous protocols developed through years. In a declarative way, it's possible to find Declarative Tactical Knowledge Test, by Mangas (1999), allowing us to assess the decisions of players on offensive phase. Later, Kannekens, Elferink-Gemser & Visscher (2009) developed a tool that understands how a player acts in certainly situations. Recently, Machado & Costa (2020) developed a tool to monitor players' perceptual-cognitive and decision-making skills.

In a procedural way, Oslin, Mitchel & Griffin (1998) developed Game Performance Assessment Instrument (GPAI) is a useful instrument to assess kids in the fields of education and research and can be used in invasion sports. In turn, Grehaigne et al., (1997) created a tool that values technical and tactical actions, named Performance Assessment in Team Sports (TSAP). Assessing positioning and movement, the Procedure Tactical Knowledge Test (KORA) was developed by Kroger and Roth (2002), allowing to assess players in invasion sports.

Seeking to understand the performance in a game context, respecting the ecology of team sports game, Teoldo et al., (2010) created the Soccer Tactical Assessment System (FUT-SAT), a specific tool to assess the tactical principles. Playing 4 minutes in a GK+3v3+GK, it's possible to assess a players' behavior, according to the authors. Through the FUT-SAT, Gonçalves, Rezende & Teoldo (2015) identified that defenders and midfielders in the U17 category have greater offensive than defensive tactical procedural knowledge.

Using GK+3v3+GR structure, Wilson et al., (2021) developed a protocol to assess players in training sessions. Recently, new tools were developed to assess players' tactical performance in official matches. It can be highlighted Golden Index Formula, that measures player's level of importance in offensive phase, and Defensive Golden Index, to assess players' level of importance in defensive phase (Pereira, Ribeiro, Grilo & Barreira, 2018; Ferreira et al., 2020).

Some studies sought to understand how variables will influence players' performance. By adding 2 floaters in a GK + 3v3 + GK game, researchers identified that the players made a more effective use of the playing space, as well as preventing the defensive stability of the team without the ball, increasing the difficulty of the game (Padilha et al., 2017; Moniz et al., 2020). As well, in SSG, manipulating the goal size, presence or not of goalkeepers tend to affect players' behaviors (Castellano et al., 2016).

By limiting the number of touches in ball, at a small-sided and conditioned games (SSCG), it was identified that the frequency of players' actions in width and length increased (Brito et al., 2019). Mental fatigue also seems to be a factor that directly influences the tactical behavior of players, impairing decision making and increasing physical strain (Kunrat et al. 2020). Match status, team composition criteria and psychological are another variables that have influence in the tactical performance (Pratas, Volossovitch & Crita, 2016; Konefal, 2018; Badari, 2021).

Seeking to understand what the best moment in game to assess players in a SSG and the right assessment duration, the purpose of this work was to investigate the real time needed for players to present their full tactical potential.

Methods

Participants

In total, 104 Portuguese young players ($14,64 \pm 0,27$) were selected to play a GK+4x4+GK Small-Sided Game (SSG). Data used in this study results from INEX project (In search of excellence: A mixed longitudinal study of young athletes), that was designed, organized, and implemented by the Centre of Research, Education, Innovation, and Intervention in Sport (CIFI²D), located in the Faculty of Sport at the University of Porto (FADEUP), Portugal. Selected participants were playing in Soccer clubs registered in Porto Football Association in competitions at regional level and must accomplished the following criteria to be included: (i) be involved in systematic soccer training programs with at least three training sessions per week and (ii) not be injured or have been injured for less than three months. An explanation of the project was made to the directors and parents, who signed the free and informed consent, previously approved by the Ethics Committee in Research with Human Beings (N. 73222617.0.0000.5404). All the procedures of this research were in accordance with the Resolution of the National Health Council (466/2012) and the Declaration of Helsinki (2013).

