



Original research

A Delphi survey and international e-survey evaluating the Doha agreement meeting classification system in groin pain: Where are we 5 years later?

Willem M.P. Heijboer^{a,b}, Adam Weir^{a,c,d}, Eamonn Delahunty^{e,f}, Per Hölmich^g, Anthony G. Schache^h, Johannes L. Tol^{a,b}, Robert-Jan de Vos^c, Zarko Vuckovic^a, Andreas Serner^{a,*}

^a Aspetar Orthopaedic and Sports Medicine Hospital, Qatar

^b Amsterdam UMC, University of Amsterdam, Department of Orthopaedic Surgery, Amsterdam Movement Sciences, Amsterdam, Netherlands

^c Department of Orthopaedics and Sports Medicine, Erasmus MC University Medical Centre, the Netherlands

^d Sport Medicine And Exercise Clinic Haarlem (Sport en Beweeg Kliniek), Haarlem, the Netherlands

^e School of Public Health, Physiotherapy and Sports Science, University College Dublin, Ireland

^f Institute for Sport and Health, University College Dublin, Ireland

^g Department of Orthopedic Surgery, Sports Orthopedic Research Center—Copenhagen (SORC-C), Arthroscopic Center, Copenhagen University Hospital, Denmark

^h La Trobe Sport and Exercise Medicine Research Centre, La Trobe University, Australia

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ABSTRACT

Objectives: To evaluate the adoption of and opinions on the Doha agreement meeting classification in groin pain in athletes.

Design: Delphi survey and e-survey.

Methods: A 2-round Delphi survey among the Doha agreement meeting expert group, and a separate international e-survey among clinicians who regularly assess athletes with groin pain. Clinical cases were presented, and participants provided their preferred terms for the diagnoses. All participants reported if they had adopted the Doha agreement meeting classification system in their practice. The Doha agreement meeting experts also shared opinions on amendments to the classification system, and reported their level of agreement with suggested statements. **Results:** In the Delphi survey, the Doha agreement meeting experts ($n = 21$) reported 8–11 different terms for their primary diagnosis of each presented case. The Doha agreement meeting terminology was used by 50–67% of these experts. In the international e-survey ($n = 51$), 12–15 different diagnostic terms were reported in each clinical case, and 43–55% of clinicians used the Doha agreement meeting terminology. Adoption of the Doha agreement classification system in practice was reported by 73–82% of the Doha agreement meeting experts and 57–69% of the clinicians in the international e-survey. The experts suggested 49 statements regarding amendments to the classification system. Seven of these reached >75% agreement or disagreement.

Conclusions: Five years after publication, the majority of the Doha agreement expert group and independent international clinicians report adopting the Doha agreement meeting classification system. There is still considerable heterogeneity in diagnostic terminology when clinical cases are presented, and disagreement on statements related to amendments of the current classification system.

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Practical implications

- The high adoption of the Doha agreement meeting classification system indicates a good perceived clinical utility by clinicians.
- The Doha agreement meeting classification system can assist in clear communication among clinicians.
- Future consensus statements should include a structured knowledge transfer and dissemination plan, as well as evaluating their recommendations over time.

1. Introduction

Diagnosing longstanding groin pain in athletes is challenging. Within the groin region, numerous anatomical structures are located in close proximity and there is no gold standard for diagnosis.^{1,2} Complexity is added by numerous diagnostic terms being used to describe similar conditions.^{3,4} A previous study with 23 groin pain experts reported 18 and 22 different terms to describe preferred diagnoses in 2 clinical cases of athletes with longstanding groin pain.⁴

Homogenous terminology is important beyond just improving communication and interpreting research results. Different diagnostic terms used for similar conditions can lead to different management strategies

* Corresponding author.

E-mail address: andreas.serner@aspetar.com (A. Serner).

and can impact patients psychosocially.⁵ The 2015 Doha agreement meeting on groin pain in athletes aimed to resolve the problem of heterogeneous terminology by agreeing to standard terminology and definitions. A clinical classification system was developed based on injury history and clinical examination. It recommended the use of 4 defined clinical entities (adductor-, inguinal-, iliopsoas- and pubic-related groin pain), and is referred to as the Doha agreement meeting classification system.²

Recommendations from agreement meetings or consensus statements are rarely evaluated, although they may change over time due to emerging evidence and/or user experiences.^{6,7} The Doha agreement meeting classification system has received considerable academic interest since its publication. A Google Scholar citation search in June 2021 revealed 325 citations. Despite this academic interest, the acceptance and real-world adoption of the Doha agreement meeting classification remains unknown. To investigate this issue, we conducted a study with 2 different groups: Firstly, a Delphi survey among the experts who participated in the Doha agreement meeting. Secondly, an international e-survey among clinicians who regularly assess and treat athletes with groin pain.

