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Reabilitação da lesão muscular dos isquiotibiais: Percepções e práticas dos fisioterapeutas que atuam em clubes de elite do futebol brasileiro

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Reabilitação da lesão muscular dos isquiotibiais: Percepções e práticas dos fisioterapeutas que atuam em clubes de elite do futebol brasileiro

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RESUMO

Introdução: A lesão por estiramento dos isquiotibiais (*hamstring strain injury* - HSI) é a lesão sem contato mais prevalente no futebol profissional masculino. Apesar do entendimento das HSI e seu processo de reabilitação ter avançado substancialmente nas últimas décadas, ainda não se sabe como as HSIs são manejadas por fisioterapeutas que vivenciam o "mundo real" do futebol profissional. **Objetivo:** Descrever as percepções e práticas de fisioterapeutas de clubes de futebol brasileiros de elite sobre o manejo de atletas com HSI. **Métodos:** Fisioterapeutas que atuaram em clubes de futebol de elite, Campeonato Brasileiro Série A (20 clubes) e Série B (20 clubes) na temporada de 2021, foram convidados a responder uma pesquisa online. **Resultados:** Responderam ao questionário 62 fisioterapeutas. Atuaram em 35 dos 40 clubes potenciais para este estudo (87,5% de representatividade), sendo 17 clubes atuantes na Série A e 18 na Série B. Apesar da heterogeneidade de escolhas quanto às práticas de avaliação, quase todos os entrevistados utilizam exames de imagem, adotam escalas de classificação das lesões, e avaliam aspectos relacionados à dor, amplitude de movimento, força muscular, estado funcional e psicológico de atletas com HSI. Os programas de reabilitação são geralmente divididos em 3-4 fases. Agentes eletrofísicos, terapia manual, alongamentos, exercícios de fortalecimento, exercícios de estabilização lombopélvica e exercícios que mimetizam as demandas funcionais do futebol são utilizados pela maioria dos entrevistados. A força muscular foi o critério de retorno ao esporte mais relatado. **Conclusão:** O presente estudo permitiu que a comunidade fisioterapêutica esportiva conhecesse as abordagens usualmente adotadas no manejo de atletas com HSI que jogam em clubes de futebol de elite brasileiros.

Palavras-chave: Futebol, lesão muscular, fisioterapia, reabilitação.

ABSTRACT

Background: Hamstring strain injury (HSI) is the most prevalent non-contact injury in professional men's football. Despite the understanding of HSI and its rehabilitation process has advanced substantially in last decades, how HSIs are managed by physical therapists who experience the 'real world' of professional football is still unknown. **Objective:** To describe perceptions and practices of physical therapists from elite Brazilian football clubs regarding the management of athletes with HSI. Methods: Physical therapists who worked in elite football clubs, Brazilian Championship Series A (20 clubs) and Series B (20 clubs) at 2021 season, were invited to answer an online survey. **Results:** Sixty-two physical therapists answered the questionnaire. They worked in 35 of the 40 potentials clubs for this study (87.5% representativeness), being 17 clubs engaged in Series A and 18 in Series B. Despite the heterogeneity of choices regarding assessment practices, almost all respondents use imaging exams, adopt injury classification scales, and evaluate aspects related to pain, range of motion, muscle strength, functional and psychological status of athletes with HSI. Rehabilitation programs are usually divided into 3-4 phases. Electrophysical agents, manual therapy, stretching, strengthening exercises, lumbopelvic stabilization exercises and exercises that mimic the functional demands of football are used by most respondents. Muscle strength was the most reported RTP criterion. **Conclusion:** The present study allowed the sports physical therapy community to become aware of the approaches usually adopted in the management of athletes with HSI who play in Brazilian elite football clubs.

Keywords: Soccer, muscle injury, physical therapy, rehabilitation.

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LISTA DE ABREVIATURAS E SIGLAS

HSI	Hamstring Strain Injury
RTP	Return to Play
MRI	Magnetic Resonance Imaging
RCTs	Randomized Clinical Trials
NMES	Neuromuscular Electrical Stimulation
TENS	Transcutaneous Electrical Nerve Stimulation
GPS	Global Positioning System
SLHB	Single Leg Hamstring Bridge
EPA´s	Electrical Physical Agents
ROM	Range of Motion

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1 CONTEXTUALIZAÇÃO

A lesão por estiramento dos isquiotibiais (*hamstring strain injury* - HSI) é a lesão sem contato mais prevalente no futebol masculino profissional, representando cerca de 14% de todas as lesões (Ekstrand et al., 2020). Por temporada é esperado que 22% dos jogadores de uma equipe sofram pelo menos uma HSI (Ekstrand et al., 2016), ou seja 5-6 atletas de uma equipe de 25 jogadores (Ekstrand et al., 2020). As HSI apresentam um alto índice de recorrências (cerca de 14%), o que aumenta o impacto negativo no desempenho esportivo e nas finanças do clube ao longo de uma temporada (Hägglund et al., 2013; Eliakim et al., 2020).

A literatura tem classificado a gravidade das lesões baseada no tempo de afastamento necessário até o retorno ao treinamento. As lesões classificadas como moderadas (8-28 dias) são responsáveis por mais de 50% de todos os afastamentos e estão relacionadas a danos estruturais no tecido muscular (Ekstrand et al., 2013; Ekstrand et al., 2020). A localização da lesão e a magnitude do dano estrutural determinam a severidade e o tempo de afastamento necessário para o retorno seguro aos treinamentos (Heiderscheit et al., 2010; Hagglund et al., 2013; Ekstrand et al., 2020).

As lesões por estiramento dos isquiotibiais estão relacionadas a esportes que envolvam principalmente corridas em alta velocidade e *sprints*, o que determina o mecanismo de lesão mais frequente (Chumanov et al., 2012). A mecânica do movimento de corrida gera uma grande quantidade de carga excêntrica nos isquiotibiais, principalmente na fase de balanço terminal, cuja ação dos isquiotibiais visa controlar e preparar o membro inferior para a transição

da fase de balanço para a fase de apoio (Heiderscheit et al., 2010; Liu et al., 2017; Hegyi et al., 2019). Estudos que analisaram o comportamento dos isquiotibiais durante corridas em diferentes velocidades, através de modelos biomecânicos ou por atividade eletromiográfica, observaram uma maior ativação e um maior alongamento da unidade músculo-tendão no terço final da fase de balanço, principalmente com o aumento da velocidade (Thelen et al., 2005; Liu et al., 2017; Hegyi et al., 2019). Dentre os três músculos que compõem os isquiotibiais, a porção longa do bíceps femoral foi a que apresentou uma maior fração de estiramento, atingindo uma média de 10% à mais de seu comprimento quando comparado ao semitendíneo (8%) e ao semimembranoso (7%), caracterizando assim o mecanismo de lesão dos isquiotibiais (Thelen et al., 2005; Opar et al., 2012; Liu et al., 2017; Hegyi et al., 2019).