Procedures

Tactical performance

A Gk+4x4+Gk SSG was applied for 20 minutes: two half of 10 min with 2 minutes of interval for hydration. Field was adapted from 11 versus 11 to 5 versus 5 with a goalkeeper (Clemente et al., 2019, having 48 meters of length and 36 meters of width). The game was divided in 5 to assess their performance (4, 8, 12, 16 and 20 min). Players' tactical performance was calculated using two tests:

- 1) The System of Tactical Assessment in Football (FUT-SAT) (Teoldo da Costa et al., 2011) is based on the ten core tactical principles, divided into offensive: (i) penetration, (ii) offensive coverage, (iii) width and length, (iv) depth mobility and (v) offensive unity; and defensive: (vi) delay, (vii) defensive coverage, (viii)

balance, (ix) concentration, (x) defensive unity. This system also considers the quality and location of the action performed on the playing field and the result of that action. The Tactical Performance Index (TPI) score is calculated using the following formula: $TPI = \sum \text{tactical actions (Realization of the principle} \times \text{Quality of the action} \times \text{Action location} \times \text{Action result)} / \text{Number of tactical actions}$). Also, the Offensive TPI (OTPI) and Defensive TPI (DTPI) score were used, calculated by: $OTPI = \sum \text{tactical actions (Realization of the principle} \times \text{Quality of the action} \times \text{Action location} \times \text{Action result)} / \text{Number of tactical actions}$; $DTPI = \sum \text{tactical actions (Realization of the principle} \times \text{Quality of the action} \times \text{Action location} \times \text{Action result)} / \text{Number of tactical actions}$).

- 2) The Golden Index (GI) (Pereira et al., 2018) analyze the attacking key players, i.e., players with higher influence on the offensive organization of their teams. The GI cover variables such as passing, shooting, ball loss, dribbling, passes received, passes performed, crosses, assists, and goals. In addition, include networks analysis metrics' such as betweenness centrality, page rank and closeness centrality. Three matrices of global adjacency have been built to record all successful passing actions and were imported into SocNetV to collect the centrality metrics network. To standardize each variable, the statistical standardization technique was applied to all variables. After achieving all the standardized variables, each player GI calculation was completed using the following formula:

$$\begin{aligned} \text{Golden Index} = & 4.4615 * (\text{Assists/Time played}) + 4.3077 * (\text{Goals/Time played}) \\ & + 4.0769 * (\text{Successful Dribbles/Time played}) + 4.0769 * (\text{Positive Crosses/Time played}) \\ & + 3.9231 * (\text{Passes performed/Time played}) + 3.8462 * (\text{Shots/Time played}) \\ & + 3.7692 * (\text{Passes received/Time played}) + 3.6154 * (\text{Betweenness Centrality/Time played}) \\ & + 3.5385 * (\text{Page Rank Prestige/Time played}) - 3.4615 * (\text{Ball Losses/Time played}) \\ & + 3.4615 * (\text{IR: Closeness Centrality/Time played}) + 3.2308 * (\text{Running with ball/Time played}). \end{aligned}$$

Statistical analysis

Komolgorov-Smirnov and Levene statistical tests were performed to verify the normality and homogeneity of the data variances, respectively. Then, a linear

regression analysis was performed to observe if the first 4 and 8 minutes of playing were able to predict the performance to the end of the match (20 minutes), using Golden Index Formula and FUT-SAT. SPSS 23.0 (SPSS, Inc., Chicago, IL) statistical software was used, applying a significance level of 5%.

