

Current practice for safe return-to-play after lateral ankle sprain: A survey among French-speaking physicians

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ABSTRACT

Background: Recommendations are available for assessment criteria for safe return-to-play (RTP) after a lateral ankle sprain. However, their current use among physicians is unknown.

Methods: French-speaking physicians in Belgium, France and Switzerland were asked to complete an online survey and report their clinical assessment of selected RTP criteria.

Results: The respondent sample ($n=109$) included physicians with and without Sports Medicine education, varied level of experience and proportion of athletes in their practice population. Pain was the most selected criterion for safe RTP (90% of physicians), followed by ability to engage in functional tasks (82%), functional instability (73%), range of motion (61%), proprioception (47%), mechanical instability (39%), strength (38%) and swelling (31%). A low proportion of physicians use quantitative measures to assess these criteria (between 4% and 53%).

Conclusions: A large proportion of physicians consider the recommended criteria for RTP decisions. However, physicians do not frequently use quantitative measures.

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1. Introduction

Ankle injury is the most common musculoskeletal injury in the active and sports populations, reported in 34.2% of injuries among 24 sports [1]. Lateral ankle sprain (LAS) is the primary ankle injury, accounting for 73.9% of all ankle sprain [2]. In about 70% of cases, individuals with history of LAS still have at least one residual long-term symptom (1.5–4 years follow-up) [3]. Pain, instability, proprioception deficit, strength deficit or/and range of motion deficit could contribute to the high risk of re-injury after a LAS, and previous ankle sprain is the main risk factor [4]. Moreover, LAS is defined as a continuum of disabilities that often leads to chronic ankle instability and early ankle osteoarthritis [5]. The 2019 Rehabilitation-Oriented ASsessmentT (ROAST) establishes the diagnostic elements, and the mechanical and sensorimotor impairments that should be objectively assessed by clinicians

[6]. Although clear evidence-based criteria for return-to-play (RTP) after an ankle sprain are not yet established in the literature, narrative reviews and clinical experts' consensus describe the contents of RTP decision-making (i.e., pain, ankle perception including proprioception, ankle impairment, sensorimotor control system and sport testing) [7,8]. Thus, recommendations regarding the assessment and follow-up of LAS are available. However, their translation to clinical practice is unknown. The purpose of this study was therefore to investigate physicians' self-reported daily practice in light of these recommendations by investigating which criteria they deem more important and how they evaluate them. We hypothesized that physicians are not yet using published recommendations to make a RTP decision.

2. Materials and methods

A team of two physiotherapists (A. A. and J.-L. C.) and two physicians (R. C. and J.-F. K.) collaborated to develop a survey, based on rehabilitation-oriented assessment guidelines [6]. This survey was submitted to an expert committee of five physicians from our institution.

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The final version was accepted by our institutional ethical committee. After validation, the survey was available through <https://www.sondageonline.com> and was online from December 2018 to February 2019. The French-speaking physicians from Belgium, France or Switzerland were recruited via professional mailing lists from four health professionals (A. A., J.-L. C., R. C., J.-F. K.). A number of approximately 500 health care professionals were contacted by an e-mail containing an electronic link to the survey. The inclusion criteria were specified in the e-mail invitation: speaking French, being a physical and rehabilitation physician or orthopaedist physician or sport physician or general physician (see Appendix A1). A number of 122 respondents visited the first page of the survey but 12 were excluded because they did not fill the entire survey and one did not fill a physician's specialization, leading to a completeness rate of 89%.

The survey was divided into three parts and laid out as described below. The first part consisted of setting the criteria for a RTP decision: "In your daily practice, which parameters do you consider in determining whether a patient is able to return to competitive sport after a conservatively treated lateral ankle sprain?" This was a closed-ended question where physicians were invited to select a maximum of five items among the nine suggested: "pain, swelling, ankle range of motion, ankle muscle strength, functional ankle instability (perceived instability), proprioception (deep sensitivity), ability to engage in functional tasks (balance, jumping, running, cutting movements, etc.), mechanical ankle instability (pathological laxity), and other criteria". In the second part, details about each selected aforementioned criterion were collected. The last part focused on respondents' demographics, including years of practice, their specializations and the proportion of athletes treated (see Appendix A2).

Each physician was instructed to answer all the questions that related to their clinical practice with patients conservatively

treated for both first LAS and recurring LAS. To be time-efficient, the online survey incorporated a limited number of answers and the use of branching logic. The total number of questions answered by each physician was therefore slightly different according to their individual practice habits. The participation was completely anonymous because no identifying information was collected on any participants. The additional Checklist for Reporting Results of Internet E-Surveys (CHERRIES) was used to ensure the quality of reporting for the findings of this study (see Appendix A3).