O diagnóstico das lesões por estiramento muscular têm sido baseados em exames de imagem, exames físicos do indivíduo e histórico da lesão (Verral et al., 2003; Hui Liu et al., 2012; Ahmad et al., 2013; Askling et al., 2013; Reurink et al., 2014; Martin et al 2022). Diferentes modelos para a classificação de severidade dos estiramentos têm sido sugeridos pela literatura ao longo do tempo, relacionando o local da lesão, a quantidade de dano estrutural e o mecanismo de lesão (Mueller-Wohlfahrt et al., 2012; Pollock et al., 2014). Geralmente as lesões têm sido classificadas em: Grau I (imagem sem dano estrutural considerável com mínimo sinal radiológico, dor leve com mínima perda de função; Grau II (imagem com sinal radiológico considerável associado a dano estrutural e limitação da função); Grau III (imagem com sinal radiológico de dano estrutural severo com perda da função) (Stoller 2007; Hui Liu et al., 2012; Ahmad et al., 2013; Reurink et al., 2014).

A reabilitação dos estiramentos musculares dos isquiotibiais tem como principal objetivo devolver ao atleta sua condição de performance com o menor risco possível de uma recidiva de lesão (Heiderscheit et al., 2010; Sherry et al., 2015). Já se sabe que o início precoce de uma reabilitação funcional parece diminuir o tempo total de afastamento comparado a uma reabilitação tardia (Bayer et al., 2017). Os programas de reabilitação tem comumente dividido o manejo desta lesão em fases de acordo com a evolução dos sintomas e a função (Sherry & Best, 2004; Silder et al 2013; Bayer e al 2017; Mendiguchia et al., 2017; Whiteley et al., 2017; Medeiros et al 2020; Vermeulen e al., 2022). Embora os programas de reabilitação sejam consideravelmente heterogêneos, a literatura vem demonstrando a eficácia de estratégias que utilizem uma abordagem mais funcional, visando restaurar a amplitude de movimento, a força e a capacidade funcional atlética (Sherry & Best, 2004; Askling et al., 2013, 2014; Silder et al., 2013; Mendiguchia et al., 2017; Whiteley et al., 2017; Bayer et al., 2017; Macdonald et al., 2019; Hickey et al., 2020; Medeiros et al., 2020; Vermeulen et al., 2022). Estudos que utilizaram protocolos de exercícios excêntricos, exercícios de estabilidade do tronco, agilidade e corridas progressivas demonstraram efeitos positivos na função muscular, no tempo de afastamento e nos índices de recidiva (Sherry & Best, 2004; Askling et al., 2013, 2014; Silder et al., 2013; Mendiguchia et al., 2017; Whiteley et al., 2017; Bayer et al., 2017; Hickey et al., 2020; Medeiros et al., 2020; Vermeulen et al 2022).

Em síntese, as lesões musculares de isquiotibiais apresentam uma elevada incidência e podem ter um significativo impacto sobre a carreira de um atleta profissional, sobre o desempenho de uma equipe e sobre as finanças de um clube; o que justifica a considerável atenção que a comunidade científica

dispende a esta lesão. Os ensaios controlados aleatorizados publicados desde o início deste século fornecem alguns subsídios aos clínicos para a implementação da prática baseada em evidências no processo de reabilitação das lesões musculares de isquiotibiais, desde a avaliação até a liberação para retorno ao esporte. Porém, há de se destacar que nenhum destes ensaios foi conduzido no "mundo-real" do futebol profissional, o qual apresenta características singulares relacionadas ao perfil dos atletas lesionados, estrutura disponível para o tratamento, exigências do alto rendimento esportivo e contexto sociocultural da modalidade, entre outras. Portanto, o conhecimento acerca das percepções e práticas dos fisioterapeutas que vivem o dia a dia do futebol profissional é importante para a elucidação dos processos envolvidos na reabilitação da lesão muscular de isquiotibiais neste contexto específico.

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2 OBJETIVOS

Objetivo Geral

Verificar as percepções e práticas dos fisioterapeutas que atuam em clubes de elite do futebol brasileiro sobre a reabilitação da lesão muscular de isquiotibiais.

Objetivos específicos

- Caracterizar o perfil dos fisioterapeutas que atuam em clubes de elite do futebol brasileiro;
- Conhecer a estrutura física e organizacional que estes fisioterapeutas encontram nos setores de reabilitação dos clubes de elite do futebol brasileiro;
- Verificar as percepções e práticas dos fisioterapeutas frente à avaliação clínica e funcional da lesão muscular de isquiotibiais;
- Verificar as percepções e as práticas dos fisioterapeutas frente ao processo de reabilitação da lesão muscular de isquiotibiais;
- Verificar as percepções e as práticas dos fisioteraputas frente aos critérios para retorno ao esporte após uma lesão muscular de isquiotibiais.

3 ARTIGO

How are hamstring strain injuries managed in Brazilian elite football clubs? A survey with 62 physical therapists

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ABSTRACT

Background: Hamstring strain injury (HSI) is the most prevalent non-contact injury in professional men's football. Despite the understanding of HSI and its rehabilitation process has advanced substantially in last decades, how HSIs are managed by physical therapists who experience the 'real world' of professional football is still unknown. **Objective:** To describe perceptions and practices of physical therapists from elite Brazilian football clubs regarding the management of athletes with HSI. **Methods:** Physical therapists who worked in elite football clubs, Brazilian Championship Series A (20 clubs) and Series B (20 clubs) at 2021 season, were invited to answer an online survey. **Results:** Sixty-two physical therapists answered the questionnaire. They worked in 35 of the 40 potentials clubs for this study (87.5% representativeness), being 17 clubs engaged in Series A and 18 in Series B. Despite the heterogeneity of choices regarding assessment practices, almost all respondents use imaging exams, adopt injury classification scales, and evaluate aspects related to pain, range of motion, muscle strength, functional and psychological status of athletes with HSI. Rehabilitation programs are usually divided into 3-4 phases. Electrophysical agents, manual therapy, stretching, strengthening exercises, lumbopelvic stabilization exercises and exercises that mimic the functional demands of football are used by most respondents. Muscle strength was the most reported RTP criterion. **Conclusion:** The present study allowed the sports physical therapy community to become aware of the approaches usually adopted in the management of athletes with HSI who play in Brazilian elite football clubs.