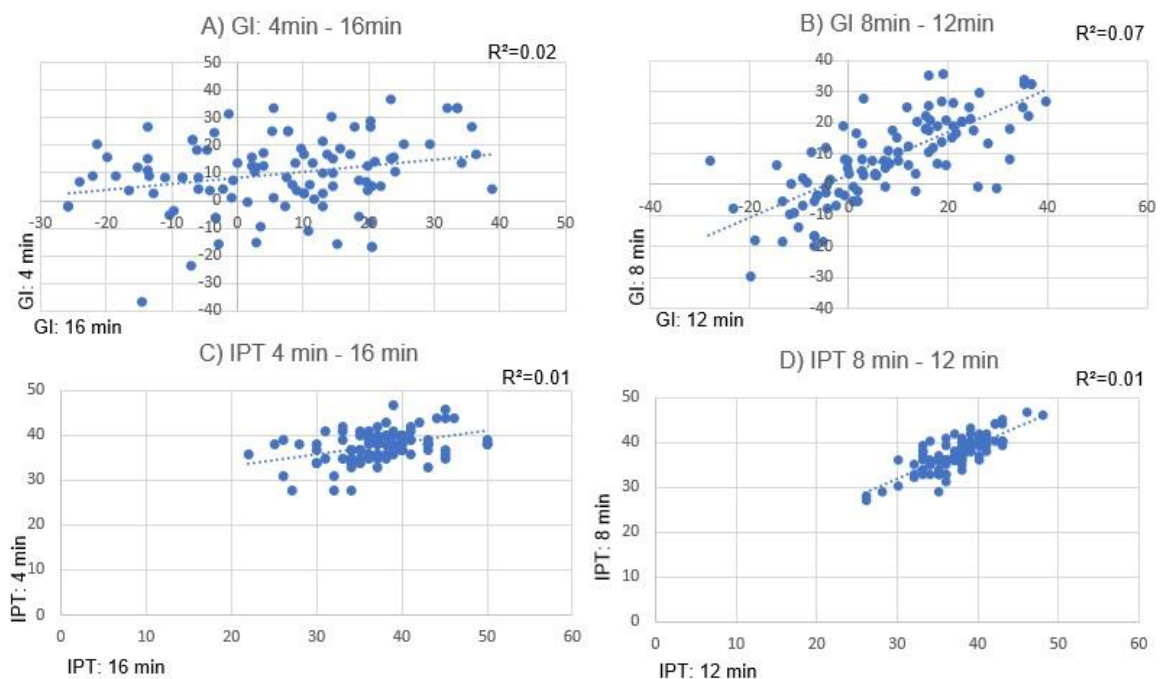
Results

Regarding players' performance in 4 and 8 minutes, they were not able to predict the performance until the end of the match (20 minutes), assessing them through Golden Index Formula ($p=0.13$ and $p=0.16$) and FUT-SAT ($p=0.18$ and $p=0.36$). That is, the initial performance does not correspond to the final performance, at 20 minutes.

Table 1: Linear regression estimations from 4 min and 8 min to the end of the match (20 min) for the last 16 min and 12 min, using Golden Index Formula and FUT-SAT.

Golden Index Formula			IPT	
	16min	12min	16 min	12 min
4min	0.13 (1.21)		0.18 (2.89)	
8min		0.16 (1.54)		0.36 (3.47)

Figure 1: Results from linear regressions estimations using Golden Index and FUT-SAT for 4-16 min and 8-12 min.



Discussion

The aim of this study was to investigate the real time needed for players to present their full tactical potential. The results found highlight that is not possible to predict the young soccer players' tactical performance. That is, the performance in first 4 and 8 minutes does not correspond to the end of match, at the 20 minutes, due to chaotic and non-linear nature of a football match, with numerous factors influencing the behavior of players, such as quality of opposition, mental fatigue, match status, numerical superiority, team composition criteria and other factors. That is, the tactical performance does not stabilize, changing during 20 minutes, being not able to find a exactly moment to assess players.

Currently, coaches and scouts search for strategies and tools to assess and identify players grows more and more. In order to reduce the subjectivity in the process, Pereira et al., (2019) created a formula to identify the most influential players in the offensive process, analyzing Club Atlético de Madrid in 2018/2019 season. In turn, Ferreira et al., (2021) created the Defensive Golden Index Formula, to assess and identify the best players in defensive process, using as model Fútbol Club Barcelona.

Searching a way to assess and identify players during training, Wilson et al., (2021) developed a formula to evaluate young players in SSG. Their formula considering offensive and defensive variables, and, according to the authors, their metrics provide a robust estimate of players' performance and how they contribute to their teams. Using SSG to identify promising players, Fenner, Iga and Unnithan (2016), defend that a good talent identification tool can be let the young players' play, and the teams with the best players are going to win games.