The aims of the Delphi survey were to: (1) determine if the experts who participated in the Doha agreement meeting now use more uniform terminology; (2) evaluate to what extent the Doha agreement meeting classification system has been adopted by the original experts; and (3) seek opinions on potential amendments and quantify the level of agreement among the experts for the proposed amendments.

The aim of the international e-survey was to evaluate to what extent the terminology and definitions outlined in the Doha agreement meeting classification system have been adopted by clinicians who regularly assess and treat athletes with groin pain.

2. Methods

We undertook: (1) a 2-round Delphi survey among the members of the Doha agreement meeting expert group² and; (2) a separate international e-survey among clinicians who regularly assess and treat athletes with groin pain. The protocols for these surveys were registered online prior to commencement: (dx.doi.org/10.17504/protocols.io.8m7hu9n and dx.doi.org/10.17504/protocols.io.bgkfstjtn). An ethics exemption was obtained from the Institutional Review Board of the Amsterdam Medical Centre, the Netherlands. The surveys were administered electronically via Google Forms. Participant responses were housed in Google Forms, with the independent study coordinator (WH) being the only person with access to this database. Once all respondents completed the survey, data were exported from the Google Forms database to a password-protected computer. A detailed description of the Delphi survey and e-survey methods is available in Supplementary Appendix A. A brief description of the methods is presented below.

Delphi survey. We invited all 24 experts from the original Doha agreement meeting to participate in a 2-round Delphi survey.⁴ Both Delphi survey rounds were opened for responses for 4 weeks (November 2019–January 2020). Email reminders were sent weekly after the initial email. If experts did not respond, they were excluded only for the specific round. All participating experts gave their informed consent.

In Delphi round 1, we asked the experts to report: 1) demographical information; 2) up to 3 terms to describe the most likely diagnosis for 3 presented clinical cases (Supplementary Appendix B); 3) if they have adopted the Doha agreement meeting classification system in different parts of their practice; 4) if they felt that terms and/or definitions of the 4 defined clinical entities of groin pain (adductor-, inguinal-, iliopsoas- and pubic-related groin pain) should be amended. Free text answers were provided and used for Delphi survey round 2. The electronic questionnaire of Delphi round 1 is available in Supplementary Appendix C.

The anonymized statements and suggestions for amendments of the Doha agreement meeting classification system from Delphi round 1 were rephrased by AW, ASe, WH, and ZV to generate statements that

reflected the original suggestions. Duplicate suggestions were amalgamated. In Delphi round 2, each expert scored each statement on a 5-point Likert-scale (strongly agree – agree – neither agree or disagree – disagree – strongly disagree). The aim was to quantify the level of agreement rather than to reach consensus. We pre-defined cut-off scores for agreement, as described in previous research^{10,11}:

0–50% – no agreement

50–75% – partial agreement

≥75% – agreement/disagreement

The answers “strongly agree” and “agree” on the Likert scale were grouped as “agree” to calculate the proportions of agreement for the different statements. Likewise, the answers “strongly disagree” and “disagree” on the Likert scale were grouped as “disagree”.

International e-survey. Clinicians were recruited by contacting all 49 FIFA Medical Centres of Excellence and all 11 International Olympic Committee (IOC) research centers. Two centers are recognized as both FIFA and IOC-centers, thus in total 58 centers were contacted and asked for the participation of up to 3 clinicians who regularly assess and treat athletes with groin pain. Clinicians were eligible for inclusion if they: 1) assessed at least 1 athlete with groin pain every month during the past year, and 2) could understand and answer in English. Clinicians who were authors of any of the consensus statements addressing diagnostic terminology in groin pain in athletes^{2,12,13} were excluded. The link to the e-survey was sent directly to all registered clinicians.

Electronic informed consent was given before proceeding to the survey (Supplementary Appendix D). The survey was open for responses for 4 weeks (June 2020). Email reminders were sent at 2 and 3 weeks after the initial email. Survey participation was anonymous, and a unique code was assigned to each respondent.