Keywords: Soccer, muscle injury, physical therapy, rehabilitation.

INTRODUCTION

The hamstring strain injury (HSI) is a hot topic in the football (soccer) medicine community. This is the most prevalent non-contact injury in professional men's football, representing near to 14% of all injuries (1). On average, around 22% of players sustain at least one HSI during a season (2), therefore a club should expect that 5-6 players in a typical 25-player squad sustain a HSI every season. The HSI recurrence rate is high (around 14%) (1), and re-injuries usually cause a longer time-loss than index injuries (mean of 21.5 and 18 days, respectively) (1). The HSI rate has not been reduced since the beginning of this century (2), and this injury burden has a negative impact on club's performance and finances (3, 4). Therefore, the medical staffs work hard to return injured players to the field as early as possible, with the greatest possible conditioning level and with the lowest possible risk of recurrence.

The understanding of HSI and its rehabilitation process has advanced substantially in the last two decades. The classification models proposed by the Munich Consensus (5) and by the British Athletics Medical Team (6) provided more accurate diagnoses than the traditional grade 1-to-3 classification systems (7). The prognostic value of imaging exams to determine the time to return to play (RTP) and risk of reinjuries is unclear (8-10), but resonance magnetic imaging (MRI) has been widely used following HSI (11-16). According to the most recent clinical practice guideline (17), clinicians should make a diagnosis of HSI when an individual presents with a sudden onset of posterior thigh pain during activity, with pain reproduced when the hamstring is stretched and/or activated, muscle tenderness with palpation, and loss of function. However, randomized clinical trials (RCTs) have used different approaches to assess athletes with suspected

HSI (11-16, 18-21). For instance, pain intensity has been assessed through numeric pain scale (15, 16, 21), visual analogue scale (13, 20), or algometry (20). Similarly, a range of tests have been used to assess losses of flexibility, muscle strength and functional capacity (11, 13, 15, 16, 18-21).

Given the lack of high-level clinical studies with pharmacological agents (eg, non-steroidal anti-inflammatory drugs and corticosteroids) and the unsatisfactory results of invasive regenerative therapies such as platelet-rich plasma injection (22), physical therapists have assumed the leading role on management of athletes with HSI. Passive strategies such as manual therapy (15, 16, 19) and electrophysical agents (12, 18, 19, 20) have been used for pain relief and inflammation control, as well as with the intention of favoring tissue healing. The core of HSI rehabilitation is to restore the muscle function and the individual's athletic performance, thus exercise is considered the primary intervention. The importance of early loading of injured musculotendinous tissue has been previously demonstrated (14), and recent evidence supports the safety of early implementation of high-intensity exercise (23). Since RCTs conducted by Askling et al. (11, 13), eccentric strengthening of hamstrings has been part of the most rehabilitation programs following HSI (12, 15, 16, 18-21). Trunk stabilization exercises have also been often included in the HSI rehabilitation (11-13, 15, 16, 18-21), as well as agility exercises (12, 15, 16, 18-20) and progressive running protocols (12, 13, 15, 16, 19, 21). Rehabilitation programs encompassing up to six phases (24) have been proposed in the literature, and a range of criteria including pain, range of motion, muscle strength, and functional status have been used to define an athlete's progression and RTP (11-13, 15, 16, 18-21). In

addition, some experts advocate in favor of considering biological healing time as a criterion for RTP (25).

The RCTs conducted by different groups around the world have provided commendable advances on the management of athletes following HSI (11-16, 18-21). Physical therapists can find valuable information for their clinical practice, including assessment protocols, details on passive strategies application, description and periodization of exercise programs, and criteria for progression and RTP. However, as well as for all sport injuries, the context matters. Most RCTs have not been conducted in the 'real world' of professional football, which has specific characteristics related to the biological and sociocultural profile of injured athletes, facilities, and resources available for treatment, physical/technical demands required for RTP, congested game schedule, psychological pressure, among others. Consequently, a successful rehabilitation program evidenced in a given study with recreational athletes, practitioners of football or other sports, without the premise of RTP as early as possible, available for 2-3 weekly rehabilitation sessions, cannot be directly replicated into a high-performance football club. How HSIs are managed by physical therapists who experience the professional football daily routine is still unknown. Therefore, the aim of this study was to describe perceptions and practices of physical therapists from elite Brazilian football clubs regarding the management of athletes with HSI.

METHODS

Study design

This is a cross-sectional study. The participants answered a questionnaire about their perceptions and practices in the management of professional football

players with HSI. The study was approved by the Research Ethics Committee of UFCSPA (Opinion #4,838,243) and all participants signed the consent form.

Participants

The study had the participation of physical therapists linked to the health departments of clubs that competed in the Brazilian Men's Football Championship, 2021 season: Series A (first division, 20 clubs) and Series B (second division, 20 clubs). Considering an average of 3 to 4 physical therapists per club, the population of physical therapists working in clubs in the two main divisions of Brazilian football was estimated at approximately 140 individuals. To guarantee the representativeness of this population, it was stipulated that ¾ of the total clubs (ie, 30 clubs) should have at least one physiotherapist composing the sample of the present study.

Procedures

The questionnaire was developed by the researchers specifically to meet the purpose of the present study. Next, two physical therapists with experience in the professional football environment reviewed the questionnaire to verify cultural issues and adequacy of language to the participants. In addition to demographic aspects of physical therapists, the final version of the questionnaire included 30 questions, divided into 3 sections: (i) questions about the structure and organization of the physical therapy sector of the club where the participants worked; (ii) questions about the physical therapy evaluation in front of an athlete with hamstring muscle injury; and (iii) questions about the rehabilitation program of an athlete with a hamstring injury.

The researchers contacted at least one physical therapist from each of the 40 clubs eligible for the study, who assisted in obtaining the contacts of other physical therapists from their respective clubs. The invitation to participate in the study was sent via WhatsApp Messenger. Physical therapists who showed interest in participating received more details about the study procedures, as well as the guarantee of confidentiality of responses. The participants' doubts were resolved before signing the consent forms.