However, it is important to highlight that many variables influence the tactical performance. One of them it's to play in numerical superiority, adding a floater in SSG. Authors identified that players' change their behavior in order use the free spaces with ball and reduce space to protect the own goal without ball (Padilha et al., 2017; Moniz et al., 2020). Moreover, older players tend to take better advantage of numerical superiority with one floater, showing higher values of space exploration (Praça et al., 2021)

Another variable is the team composition criteria, that influences the tactical performance of young players. Praça et al., (2017) suggests that coaches must be

aware that, when assembling the teams, they must consider what is intended to be trained. Players will perform differently, according to the selection criteria of the groups: speed performance, tactical ability, or aerobic power. David and Wilson (2015) confirm these findings, when they support the idea that greater levels of cooperative behaviors within a group can provide a competitive edge in intergroup competition.

Mental fatigue seems to be one of the main variables that do not let the players' performance stabilize, as it possibly decreases the teams' index, affects the way that players understand the information about the environment and the positioning of colleagues, makes the players travel shorter distances and obtain less accuracy when performing passes and shots (Smith et al., 2018; Coutinho et al., 2017; Coutinho et al., 2018; Kunrath et al., 2020).

Match status is another variable that influences the performance of players. Along with Hausler et al., (2015), it is a significant information to consider when develop a match strategy and training. According to Badari et al., (2021), in winning scenarios, players are more efficient in tactical principles, especially in actions near to the ball. In drawing scenarios, players displayed higher efficiency in defensive principles compared to losing scenarios. To Konefal et al., (2018), match status has greater influence in the individual actions during a match. In teams that are drawing or losing, players increase the incidence of passing, crossing and ball possession, but the incidence of shots still the same, do not suffering the influence of match score. With similar findings, Pratas, Volossovitch & Carita (2016) warn us to the psychological effect that match status causes in young soccer players, and their ability to deal with adverse scenarios.

Authors alert to the fact that all assessment tests have their own characteristics and limitations, but deliver different information about the players' tactical development, being important to plan training sessions, specially to know better their squad and adjust the level of training tasks (Júnior, Machado & Aquino, 2020; Machado et al., 2018).

Assuming that scouts use their "gut feeling", that is, experimental knowledge, during talent identification (Roberts et al., 2020), this paper tries to highlight the importance of patience of assess and develop players, not just identify.

Sieghartsleitner et al., (2019) draw attention to the importance of value both approaches: the combination of subjective coaches' eyes and with scientific data from assessment tools may help us to reduce errors, after all, there are other variables that will influence their development that coaches do not control.

With this, due to the chaotic and non-linear nature of the team sports game, it's possible to confirm that tactical performance varies for 20 minutes. Initial tactical performance of players did not correspond to the final tactical performance, confirming that numerous factors affect their performance during the assessment. Full attention is required during 20 minutes of playing. If test tests should serve as tools to evaluate the players' stage of evolution, removing subjectivity from the process of development talents.

Conclusion:

From the results found in this study, it was possible to notice that, even using two different instruments of tactical evaluation, there are no indicators that performance stabilizes in some of the 4-minute periods, and there is no agreement on a more suitable period for assessing players. This study shows us the importance of assessing players for as long as possible in the game, considering that their performance will change throughout the match. It is extremely important that coaches and scouts consider that, during the game, different variables influence the performance of the players, such as match status, quality of teammates, time played, number of errors or hits, among others. Assuming that there is no linearity in the results, it is essential to assess players using different protocols, as the different variables can help us to answer different questions during the process of development players.

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Capítulo 4

Discussão geral

“Não espere o futuro mudar a sua vida, porque o futuro será consequência do presente. Parasita hoje, um coitado amanhã. Corrida hoje, vitória amanhã. Nunca esqueça disso, irmão.”

Discussão Geral

Os objetivos deste trabalho buscaram responder perguntas e incitar a discussão referente ao tema de desenvolvimento de talentos, utilizando o Projeto INEX para coleta de dados, com jovens futebolistas portugueses. Neste sentido, buscamos: i) investigar de que forma o tempo de prática e a maturação biológica afetava o desempenho dos jogadores, utilizando diferentes protocolos de avaliação, sendo eles tático e técnico e ii) Analisar qual o tempo necessário para avaliar todo o potencial tático dos jogadores em testes táticos.