We asked the clinicians to report: 1) demographical information, 2) if they use a diagnostic classification system or specific diagnostic terminology when assessing and treating athletes with groin pain, 3) up to 2 terms to describe the most likely diagnosis for 2 presented clinical cases (Supplementary Appendix B), 4) to explain their reason for not using any diagnostic classification system, if this was the case. The 2 presented clinical cases were identical to cases 1 and 2 as used in the Delphi survey of the Doha agreement meeting expert group. To limit the response time with the objective of improving response rate,¹⁴ case 3 was excluded from the international e-survey and no imaging reports were presented to e-survey clinicians.

Data analysis. Participant characteristics were reported according to measurement scale and distribution. Normality for continuous data was assessed by visual inspection and the Shapiro–Wilk test in R-studio (RStudio Team (2016). RStudio: Integrated Development for R. RStudio, Inc., Boston, MA URL: <http://www.rstudio.com>). Participant responses were reported as frequency and percentages. In the registered protocol, we originally planned to calculate Fleiss' kappa statistic for the diagnoses of the three cases to compare results with the 2015 Delphi study.⁴ However, upon further reflection, we realized that this analysis would actually not be appropriate because the assumption, that the response variable (diagnosis) must have the same number of categories for each rater, would be violated.¹⁵ Therefore, this analysis was not undertaken.

3. Results

Delphi survey. Twenty-three experts (96%) responded to Delphi survey round 1. For the clinical cases, 21 experts were eligible for reporting diagnoses (AW, RJdV excluded). The responses from 1 expert for diagnoses after imaging were not recorded due to a technical issue, while 1 expert did not register a diagnosis for case 3. Demographic characteristics of the experts are described in Table 1.

All reported terms for diagnoses for the 3 clinical cases are presented in Supplementary Appendix E. For a primary (most likely) diagnosis, 8–11 different (combinations of) terms were reported by the experts. Supplementary Appendix F presents the reported primary diagnoses

Table 1
Participant characteristics.

Characteristics	Delphi survey participants (n = 23)	International e-survey participants (n = 51)
Sex		
– Male	21 (91%)	44 (86%)
– Female	2 (9%)	7 (14%)
Age (y)	53 (46–60)	41 (37–53)
Different countries	11	22
Profession		
– Sports physician	7 (30%)	22 (43%)
– Physiotherapist	6 (26%)	13 (26%)
– Orthopedic surgeon	4 (17%)	13 (26%)
– General surgeon	5 (22%)	–
– Radiologist	1 (5%)	2 (4%)
– Orthopedic physician assistant	–	1 (2%)
Working years	27 (20–32)	15 (10–25)
Number of athletes with groin pain assessed per month	8 (5–23)	5 (2–15)

Data reported as n (%) or median (interquartile range).

of all participants (Delphi survey and e-survey) and the primary diagnoses reported by the Doha agreement meeting experts during the 2015 Delphi study.⁴

For case 1, 2 experts (2/20, 10%) changed their primary diagnosis after imaging results were revealed. For case 2, 4 experts (4/20, 20%) changed their primary diagnosis after imaging results were revealed. For case 3, a primary and secondary diagnosis were combined since there were two patient-reported pain locations in this case. After revealing available imaging, 3 experts (3/19, 16%) changed their diagnosis. All reported primary diagnoses after imaging for the 3 clinical cases are available in Supplementary Appendix G.

Most experts (73–82%) reported having adopted the Doha agreement meeting classification system “always” or “often” in all 4 domains of practice (Fig. 1): 1) communication with patients (73%), 2) communication with colleagues (82%), 3) in research (77%), and 4) in teaching (82%). A total of 49 different statements regarding amendments to the current classification system were identified for round 2 of the Delphi survey.

Twenty-one experts completed round 2 of the Delphi survey (88%). A table with distributions of agreement level for all statements is available in Supplementary Appendix H. Out of the 49 statements, >75% agreement was reached on 2 statements and partial agreement (50–75%) was reached on 19 statements. No agreement (0–50%) was reached on 28 statements, of which 5 statements reached >75% disagreement (Table 2).

International e-survey. Sixty-eight clinicians of 174 potential participants (up to three clinicians from 58 centers) registered to participate in the survey. Of these 68 clinicians, 51 completed the survey (75%). They worked in 22 different countries on 5 different continents and had multidisciplinary backgrounds (Table 1).