A flexible deadline was established for participants to send the questionnaire fully answered. Therefore, the return occurred in periods that varied from a few days to a few weeks. As soon as each questionnaire was received, the researcher responsible for data collection reviewed all responses and contacted the participant for clarification when necessary.

Data analysis

Raw data were exported and analyzed on Microsoft Excel software. Exploratory data analysis was performed to determine the distribution of participants' responses, as well as mean and standard deviation for demographic data.

RESULTS

Ninety-five physical therapists from the 40 clubs engaged in Brazilian Championship 2021, Series A and Series B, were directly contacted and invited to participate in the study. Sixty-two physical therapists agreed to answer the survey and returned the questionnaires within the stipulated period (65% adherence). Participants worked in 35 of the 40 potentials clubs for this study

(87.5% representativeness), being 17 clubs engaged in Series A and 18 in Series B. Characteristics of the participants are presented in Table 1. Details regarding structure and organization of their workplaces are presented in Table 2.

Perceptions and practices of physical therapists on the assessment and rehabilitation of players with hamstring strain injury are presented in Tables 3 and 4, respectively. There was missing data in some questions (detailed in the tables) because a few participants did not respond to the researchers' contact to clarify their dubious answers.

<< Table 1 >>

<< Table 2 >>

<< Table 3 >>

<< Table 4 >>

DISCUSSION

Despite the growing volume of investigations involving the rehabilitation of HSI, the present study is a pioneer on the perceptions and practices of physical therapists who work in elite football clubs. The findings highlight the approaches commonly adopted in the management of HSI in high-level footballers who play in Brazilian clubs.

While some physical therapists advocate evaluation immediately after the injury event, others prefer to evaluate the athlete after 24-48 hours. Conversely, all respondents considered the imaging exams as 'important' or 'very important', even in view of its debatable prognostic value for athletes with HSI (8, 9, 10). Involvement of tendon tissue increases the time to RTP following HSI (8), but

only ¼ of respondents adopt the 'British Athletic Muscle Injury Classification' (6), which allows the identification of these cases with worse prognosis. The ‘Munich Consensus Classification’ (5) is adopted by approximately 45% of respondents, either alone or associated with other classifications. In the assessment of pain intensity, numerical rating scale and visual analogic scale share the respondents’ preference, who usually perform pain measurements during contraction, palpation and stretching. Despite the inherent subjectivity of such perception scales, their use is widespread not only in the initial assessment but also pain monitoring throughout rehabilitation (21). Despite the grade 'A' recommendation (ie, strong evidence) for the use of the inclinometer during evaluation of athletes with HSI (17), 39% of respondents only perform subjective analysis of range of motion. Similarly, there is a grade of 'A' recommendation for objective quantification of muscle strength after HSI (17), but 56.5% of respondents apply only manual testing to identify muscle strength deficits.

Most respondents (90%) organize their HSI rehabilitation program in phases. The number of program phases varies between 2 and 9, with the majority adopting 3 or 4 phases (44% and 34%, respectively). Three-phase programs have been the most commonly found in the literature (12, 14-16, 19, 20), although the popular ‘Aspetar Hamstring Protocol’ includes only 2 phases subdivided into 6 stages (24). The progression of athletes within rehabilitation programs is usually based on clinical and functional criteria (11-13, 15, 16, 18-21), and the present study shows that pain (93.5%), muscle strength (89%) and functionality (85.5%) are the most adopted aspects. Interestingly, 76% of respondents use the time elapsed since injury as a criterion for progression of the rehabilitation program,

even though this criterion is not adopted in the main RCTs (11-16, 18-21) or in the ‘Aspetar Hamstring Protocol’ (24).

Electrophysical agents are widely used in the rehabilitation of HSI in professional football (98% of respondents), with analgesic currents (93%), photobiomodulation (89%) and cryotherapy (87%) being the most common ones. It is noteworthy that such interventions were not even addressed in the most recent ‘Clinical Practice Guideline’ (17). Electrostimulation (19) and cryotherapy (12, 18) were included as adjuvants in a few RCTs, while Medeiros et al. (20) did not find differences between the application of photobiomodulation or placebo in the functional rehabilitation of athletes with HSI. The lack of evidence can also be found for manual therapy and other passive interventions. Massage and myofascial release are manual therapy techniques included in some rehabilitation programs (15, 16, 19) and used by 97% of respondents in the present study. Among the other passive techniques (not related to manual therapy), attention is drawn to the fact that the elastic taping is used by almost half of respondents, even with the ineffectiveness of this intervention evidenced in other musculoskeletal conditions (26).

Resistance exercises to strengthen the hamstrings are present in the main RCTs with HSI (11-16, 18-21) and were mentioned by 98% of respondents of the present study. Exercises using body weight and free weights seem to be the most used, although there was a high percentage reporting adoption of other forms of exercise, including isokinetic exercise by more than half of respondents. Askling et al. (11, 13) were the first to demonstrate the benefits of adding exercises with eccentric overload on the time to RTP following HSI. More recently, the Nordic hamstring exercise has been evidenced as an effective strategy to prevent index

and recurrent HSIs (27). Therefore, the adoption of eccentric exercises by 93.5% of the participants is in line with current recommendations (17).

The periodization of resistance training (ie, the organization and manipulation of variables such as weekly frequency, number of series and repetitions per series) is still poorly explored in the sports rehabilitation field (28). Unlike more prolonged rehabilitation programs that provide a periodization closer to that recommended for healthy individuals (29), as in cases of anterior cruciate ligament reconstruction, muscle strengthening following most HSI last just a few weeks. It is also noteworthy that elite football athletes receive daily physiotherapeutic care, often more than once a day. It is a treatment routine different from those implemented by RCTs involving other profiles of athletes and that perform 2-3 weekly sessions (11, 13, 14, 20, 21). Even so, the present study reports that most respondents normally use 3-4 sets per exercise, which is consistent with the volume found in several HSI RCTs (11-13, 15, 16, 18-21). Furthermore, a recent ‘Clinical Practice Guideline’ (17) advocated that successful interventions have included 6 to 12 repetitions per set, depending on exercise intensity, with load and range of motion being increased as tolerated. This number of repetitions is close to the range of 5 to 15 repetitions predominantly used by respondents of the current study.