Primeiro, nos testes técnicos, foi possível identificar que a maturação biológica foi capaz de prever o desempenho no teste de drible em velocidade e passe longo de 35m em jogadores do escalão U13. Estes achados corroboram com os achados de Rowat, Fenner and Unnithan (2017), em que os autores perceberam que a maturação biológica foi capaz de prever o desempenho em teste de drible em velocidade e passe em jogadores entre 16 e 18 anos. Hill et al., (2019) atentam para o fato de que é a partir dos 12 anos que a influência da maturação biológica começa a afetar os jogadores.

Autores ainda atentam para o fato de que, em idades mais jovens, jogadores sem tanta experiência no futebol tendem a sofrer ainda mais os efeitos da maturação biológica (Votteler & Honer, 2014; Prado et al., 2020). Por sua vez, que é uma variável que afeta diretamente o desempenho e desenvolvimento dos jogadores, bem como influencia o processo de seleção de jogadores de elite (Abarghoueinejad et al., 2021; Massa et al., 2021). É importante que treinadores tenham a sensibilidade durante esse desenvolvimento, já que, de acordo com Towlson et al., (2017), jogadores mais maturados tendem a ser alocados em posições defensivas no terreno em idades mais jovens, devido as vantagens físicas que oferecem à equipe. Por possuírem a vantagem física, Cumming et al., (2018) defendem que esses jogadores têm uma tendência de desenvolver habilidades de autorregulação, portanto, expô-los a ambientes de aprendizagem mais desafiadores, pode facilitar a desenvolver habilidades psicológicas mais adaptativas.

Em relação ao tempo de prática, a variável foi capaz de prever o desempenho no teste dinâmico de passe, no ângulo de 90 graus, no escalão U12. Já no escalão U13, o tempo de prática foi capaz de prever o desempenho no teste de dar toques

na bola, sem com que ela caia no chão, e passe longo 35m. No escalão U14, o tempo de prática foi capaz de prever o desempenho no teste de passe 20m. Abarghoueinejad et al., (2021) atentam para o fato de que o desempenho motor evolui com o tempo, sofrendo também com a influência da maturação biológica e dos estímulos vividos em treino. Gouvea et al., (2017) sugerem que existe uma relação direta entre o tempo de prática e testes técnicos que avaliam a capacidade do jogador em conduzir a bola em velocidade. Todavia, Hujigen et al., (2010) recordam que é apenas os 16 anos que o tempo de prática contribui efetivamente para o melhor desempenho da tarefa.

Já nos testes táticos, o tempo de prática foi capaz de prever o desempenho tático, utilizando a ferramenta FUT-SAT. Como já referido por Abarghoueinejad et al., (2021), a performance motora em jogo é uma variável que vai evoluindo com o tempo de prática, bem como os estímulos do treino. Em concordância com estes achados, Prado et al., (2020) sugerem que o tempo de prática influencia positivamente na evolução do desempenho motor, fornecendo ferramentas para os jogadores realizarem ações técnicas durante o jogo.

O tempo de prática parece ser uma variável que possui grande importância no desenvolvimento dos jovens jogadores. Seja ele de através de sessões de treino em clubes, ou da prática informal por lazer, assumindo um papel importante ao facilitar o processo, já que a especialização precoce e o engajamento precoce são fenômenos observados em diversos países na América do Sul, Europa e África (Ward et al., 2007; Ford et al., 2012; Hornig et al., 2016). Corroborando com os estudos anteriores, Ford et al., (2020) entrevistaram jogadoras de 5 seleções nacionais de alto nível, e identificaram que na infância, elas acumularam mais horas jogando futebol em relação a outros esportes, reafirmando a importância do engajamento precoce na modalidade.