2.1. Data analysis

Statistics were performed using SAS studio University edition 2.8 9.4 M6. We calculated the frequency distribution of the answers using percentages. Then, the relationship between the selection of a criterion and the characteristics of the physicians (Sports Medicine education, experience and percentage of athletes treated) was analyzed by means of a Chi-squared test. The same analyses were performed for the choice of functional tests and the use of quantitative measures in relation to the characteristics of the physicians. Results were considered significant at $p \leq 0.05$.

3. Results

Among the 122 respondents, 109 completed both the survey and selected a physician specialization. Our three main demographic variables of interest were the presence of Sports Medicine education, the years of experience (time of medical practice) and the usual proportion of athletes treated among their patient population. The physicians were free to estimate the number of patients they considered as athletes, including recreational and professional athletes. The respondent sample included 46% of physicians with sport medicine specialization (*Spe*). *Spe* could be only specialized in Sport Medicine or they could be specialized in

Table 1
Characteristics of French-speaking physicians surveyed ($n = 109$).

Age n (%)		
25–40 y	45	(42)
41–60 y	46	(41)
>60 y	18	(17)
Clinical setting n (%)		
Hospital	54	(50)
Hospital + private office	2	(2)
Hospital + sports club or federation	12	(11)
Private office	23	(21)
Private office + sports club or federation	11	(10)
Sports club or federation	1	(1)
Hospital + private office + sports club or federation	5	(5)
Sports Medicine education n (%)		
Physicians with Sports Medicine education (<i>Spe</i>)	50	(46)
- Sports Medicine education only	24	
- Physical and rehabilitation education + Sports Medicine education	19	
- Orthopaedic + Sports Medicine education	1	
- General medicine + Sports Medicine education	6	
Physicians without Sports Medicine education (<i>NoSpe</i>)	59	(54)
- Physical and rehabilitation education	33	
- Orthopaedic education	13	
- General medicine education	13	
Years of experience n (%)		
<5 years (<i>Exp5</i>)	28	(26)
5–20 years (<i>Exp5-20</i>)	41	(37)
>20 years (<i>Exp20+</i>)	40	(37)
Percentage of athletes treated n (%)		
<20% (<i>Ath20%</i>)	50	(46)
20–80% (<i>Ath20-80%</i>)	41	(38)
>80% (<i>Ath80%+</i>)	18	(16)

Spe: physicians with Sport Medicine education. *NoSpe*: physicians without Sport Medicine education. *Exp5*: physicians with less than five years of experience. *Exp5-20*: physicians with between five and 20 years of experience. *Exp20+*: physicians with more than 20 years of experience. *Ath20%*: physicians who treat less than 20% athletes. *Ath20-80%*: physicians who treat between 20% and 80% athletes. *Ath80%+*: physicians who treat more than 80% athletes.

another area (e.g. General Medicine) and in Sport Medicine. A similar proportion of physicians had no Sport Medicine specialization (*NoSpe*:54%). Likewise, regarding the years of experience, the sample was well distributed between physicians with less than 5 years of experience (*Exp5*: 26%), 5 to 20 years of experience (*Exp5-20*: 37%) and more than 20 (*Exp20+*: 37%). The number of physicians who treat less than 20% athletes (*Ath20*: 46%) and physicians who treat between 20% and 80% athletes (*Ath20-80*: 38%) were larger than those who treat more than 80% athletes (*Ath80+*: 16%). The description of the population is presented in the Table 1.

The most selected ankle-related RTP criteria and the percentage of selected quantitative measures of these criteria are presented in Fig. 1. Pain and functional ankle instability were selected by a large number of physicians (90% and 73%, respectively). In the second part of the survey, only half of the 90% of physicians (53%) selected a quantitative pain scale (visual pain scale) and only 4% of the 73% of physicians selected a quantitative scale of functional ankle instability (questionnaire). Ability to engage in functional tasks was the second most selected ankle-related criteria by the physicians (82%). However, only 31% of these 82% of physicians used the previous measures and/or reference measures of hop tests, balance test, gait and sports movement analysis. More details on the ability to engage in functional task responses are available in the supplementary material (see Appendix A4). Ankle range of motion was selected by 61% of physicians, but only 27% of these 61% of physicians selected a goniometer and/or a measurement

tool to assess this criterion. Proprioception was selected by 47% of physicians, but only less than half (18%) of these 47% of physicians selected a goniometer and/or an isokinetic machine and/or the Myolux® to assess this criterion.