All respondents declared using exercises aimed at increasing range of motion, mainly dynamic stretching (82%). While the flexibility deficit is not evidenced as a risk factor for HSI (30), the loss of range of motion after HSI seems to justify the attention of clinicians to this aspect, which is considered an intervention with grade of recommendation 'B' (ie, moderate evidence) (17). The same grade of recommendation 'B' is assigned to lumbopelvic stabilization

exercises (17), which are commonly used by 93.5% of respondents. The lumbopelvic stabilization seems to play a role on HSI prevention (31), and since Sherry & Best (18) showed the benefits of a rehabilitation program with lumbopelvic stabilization exercises this type of intervention has been included in the main HSI RCTs (11-13, 15, 16, 18-21).

Sherry & Best (18) also introduced the idea of progressive agility exercises in HSI rehabilitation, which currently achieve a grade of recommendation 'B' (17). In the present study, we addressed this type of intervention within the context of exercises that mimic the functional demands of football (running, changing direction, jumping, passing/kicking, etc.) and we verified the high rate of use of this type of stimulus. Interestingly, sprints have been considered the main HSI mechanism in football (2) and were not included in the rehabilitation programs of some respondents of our survey. It is possible, however, that other members of the health/coaching staff (eg, strength and conditioning coaches) are in charge for the transition to the field phase in some clubs. Considering the potential preventive effect of exposure to sprints on HSI risk (32), the inclusion of this type of stimulus in more advanced phases of rehabilitation programs seems advisable.

All respondents reported undergoing periodic assessments throughout rehabilitation, with pain (84%) and muscle strength (82%) being the most measured outcomes. Regarding the assessments carried out for decision-making about RTP, we observed heterogeneity of responses within a range of outcomes. Muscle strength levels (71%) and performance in sprints/high-speed running (58%) are the only outcomes used as criteria for discharge by more than half of respondents. According to a worldwide survey on RTP practices following HSI in premier league football teams (33), absence of pain, hamstring strength, training

load and functional performance/sport-specific tests were the most frequently outcomes, but there was no consistent information given to advance knowledge on specific metrics and thresholds for criteria. The predictive value of such criteria for re-injury rate and its specific cut-offs for professional football players should be further investigated.

Some limitations of this study should be acknowledged. First, considering that only Brazilian physical therapists participated in this research, the results do not necessarily reflect the management provided to athletes with HSI in other countries. Aspects related to the professional training of physical therapists in Brazil may affect the respondents' choices, as well as social, psychological, and cultural aspects of Brazilian football. Therefore, caution is needed when comparing our findings with other football contexts worldwide. Second, the data collection instrument (ie, self-completed questionnaire) is prone to inconsistent responses. We minimized this limitation through direct contact with the participants for clarification after completing the questionnaires, leading to a very low number of missing data.

CONCLUSION

The present study allowed the sports physical therapy community to become aware of the approach usually adopted in the management of athletes with HSI who play in Brazilian elite football clubs. Despite the heterogeneity of choices regarding assessment practices, almost all respondents use imaging exams, adopt injury classification scales, and evaluate aspects related to pain, range of motion, muscle strength, functional and psychological status of athletes with HSI. Rehabilitation programs are usually divided into 3-4 phases.

Electrophysical agents, manual therapy, stretching, strengthening exercises, lumbopelvic stabilization exercises and exercises that mimic the functional demands of football are used by most respondents. Muscle strength was the most reported RTP criterion.

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TABLES

Table 1. Characteristics of participants.

Demographic data	**mean±SD (Min; Max) or distribution**
Experience as a physical therapist (years)	13.1±6.8 (1; 30)
Experience with professional football (years)	9.5±6.7 (0.5; 26)
Experience in the professional team of the current club (years)	7.0±6.4 (0.25; 26)
Professional/Academic degrees (distribution)	
- SONAFE specialist certification	12 (19.4%)
- Specialization course	46 (74.2%)
- Master's degree	11 (17.7%)
- Doctoral degree	3 (4.8%)

Max, maximum; Min, minimum; SD, standard deviation; SONAFE, Brazilian National Society of Sports Physical Therapy.

Table 2. Characteristics of the participants' workplaces. Results are presented as absolute and percent distribution.

Question	Answer	N (%)
1) In addition to the physical therapy room, what facilities do you have access for rehabilitation activities?	Football field	62 (100%)
	Gym room	62 (100%)
	Pool	37 (59.7%)
	Grass court (natural or synthetic)	28 (45.2%)
	Sand court	26 (41.9%)
	Multi-sport court	7 (11.3%)
2) Regarding electrophysical agents, which ones do you have available at the club?	Cryotherapy	62 (100%)
	Analgesic currents (eg, TENS)	62 (100%)
	Pneumatic compression boots	61 (98.4%)
	Excitomotor currents (eg, NMES)	60 (96.8%)
	Therapeutic ultrasound	57 (91.9%)
	Photobiomodulation (ie, lasertherapy)	56 (90.3%)
	Diathermy (eg, short wave, microwave)	53 (85.5%)
	Compression boots with cryotherapy	53 (85.5%)
	Shock waves	27 (43.5%)
	Magnet therapy	23 (37.1%)
	Intratissue percutaneous electrolysis	22 (35.5%)
	Others	3 (4.8%)
3) Regarding resistance exercise, which resources do you have available at the club?	Free weights (eg, dumbbells, barbells, plates)	62 (100%)
	Weight machines (eg, leg-press, leg curl)	62 (100%)
	Elastic bands	62 (100%)
	Isokinetic dynamometer	42 (67.7%)
	Pneumatic equipment	36 (58.1%)
	Isoinertial equipment	28 (45.2%)
	Others	6 (9.7%)
4) Regarding aerobic exercise, which resources do you have available at the club?	Treadmill	62 (100%)
	Exercise bike	62 (100%)
	Track or outdoor space	60 (96.8%)
	Elliptical	43 (69.4%)
	Others	6 (9.7%)
5) Is there a coordinator in the physical therapy sector?	No	14 (22.6%)
	Yes	48 (77.4%)
6) Is there a physical therapist in the field during training sessions?	Always	25 (40.3%)
	Sometimes	32 (51.6%)
	Never	4 (6.5%)
	**missing data (n=1)*	
7) Is there a physical therapist in the field during games?	Always	35 (56.5%)
	Sometimes	17 (27.4%)
	Never	10 (16.1%)
8) Do the club's physical therapists follow a standard protocol for assessment of athletes with HSI?	No	11 (17.7%)
	Yes	51 (82.3%)
9) Do the club's physical therapists follow a standard protocol for rehabilitation of athletes with HSI?	No	17 (27.4%)
	Yes	45 (72.6%)

10) Do the club's physical therapists follow a standard protocol for RTP of athletes with HSI?	No	7 (11.3%)
	Yes	55 (88.7%)

HSI, hamstring strain injury; NMES, neuromuscular electrical stimulation; RTP, return to play; TENS, transcutaneous electrical nerve stimulation.