Em relação a maturação biológica, ela não foi capaz de prever o desempenho tático em jogo. Reis & Almeida (2020) afirmam que a maturação não influencia no desempenho tático, mas sim no comportamento e variabilidade tática dos jogadores. Com resultados semelhantes, Borges et al., (2018) encontraram uma correlação fraca entre a maturação e o desempenho tático em jogo. Por sua vez, quando Clemente et al., (2021) tentaram encontrar relação entre a maturação e a quantidade

de minutos jogados na temporada, entre os escalões U11 e U14, os dados não foram significativos.

Posteriormente, ao buscar perceber qual era o melhor momento para avaliar os jogadores durante o jogo, tentamos prever o desempenho tático do jogador aos 4 e 8 minutos em comparação com seu desempenho final no jogo, aos 20 minutos. De acordo com os resultados encontrados, não foi possível observar relação entre o desempenho inicial com o desempenho geral dos jogadores, não encontrando um momento mais adequado para avaliar os jogadores.

É importante salientar que inúmeros fatores irão influenciar a performance dos jogadores, como placar de jogo, qualidade do adversário e composição das equipes, tornando o processo de avaliação não-linear, sendo necessário sempre a máxima da atenção de treinadores e *scouts* na hora de avaliar os jogadores, já que o estudo comprova que a performance irá variar durante o jogo.

Como reflete Ribeiro et al. (2021), os modelos tradicionais de identificação de talentos tratam o processo através de uma abordagem linear, levando a uma especialização precoce. É necessário romper com esse paradigma e perceber que a não-linearidade, natureza caótica e a imprevisibilidade do jogo, como refere Garganta (2009), deve ser levada em consideração, já que é a partir das inúmeras interações entre atletas e o ambiente, os jogadores buscarão se adaptar a um conjunto de constrangimentos na partida.

Uma das variáveis que influencia no comportamento tático dos jogadores é adicionarem um jogador para gerar superioridade numérica. Quando isso acontece, os jogadores com bola acabam por aproveitar melhores os espaços livres, com objetivo de fazer o gol, e a equipe sem bola busca reduzir os espaços e proteger a baliza (Back Padilha et al., 2017; Moniz et al., 2020). Além disso, existe uma correlação entre uma maior inferioridade numérica e um melhor posicionamento defensivo por parte dos jogadores (Sampaio et al., 2014)

A composição das equipes é outro critério que tem grande influência no desempenho dos jogadores. O desempenho irá variar, ao colocar jogadores com características diferentes como: velocidade máxima, potência aeróbia e habilidade tática, além de reafirmar a importância de conhecer como seus companheiros jogam, já que irá promover uma maior cooperação coletiva, fornecendo uma vantagem grupal (David & Wilson, 2015; Praça et al., 2017).

O placar momentâneo da partida também parece exercer bastante influência no comportamento tático dos jogadores (Carling et al., 2005; Lago, 2009). Quando estão ganhando, jogadores são mais eficientes em princípios táticos, principalmente os que demandam ações próximas a bola (Badari et al., 2021). De acordo com os mesmos autores, todavia, quando o jogo está empatado, os jogadores apresentam melhor eficiência nos princípios táticos defensivos em comparação quando estão perdendo.

Ainda sobre jogadores de equipes que estão em desvantagem ou igualdade no placar, a incidência de passes, cruzamentos aumenta, apesar de que a incidência de remates não seja alterada (Konefal et al., 2018). Consequentemente, a posse de bola das equipes em desvantagem aumenta, devido à necessidade de fazer gols (Lago, 2009). Por fim, Pratas, Volossovitch & Carita (2016) citam o fato de a importância de jovens jogadores terem a capacidade de lidar com cenários adversos.

Por último, a fadiga mental é uma variável que não permite a estabilização da performance dos jogadores, já que com o passar do tempo, afeta o modo com que os jogadores recolhem informação do ambiente, bem como o posicionamento dos colegas, percorram menores distâncias e tenham menor precisão nas ações técnicas de passe, drible, cruzamento e remate (Smith et al., 2018; Coutinho et al., 2017; Coutinho et al., 2018; Kunrath et al., 2020; Trecroci et al., 2020).