For case 1, 15 different terms were reported as a primary diagnosis, with “inguinal-related groin pain” (43%) and “sports(man)’s hernia” (16%) as the most frequently used terms. For case 2, 12 different terms were reported as a primary diagnosis, with “adductor-related groin pain” (55%), “adductor (longus) tendinopathy” (12%) and “adductor (longus) enthesopathy” (8%) as the most frequently used terms. All reported terms for the primary diagnoses of the 2 clinical cases are presented in Supplementary Appendix F. A full overview of reported terms for the 2 clinical cases is presented in Supplementary Appendix E.

In total, 69% of international clinicians reported using the Doha agreement meeting classification; either in isolation (57%) or in combination with other classification systems (12%). Fifteen clinicians (29%) reported not using any classification system (Table 3).

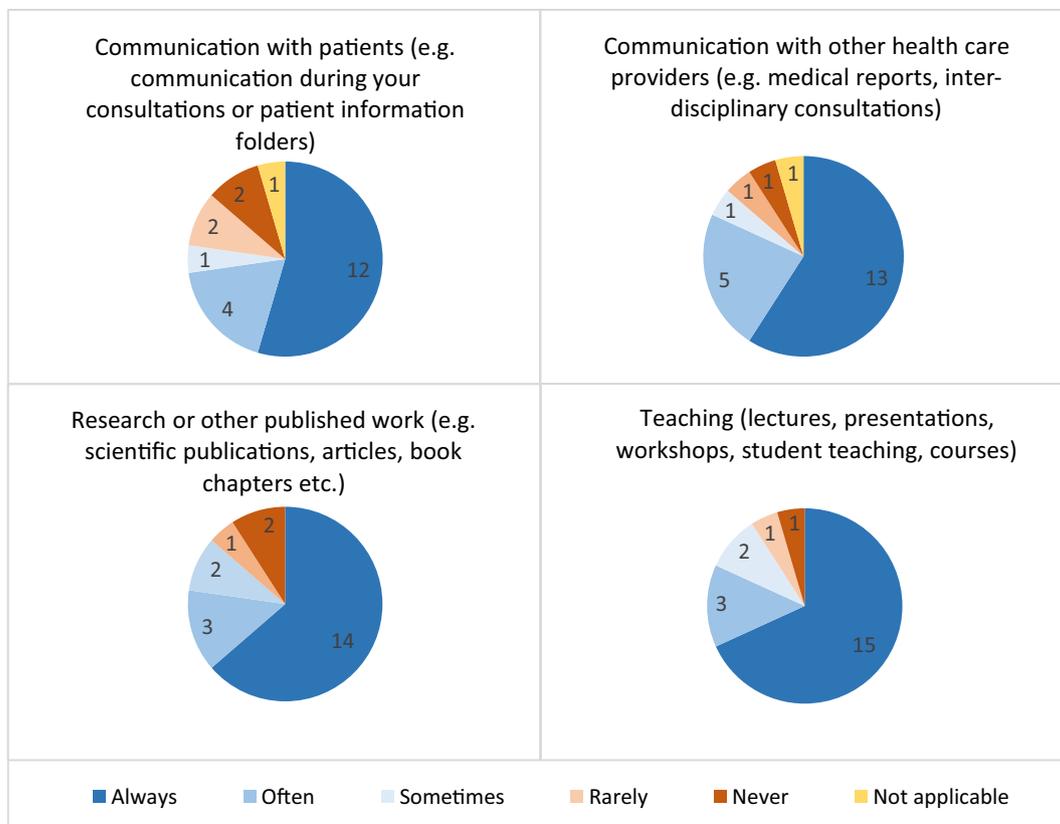


Fig. 1. Current adoption of the Doha agreement meeting classification system by the Doha agreement meeting experts within four domains of practice (n = 22).

Table 2
Statements that reached >75% agreement or > 75% disagreement in Delphi round 2.

General comments and suggested amendments for the Doha agreement meeting classification system (n = 21)	Agreement	Neither agree or disagree	Disagreement
<i>The role of MRI findings needs to be further clarified to improve the Doha agreement meeting classification.</i>	76%	0%	24%
<i>Pubic bone stress, pubic stress fracture and pubic apophysitis should be differentiated since these diagnoses may provide clarification and have a different prognosis and management.</i>	76%	0%	24%
<i>The Doha agreement meeting classification terminology is too vague. The Core is a better term. This includes the entire region of the body from mid-chest to mid-thigh.</i>	5%	5%	90%
<i>“Sportsmen’s Groin” or “Athlete’s Groin” is a better term than “Inguinal-related groin pain”.</i>	5%	5%	90%
<i>We need a completely different classification system, because the Doha agreement meeting classification does not differentiate enough.</i>	9%	9%	81%
<i>The distinction between adductor- and pubic-related groin pain is ambiguous. Having pubic-related groin pain as a separate entity is not necessary.</i>	14%	5%	81%
<i>Adductor-related groin pain and pubic-related groin pain should be combined as entities.</i>	19%	0%	81%