Conversely, the ankle muscle strength was only selected by 38% of physicians and 20% of these 38% of physicians selected a quantitative measure (isokinetic and/or the Myolux® and/or hand-held-dynamometer tool). Likewise, mechanical ankle instability was selected by 39% of physicians and 17% of these 39% of physicians selected the anterior drawer test and/or varus test with quantitative measures to assess it. Similarly, ankle swelling was selected by 31% of physicians, and 24% of these 31% of physicians selected a measurement tool and/or the Esterson figure-of-8 quantitative measure to assess it.

A summary table of the selected criteria and measurement methods used by physicians in light of the published recommendations is available in the supplementary material (see Appendix A5).

The influence of the physicians' demographic on the criteria selection is presented in Table 2. Ability to engage in functional tasks and ankle range of motion criteria were significantly more commonly selected by the *Spe* group as compared to the *NoSpe* (*Spe*:94% vs. *NoSpe*:71%, $\chi^2=9.40$, $p=0.002$ and *Spe*:72% vs. *NoSpe*:51%, $\chi^2=5.07$, $p=0.02$, respectively). The selection of ability to engage in functional tasks and ankle range of motion criteria was, however, not significantly influenced by physicians' experience ($\chi^2=0.51$; $p=0.77$ and $\chi^2=1.50$; $p=0.47$, respectively) nor by