Por diminuir a percepção periférica dos jogadores, são priorizadas as ações individuais, em detrimento das coletivas, buscando ações a baliza adversária e proteger sua própria baliza (Kunrath et al., 2020). Para garantir a total performance, Gontois et al., (2019) recomendam que antes de jogos e treinos, atletas evitem atividades de alta demanda cognitiva. É também necessário ter a sensibilidade por parte de treinadores que em épocas de exames e/ou algumas fases do torneio, jogadores já podem chegar com algum desgaste a nível de fadiga mental (Thompson et al., 2020).

Portanto, todas as variáveis levantadas influenciam direto no rendimento dos jogadores durante o jogo, sendo necessário levar em consideração todo o contexto durante a avaliação por parte de treinadores e avaliadores.

Capítulo 5

Conclusões

“É um mundo cão, pra nós perder não é opção, certo? De onde o vento faz a curva brota o papo reto. Num deixo quieto, num tem como deixar quieto, a meta é deixar sem chão quem riu de nós sem teto!”

Conclusões

Constatou-se então, com este trabalho, que a maturação biológica de prática tem a capacidade de prever o desempenho nos testes técnicos, nomeadamente no teste de drible em velocidade e passe longo 35m no escalão U12 e U13, respectivamente, realizados de maneira analítica, porém não foi capaz de prever o desempenho tático, durante um jogo reduzido GR+4v4+GR.

Já o tempo de prática foi capaz de prever o desempenho nos testes de passe dinâmico, no ângulo 90 graus no escalão U12, passe longo 35m e teste de dar toques sem deixar a bola cair no chão no escalão U13 e no passe 20m no escalão U14, bem como a capacidade de prever o desempenho tático, utilizando a ferramenta de avaliação FUT-SAT.

E ao avaliá-los apenas em contexto de jogo, percebemos que o desempenho tático inicial, aos 4 e 8 minutos, não corresponde ao desempenho ao final do jogo, aos 20 minutos, em nenhuma das ferramentas de avaliação. Isso nos mostra a variação de desempenho tático dos jogadores ao serem avaliados e a não estabilização do desempenho ao longo dos 20 minutos.

Portanto, não há um momento ideal entre os extratos de 4 minutos durante a jogo para que os jogadores sejam analisados através das ferramentas de observação, já que não há a estabilização da performance. Emerge a necessidade em estar atento durante a totalidade da avaliação, sem que nossa avaliação seja condicionada ao desempenho inicial que os jogadores apresentam, visto que inúmeras variáveis influenciarão o desempenho.

Por fim, reforça-se a importância da avaliação dos jogadores em processo de formação. É dever do treinador levar em consideração que inúmeras variáveis influenciarão o desempenho dos jogadores, sendo necessário a escolha correta dos testes, bem como sua intencionalidade, para que ele consiga entender os pormenores de cada jogador e buscar fazer com que evoluam ao final do processo.

O estudo apresenta algumas limitações, sendo elas i) ausência de jogadores que disputam campeonatos nacionais no país, ii) correlacionar os dados das avaliações com o desempenho durante o campeonato, iii) uma maior quantidade de jogadores para tornar o estudo mais robusto, iv) avaliá-los em um contexto de maior duração nas partidas, talvez 20 minutos não seja o suficiente.

Para estudos futuros, recomenda-se buscar correlacionar o uso do GPS com as ferramentas de avaliação táticas, nomeadamente o FUT-SAT e o Golden Index Ofensivo, bem como a utilização do Golden Index Defensivo para melhor entender o desempenho dos jogadores e buscar perceber o melhor momento para avaliá-los.

Também, buscar avaliar jogadores de diferentes níveis competitivos, pois acredita-se que é uma variável que afeta diretamente os resultados encontrados no estudo, já que possuem maior quantidade de treinos na semana, competem contra melhores equipes e possuem jogadores mais adaptados a cenários adversos.

Por fim, recomenda-se a avaliação de jogadores de países diferentes, partindo do pressuposto que a cultura futebolística de cada país poderá influenciar no resultado das avaliações.

Capítulo 6

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