Table 3. Perceptions and practices of physical therapists on the assessment of players with hamstring strain injury. Results are presented as absolute and percent distribution.

Question	Answer	N (%)
1) How long after the injury event do you believe is the best time to evaluate athletes with HSI?	Immediately after the injury	11 (17.7%)
	First 12 h after injury	18 (29%)
	12-24 h after injury	22 (35.5%)
	24-48 h after injury	11 (17.7%)
	More than 48 h after the injury	0
2) Do you usually have imaging exams of athletes with HSI?	No	0
	Yes	62 (100%)
3) How important is it for you to have imaging exams of athletes with HSI?	Very important	46 (74.2%)
	Important	16 (25.8%)
	Little important	0
	Not important	0
4) Do you use any classification system for HSI? If yes, which one(s)?	No	0
	Yes	62 (100%)
	Munich Consensus	28 (45.2%)
	British Classification	15 (24.2%)
	Subjective classification (mild, moderate, severe)	15 (24.2%)
	Classification in degrees (I, II, III)	12 (19.3%)
5) Do you assess pain of athletes with HSI?	No	0
	Yes	62 (100%)
If yes, what parameters are evaluated?	Intensity of pain	58 (93.5%)
	Site of pain	54 (87.1%)
	Extension of the painful zone	48 (77.4%)
If yes, which method(s) do you use?	Numeric rating scale	37 (59.7%)
	Visual analogic scale	39 (62.9%)
	Pressure algometry	3 (4.8%)
If yes, under what conditions is pain evaluated?	Pain on contraction	62 (100%)
	Pain on palpation	61 (98.4%)
	Pain on stretching	55 (88.7%)
	Pain at rest	37 (59.7%)
	Pain during any specific test	17 (27.4%)
6) Do you assess range of motion of athletes with HSI? If yes, which method do you use?	No	1 (1.6%)
	Yes	60 (96.8%)
	**missing data (n=1)*	
	Quantitative analysis (eg, goniometry)	36 (58.1%)
	Subjective analysis (eg, visual inspection)	35 (56.5%)
7) Do you assess the hamstring strength of athletes with HSI?	No	0
	Yes	62 (100%)
If yes, which method do you use?	Testing against manual resistance	52 (83.9%)
	Testing with hand-held dynamometer	22 (35.5%)
	Testing with load cells	6 (9.7%)

If yes, in what type(s) of muscle contraction?	Isometric	48 (77.4%)
	Concentric	44 (71%)
	Eccentric	39 (62.9%)
8) Do you assess the functional status of athletes with HSI? If yes, how?	No	0
	Yes	62 (100%)
	Basic movements (eg, squat, step up/down)	51 (82.3%)
	Running	29 (46.8%)
	Askling H-test	26 (41.9%)
	Walking	25 (40.3%)
	Jump	16 (25.8%)
9) Do you assess the psychological status of athletes with HSI? If yes, how?	No	1 (1.6%)
	Yes	61 (98.4%)
	During a casual conversation	51 (82.3%)
	Refers to the club psychologist when necessary	16 (25.8%)
	Uses a questionnaire	3 (4.8%)

HSI, hamstring strain injury.

Table 4. Perceptions and practices of physical therapists on the rehabilitation of players with hamstring strain injury. Results are presented as absolute and percent distribution.

Question	Answer	N (%)
1) Do you usually organize the rehabilitation program for athletes with HSI in phases? If yes, how many?	No	5 (8.1%)
	Yes	56 (90.3%)
	**missing data (n=1)*	
	2 phases	2 (3.2%)
	3 phases	28 (45.2%)
	4 phases	21 (33.9%)
	5 phases	2 (3.2%)
	8 phases	2 (3.2%)
	9 phases	1 (1.6%)
2) Do you usually apply specific criteria for the progression of the rehabilitation program? If yes, which one(s)?	No	1 (1.6%)
	Yes	59 (95.2%)
	**missing data (n=1)*	
	Pain	58 (93.5%)
	Strength	55 (88.7%)
	Functional status	53 (85.5%)
	Time	45 (72.6%)
	Range of motion	42 (67.7%)
	Psychological status	24 (38.7%)
3) Do you usually apply electrophysical agents in the rehabilitation of athletes with HSI? If yes, which one(s)?	No	0
	Yes	62 (100%)
	Analgesic currents (eg, TENS)	58 (93.5%)
	Photobiomodulation (ie, lasertherapy)	55 (88.7%)
	Cryotherapy	54 (87.1%)
	Compression boots with cryotherapy	46 (74.2%)
	Diathermy (eg, short wave, microwave)	46 (74.2%)
	Pneumatic compression boots	43 (69.4%)
	Therapeutic ultrasound	39 (62.9%)
	Excitomotor currents (eg, NMES)	21 (33.9%)
	Intratissue percutaneous electrolysis	19 (30.6%)
	Magnet therapy	11 (17.7%)
	Shock waves	11 (17.7%)
4) Do you usually apply manual therapy techniques in the rehabilitation of athletes with HSI? If yes, which one(s)?	No	1 (1.6%)
	Yes	60 (96.8%)
	Myofascial release	59 (95.2%)
	Mobilization	47 (75.8%)
	Manipulation	37 (59.7%)
	Massage	33 (53.2%)
	Lymphatic drainage	19 (30.6%)
	Osteopathy	16 (25.8%)
	Maitland	1 (1.6%)
	Holfing	1 (1.6%)
5) Do you usually apply other passive therapies in	No	23 (37.1%)
	Yes	39 (62.9%)