4. Discussion

Five years after publication, the majority of the Doha agreement meeting expert group (73–82%) and independent international clinicians (57–69%) report adopting the terminology of the Doha agreement meeting classification system. However, when clinical cases were presented, only 50–67% of the Doha agreement meeting experts and 43–55% of the independent international clinicians used the actual terminology to describe their diagnosis according to agreed definitions.² Compared to the original 2015 Doha agreement meeting Delphi survey,⁴ where only 26–39% of the experts used the Doha agreement meeting terminology for 2 presented clinical cases, the level of uptake seems to have improved. Only 7 out of 49 statements regarding possible amendments of the current classification reached >75% agreement or disagreement.

During the past decade, 3 consensus statements attempted to address the problem of heterogeneous terminology in groin pain in athletes.^{2,12,13} However, they themselves provided heterogeneous advice. In 2014, The British Hernia Society’s published a position statement focused on the inguinal region, proposing the term “inguinal disruption” instead of the commonly used term “sportsman’s hernia/groin”. In 2015, the Doha agreement meeting classification system recommended the use of 4 defined clinical entities based on patient history and clinical examination.² In 2016, the Italian consensus meeting reported the

umbrella term “groin pain syndrome”, comprising 11 categories and 63 potential (pathoanatomical) causes of groin pain.¹³ Our Delphi survey among the Doha agreement meeting expert group mainly focused on the Doha agreement meeting classification, whereas the international e-survey also addressed the other consensus statements.

Delphi survey. Although the Doha agreement is widely adopted by the Doha agreement meeting expert group, 2–4 experts reported to rarely or never use the classification system in different contexts. The main reported reason for not using the Doha agreement meeting classification by these experts was that they feel the entity approach it is not specific enough. One of these experts stated: “It needs to have e.g. adductor-related groin pain diagnosed as X”. Subclassifications with more specific (pathoanatomical) diagnoses within the current clinical entities could be relevant if these would alter treatment or prognosis.¹⁶ However, evidence on the prognostic value of specific clinical- or imaging findings in longstanding groin pain is lacking. In acute adductor injuries, a recent study showed that palpation pain and/or a palpable defect at the proximal adductor longus insertion is associated with increased time to return to full team training.¹⁷ Such a clinical subclassification within adductor-related groin pain could be a valuable amendment, as it influences prognosis.¹⁶ Identifying similar types of findings in athletes with longstanding groin pain will provide more support for potential subclassifications of the defined entities.

The number of different terms reported for the primary diagnosis of the 3 presented clinical cases (8–11 terms per case in this study versus 9–11 terms per case in the 2015 study⁴) shows that there is still a substantial amount of heterogeneity in terminology being used by the experts. Contrarily, the percentage of experts that use the Doha agreement meeting specific terminology according to the agreed definitions seems to have increased. In 2015, 26–39% of the Doha agreement meeting experts used the Doha agreement meeting terminology for 2 presented clinical cases, compared to 50–67% of the same experts in the present study. Only a limited number of experts changed their diagnosis based on the imaging outcomes. This may be due to the fact that most (50–60%) experts used the Doha agreement criteria (Supplementary Appendix G). It may be that experts with a lot of clinical experience recognize clinical patterns and are therefore more confident in establishing a diagnosis without the use of imaging. It is unknown whether these findings are generalizable for clinicians with less clinical experience in diagnosing athletes with groin pain.

The 50–67% of experts that used the Doha agreement meeting terminology for the presented clinical cases contrasts with the 73–82% of experts who reported having adopted the classification “always” or “often”. A difference in the perception of what defines a diagnosis may have caused these conflicting responses. Historically, the term diagnosis has been used in different ways: to describe the cause of a disease/injury, to describe a disease/injury (without attempt to explain the cause) or to describe symptoms.¹⁸ The Doha agreement meeting classification system and associated definitions are based on localized symptoms and clinical (examination) findings and do not say anything about

Table 3
International e-survey responses on diagnostic terminology (n = 51).