the rehabilitation of athletes with HSI? If yes, which one(s)?	Elastic taping	30 (48.4%)
	Locally applied substances (eg, ointments)	12 (19.4%)
	Rigid taping	2 (3.2%)
	Bracing	2 (3.2%)
	Compressive stockings	1 (1.6%)
	Acupuncture	1 (1.6%)
	Dry needling	1 (1.6%)
6) Do you usually apply exercises to increase range of motion in the rehabilitation of athletes with HSI? If yes, which one(s)?	No	0
	Yes	62 (100%)
	Dynamic stretching	51 (82.3%)
	Static stretching	27 (43.5%)
	Ballistic stretching	27 (43.5%)
	Pilates	12 (19.4%)
	Proprioceptive Neuromuscular Facilitation	11 (17.7%)
	Isostretching	1 (1.6%)
	Muligan	1 (1.6%)
	Maitland	1 (1.6%)
7) Do you usually apply exercises for muscular strengthening in the rehabilitation of athletes with HSI?	No	1 (1.6%)
	Yes	61 (98.4%)
If yes, do you include exercises with eccentric overload?	No	2 (3.2%)
	Yes	58 (93.5%)
	**missing data (n=1)*	
If yes, what types of exercise do you most commonly use?	Body-weight exercises	55 (88.7%)
	Free weights (eg, barbells, plates, shin guards)	54 (87.1%)
	Exercises on machines (eg, leg curl)	51 (82.3%)
	Isometric exercises	47 (75.8%)
	Exercises with resistance bands	40 (64.5%)
	Isokinetic exercises	32 (51.6%)
If yes, how many sets per exercise do you most commonly use?	1 set	0
	2 sets	5 (8.1%)
	3 sets	40 (64.5%)
	4 sets	28 (45.2%)
	5 sets	3 (4.8%)
	**missing data (n=2)*	
If yes, what repetition range per set do you most commonly use?	<5 reps	2 (3.2%)
	5-10 reps	33 (53.2%)
	10-15 reps	38 (61.3%)
	15-20 reps	5 (8.1%)
	>20 reps	0
	** missing data (n=2)*	
8) Do you usually apply lumbopelvic stabilization exercises in the	No	4 (6.5%)
	Yes	58 (93.5%)

rehabilitation of athletes with HSI? If yes, which one(s)?	Static exercises	29 (46.8%)
	With slow/controlled movements	46 (74.2%)
	With explosive movements	26 (41.9%)
	With unexpected stimuli (perturbations)	20 (32.3%)
9) Do you usually apply exercises that mimic functional demands of football in the rehabilitation of athletes with HSI? If yes, which one(s)?	No	3 (4.8%)
	Yes	59 (95.2%)
	Breaking and acceleration	59 (95.2%)
	High-speed turns and changes of direction	58 (93.5%)
	High-speed running	57 (91.9%)
	Jumps and landings	56 (90.3%)
	Passes and kicks	56 (90.3%)
	Sprints	55 (88.7%)
10) Do you normally carry out periodic assessments during the rehabilitation program for athletes with HSI? If yes, which ones?	No	0
	Yes	62 (100%)
	Pain	52 (83.9%)
	Muscle strength	51 (82.3%)
	Functional status	41 (66.1%)
	Range of motion	37 (59.7%)
	Askling H-test	8 (12.9%)
	SLHB test	8 (12.9%)
	Sports gesture on the field	8 (12.9%)
	GPS data	6 (9.7%)
	Imaging exam (ultrasound)	5 (8.1%)
	Psychological status	5 (8.1%)
	Thermography	3 (4.8%)
11) Do you adopt specific criteria to release athletes following HSI to return to training with the team (or with the staff responsible for transition)? If yes, which one(s)?	No	2 (3.2%)
	Yes	60 (96.8%)
	Muscle strength	44 (71%)
	Sprints/high-speed running	36 (58.1%)
	Intense actions (eg, accelerations)	27 (43.5%)
	Pain	27 (43.5%)
	External workload (GPS metrics)	20 (32.3%)
	Range of motion	17 (27.4%)
	Functional tests (eg, hops, H-test, SLHB)	17 (27.4%)
	Imaging exam	14 (22.6%)
	Time since injury event	2 (3.2%)

GPS, Global Positioning System; HSI, hamstring strain injury; NMES, neuromuscular electrical stimulation; SLHB, single-leg hamstring bridge; TENS, transcutaneous electrical nerve stimulation.

5 CONCLUSÃO GERAL

O presente estudo foi pioneiro na investigação acerca das percepções e práticas de fisioterapeutas que atuam em clubes de elite de futebol acerca do manejo de atletas com lesões musculares de isquiotibiais. A representatividade de mais de 87% dos clubes por meio dos 62 fisioterapeutas entrevistados confere validade aos achados para com a população estudada, de modo que os achados deste estudo fornecem para a comunidade fisioterapêutica esportiva o conhecimento sobre a abordagem usualmente recebida por atletas de elite do futebol brasileiro.

Apesar da heterogeneidade de escolhas em relação às práticas de avaliação de atletas com lesão muscular de isquiotibiais, há unanimidade dos fisioterapeutas para com a utilização de exames de imagem e adoção de escalas de classificação da lesão. Quase todos avaliam aspectos relacionados à dor, amplitude de movimento, força muscular, estado funcional e psicológico dos atletas. Em síntese, os programas de reabilitação geralmente são divididos em 3-4 fases. Agentes eletrofísicos, terapia manual, exercícios de alongamento, fortalecimento e estabilização lombopélvica, bem como exercícios que mimetizem demandas funcionais do futebol são usados pela maioria dos fisioterapeutas. Dentre os critérios de retorno ao esporte, a força muscular é o mais frequentemente avaliado.

Por fim, destaca-se que algumas divergências encontradas entre as percepções e práticas reportadas pelos entrevistados e as evidências provenientes dos principais ensaios clínicos randomizados envolvendo indivíduos com lesão muscular de isquiotibiais precisam ser relativizadas diante

do contexto específico em que estão inseridos os fisioterapeutas participantes do presente estudo, o qual se difere daquele encontrado na grande maioria das investigações científicas da área. Mais pesquisas precisam ser feitas dentro do "mundo real" do futebol profissional brasileiro e mundial para que a evolução científica contribua de forma mais impactante sobre a prática clínica dos fisioterapeutas que atuam neste contexto.

6 IMPACTOS DO TRABALHO

O conjunto de informações aqui reportadas sobre as percepções e práticas dos fisioterapeutas que vivem o dia a dia do futebol profissional elucida os processos envolvidos no manejo de atletas acometidos pela lesão muscular de isquiotibiais. Isso tem impacto direto sobre a comunidade científica, que a partir dos nossos achados é capaz de encontrar lacunas e inconsistências entre o que tem sido evidenciado pela literatura e aquilo que de fato é executado na prática dos fisioterapeutas no futebol profissional, direcionando futuras investigações com perguntas de pesquisa relevantes aos clínicos. Ao mesmo tempo, nosso trabalho também pode ter impacto sobre a comunidade dos fisioterapeutas do esporte, uma vez que pela primeira vez terão a oportunidade de refletir sobre a sua atuação clínica individual tendo como base de comparação um grupo de 62 profissionais que ocupam cargos em clubes de elite do futebol brasileiro. Por fim, tanto o impacto sobre pesquisas futuras quanto sobre a atuação clínica dos fisioterapeutas do esporte conduz a potenciais impactos econômicos. No âmbito do esporte profissional, a evolução das práticas de manejo das lesões musculares pode repercutir em uma redução do tempo de afastamento e da taxa de recidivas, o que significa menos prejuízos financeiros aos clubes devido à ausência de atletas em campo. Para o atleta, ter uma reabilitação otimizada e diminuir o número de recidivas significa maiores oportunidades de sucesso profissional e longevidade na carreira de atleta. Diante destes e outros potenciais impactos deste estudo, instiga-se que mais investigações sejam conduzidas com o objetivo de retratar a prática clínica dos fisioterapeutas que atuam em diferentes contextos esportivos.

ANEXOS

ANEXO A

Parecer Conselho de Ética

UNIVERSIDADE FEDERAL DE CIÊNCIAS DA SAÚDE DE PORTO ALEGRE

PARECER CONSUBSTANCIADO DO CEP

DADOS DO PROJETO DE PESQUISA

Título da Pesquisa: Reabilitação da lesão muscular dos isquiotibiais: Percepções e práticas dos fisioterapeutas que atuam em clubes de elite do futebol brasileiro

Pesquisador: Bruno Manfredini Baroni

Área Temática:

Versão: 1

CAAE: 48685321.6.0000.5345

Instituição Proponente: Universidade Federal de Ciências da Saúde de Porto Alegre

Patrocinador Principal: Financiamento Próprio

DADOS DO PARECER

Número do Parecer: 4.838.243

Apresentação do Projeto:

Introdução: A lesão por estiramento dos músculos isquiotibiais está entre as mais prevalentes em esportes que envolvam sprints e corridas em alta velocidade, além de apresentar um elevado índice de recidiva. No âmbito do futebol profissional, o enfoque da reabilitação tem sido devolver o atleta ao treinamento no menor tempo possível, sem sintomas e com parâmetros funcionais restabelecidos. Ensaios controlados aleatorizados têm fornecido direcionamentos para os programas de reabilitação desta lesão. No entanto, nenhum destes estudos foi desenvolvido no "mundo real" do futebol profissional. Portanto, o conhecimento acerca das percepções e práticas dos fisioterapeutas que vivem o dia-a-dia do futebol profissional são importantes para a elucidação dos processos envolvidos no processo de reabilitação da lesão muscular de isquiotibiais neste contexto específico. Objetivo: Verificar as percepções e práticas dos fisioterapeutas que atuam em clubes de elite do futebol brasileiro sobre a reabilitação da lesão muscular de isquiotibiais. Métodos: Este estudo é caracterizado como observacional descritivo transversal. Serão convidados a participar da pesquisa profissionais que atuam na área de reabilitação em clubes que disputam a 1ª e 2ª divisões do Campeonato Brasileiro de futebol masculino, no ano de 2021. Todas as entrevistas serão realizadas por um mesmo pesquisador e por meio de plataformas virtuais (Googlemeet ou Whatsapp). O pesquisador seguirá um roteiro composto por 48 questões, as quais estão subdivididas em cinco seções: (1) questões sobre o perfil dos fisioteraputas responsáveis pelo setor de reabilitação do clube; (2) questões sobre o

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estruturação e logística no seu clube; (3) questões sobre a avaliação fisioterapêutica frente a lesão muscular dos isquiotibiais; (4) programa de reabilitação das lesões musculares dos isquiotibiais; (5) critérios para o retorno ao esporte nas lesões musculares dos isquiotibiais. As entrevistas deverão durar entre 20 e 30 minutos. Serão utilizados valores de ocorrência para a análise descritiva dos dados, enquanto a análise associativa será realizada pelo teste de Qui-quadrado. O nível de significância adotado para o estudo será de 5% (= 0,05) e o programa estatístico para análise dos dados será o SPSS 18.0.

Objetivo da Pesquisa:

Verificar as percepções e práticas dos fisioterapeutas que atuam em clubes de elite do futebol brasileiro sobre a reabilitação da lesão muscular de isquiotibiais.

Avaliação dos Riscos e Benefícios:

Riscos:

A participação no presente estudo não confere riscos aparentes. Registre-se que o voluntário será indenizado por qualquer evento adverso comprovadamente decorrente da pesquisa. Um possível risco é a sensação de desconforto ao responder alguma questão.

Benefícios:

O único benefício concedido aos participantes será o relatório fornecido ao final do estudo, no qual os pesquisadores apresentarão os achados referentes ao conjunto de clubes participantes. Reitera-se que não serão apresentados dados individuais dos clubes

Comentários e Considerações sobre a Pesquisa:

Vide conclusão.

Considerações sobre os Termos de apresentação obrigatória:

Apresentados e adequados

Recomendações:

De acordo, sem recomendações.

Conclusões ou Pendências e Lista de Inadequações:

A pesquisa encontra-se de acordo com a Norma vigente Resolução 466/12 para pesquisa em seres humanos.

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Considerações Finais a critério do CEP:

De acordo com o parecer do Relator.

Este parecer foi elaborado baseado nos documentos abaixo relacionados:

Tipo Documento	Arquivo	Postagem	Autor	Situação
Informações Básicas do Projeto	PB_INFORMAÇÕES_BÁSICAS_DO_PROJETO_1784961.pdf	30/06/2021 10:43:45		Aceito
Folha de Rosto	FolhaDeRosto_assinada.pdf	30/06/2021 10:43:32	Bruno Manfredini Baroni	Aceito
Projeto Detalhado / Brochura Investigador	Projeto_Henrique_Valente.pdf	29/06/2021 23:18:28	Bruno Manfredini Baroni	Aceito
Declaração de concordância	TCDU.pdf	29/06/2021 23:17:50	Bruno Manfredini Baroni	Aceito
Declaração de Pesquisadores	TCER.pdf	29/06/2021 23:17:34	Bruno Manfredini Baroni	Aceito
TCLE / Termos de Assentimento / Justificativa de Ausência	TCLE.pdf	29/06/2021 23:17:12	Bruno Manfredini Baroni	Aceito

Situação do Parecer:

Aprovado

Necessita Apreciação da CONEP:

Não

PORTO ALEGRE, 09 de Julho de 2021

Assinado por:
Fernanda Bordignon Nunes
(Coordenador(a))