	Response	n (%)
Classification system(s) used when clinically assessing athletes with groin pain (n = 51)	Doha agreement meeting classification ²	29 (57%)
	Not using any classification system	15 (29%)
	Doha agreement meeting classification ² + Italian Groin Pain Consensus ¹³ + British Hernia Society position statement ¹²	4 (8%)
	Doha agreement meeting classification ² + Warwick agreement on femoroacetabular impingement ⁵ + International Hip-related Pain Research Network ⁹	1 (2%)
	Doha agreement meeting classification ² + Italian Groin Pain Consensus ¹³ + “other common terms”	1 (2%)
	Combination of classification systems (not specified)	1 (2%)
	I don’t know them	7 (14%)
Reason for not using any of the available classification systems (n = 15)	I know them but prefer a different approach	6 (12%)
	Other	2 (4%)

pathoetiology, and may therefore not be considered a diagnosis by some of the experts.

There appears to be a lack of agreement in how to improve the Doha agreement meeting classification system at this stage. On the other hand, a completely different classification system was also not considered as a solution by the experts (81% disagreement). We believe that more original research is needed to create a better foundation for agreement on an improved version, including studies on the reliability of the classification system and investigations of prognostic examination findings.

International e-survey. In the e-survey, 69% of clinicians reported using the Doha agreement meeting classification system in isolation (57%) or in combination with other classifications (12%) when treating athletes with groin pain (Table 3). A review showed that there can be an average time lag of 17 years between publication of new research findings and adoption in clinical practice.¹⁹ In this light, the current adoption of the Doha agreement classification in this cohort of independent international clinicians can be considered relatively successful. However, we also note that 1 in every 7 clinicians responding to the e-survey were not aware of any consensus statements on diagnostic terminology in groin pain in athletes. Additionally, 1 in 8 clinicians was aware of these consensus statements but preferred a different approach. This highlights the importance of a structured knowledge transfer and dissemination plan for recommendations of consensus statements, as well as evaluating these recommendations over time.

For the presented clinical case 1, sports(man)'s hernia was the second most frequently used term for a primary diagnosis. The use of this term is, however, discouraged by two expert groups, since an actual hernia is rarely present in athletes.^{2,12} For case 2, adductor-related groin pain was the most frequently used term, followed by adductor (longus) tendinopathy and adductor (longus) enthesopathy. Potentially, these latter 2 terms could in time be subclassifications of adductor-related groin pain, on the basis of sufficient scientific evidence. A statement in round 2 of the Delphi survey proposing these specific subclassifications reached only 43% agreement and 33% disagreement (Supplementary Appendix H), indicating a current lack of agreement on this issue.

A strength of our study is that we collected opinions of independent international clinicians who regularly assess and treat athletes with groin pain. However, the number of responses to the international e-survey was relatively low, and results may therefore not be generalizable to all clinicians who treat athletes with groin pain. The sample nevertheless provides a good insight into the practice of a group of international multidisciplinary clinicians from recognized sports medicine centers. Following best-practice reporting guidelines, the names of the members of our research team were disclosed to the participants at the start of the Delphi survey and international e-survey. As 7 out of the 9 current authors were part of the original 2015 Doha agreement meeting expert group, we cannot exclude that a bias was introduced through potentially socially desirable responses. To reduce the likelihood of this potential issue, survey responses were anonymous and survey registrations (email addresses) were only visible to the independent study coordinator (WH).

The current lack of expert agreement to alter the Doha agreement meeting classification highlights the need for more original research to inform these opinions. This research should focus on clinical and/or imaging findings that influence prognosis or treatment, to define clinically meaningful subclassifications. We also recommend that future consensus statements should include a structured knowledge transfer and dissemination plan.

5. Conclusion

Five years after publication, the majority of the Doha agreement meeting expert group and independent international clinicians report adopting the Doha agreement meeting classification system. There is

still considerable heterogeneity in diagnostic terminology when clinical cases are presented, and disagreement on statements related to amendments of the current classification system.

Patient consent for publication

Not required. Potential identifiers for the presented clinical cases were adjusted to ensure anonymity.

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Declaration of interest statement

The authors declare no financial conflict of interest. Seven out of the nine authors of this study were also author of the Doha agreement meeting on terminology and definitions in groin pain in athletes. The authors declare that this did not influence execution or reporting of this study.

Confirmation of ethical compliance

An ethics exemption was obtained from the Institutional Review Board of the Amsterdam Medical Centre, the Netherlands. All participants gave their informed consent.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jsams.2021.06.014>.

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