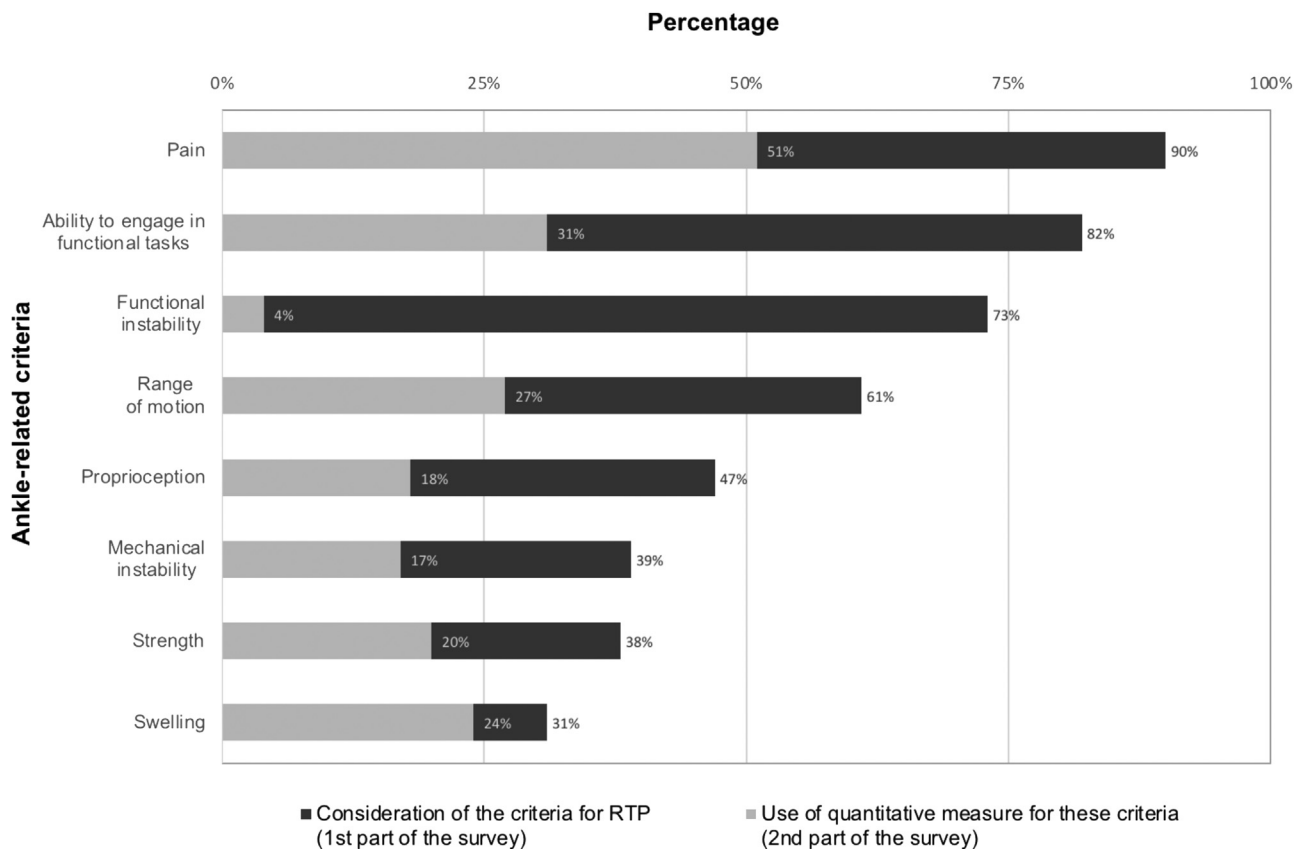


Figure 1. RTP criteria reportedly used by the surveyed physicians. For each criterion, the proportion of physicians using this criterion for RTP decision is depicted in dark grey while the use of a quantitative measure for this criterion is depicted in light grey. For instance, 90% of the 109 physicians selected pain for their RTP decision and 51% among them use a quantitative measure to assess it. Consideration of criteria for RTP decision represents the percentage of physicians who selected a maximum of five criteria among the nine suggested in the first question. Use of quantitative measure for these criteria represents the percentage of physicians who selected a visual pain scale for pain, previous and/or reference measures of hop test, balance test, gait and/or sport movement analysis for functional tasks, questionnaire for functional instability, goniometer and/or a measurement tool for range of motion, Myolux® and/or goniometer tools and/or arthro-motor for proprioception, anterior drawer test and/or varus test for mechanical instability, isokinetic and/or Myolux® and/or hand-held-dynamometer tool for strength and figure-of-8 for swelling. Physicians had access to the quantitative questions only if they selected the item corresponding to the first question.

Table 2
Return-to-play (RTP) criteria selected after ankle sprain according to the physicians' demographics (selected vs. not selected).

Variable	Pain		Ability to engage in functional tasks		Functional instability		Range of motion		Proprioception		Mechanical instability		Strength		Swelling	
	Selected	p	Selected	p	Selected	p	Selected	p	Selected	p	Selected	p	Selected	p	Selected	p
Sports Medicine education																
Yes (n = 50)	88%		94%		76%		72%		50%		26%		34%		28%	
No (n = 59)	92%	0.54	71%	0.002**	71%	0.57	51%	0.02*	44%	0.54	51%	0.01*	41%	0.47	34%	0.58
Years of experience																
<5 years (n = 28)	96%		79%		71%		68%		29%		39%		36%		39%	
5–20 years (n = 41)	88%		80%		80%		54%		54%		41%		37%		27%	
>20 years (n = 40)	88%	0.41	85%	0.77	68%	0.40	63%	0.47	53%	0.08	38%	0.94	40%	0.92	30%	0.54
Percentage of athletes treated																
<20%(n = 50)	92%		80%		72%		54%		42%		54%		42%		30%	
20–80% (n=41)	90%		80%		73%		68%		49%		29%		32%		41%	
>80% (n = 18)	83%	0.58	89%	0.68	78%	0.89	61%	0.38	56%	0.58	22%	0.01*	39%	0.60	11%	0.07

The physicians (n = 109) could select a maximum of five RTP criteria among the nine suggested. The physicians' selection was analyzed by means of a Chi-squared test.

* p < 0.05.
** p < 0.01.

the proportion of athletes treated ($\chi^2 = 0.76$; $p = 0.68$ and $\chi^2 = 1.93$; $p = 0.38$, respectively). Mechanical ankle instability was selected significantly less by the *Spe* and *Ath80+* subsamples (*Spe*:26% vs. *NoSpe*:51% $\chi^2 = 7.00$; $p = 0.01$ and *Ath80+*:22% vs. *Ath20-80*:29% vs. *Ath20*:54% $\chi^2 = 8.45$; $p = 0.01$) and this criterion was not influenced by the physicians' experience ($\chi^2 = 0.13$; $p = 0.94$). Regarding the ankle swelling criterion, *Ath80+* selected this criterion less than *Ath20-80* and *Ath20* (*Ath80+*:11% vs. *Ath20-80*:41% vs. *Ath20*:30%, $\chi^2 = 5.43$; $p = 0.07$).

The *Spe* group selected the visual pain scale significantly more than the *NoSpe* (*Spe*:64% vs. *NoSpe*:41%, $\chi^2 = 5.09$; $p = 0.03$). The other physicians' demographics did not significantly affect the choice of use of quantitative measures, as reported in the supplementary material (see Appendix A5).

4. Discussion

The aim of our study was to evaluate whether physicians used LAS assessment recommendations in determining a safe RTP. Findings from our study have revealed that physicians' daily practices were inconsistent with the guidelines in the available literature [6–8] for our sample population. Although a large proportion of physicians seem aware of the criteria for pain, the ability to engage in functional tasks, functional ankle instability and ankle range of motion criteria described in the recommendation-oriented assessment for LAS [6], few of them are using recommended measurement tools in their daily practice. Furthermore, a low proportion of physicians considered mechanical ankle instability, ankle muscle strength and ankle swelling. The use of quantitative measures is similarly low with respect to these recommended criteria [6]. Our study further revealed that physicians with a Sports Medicine specialization (*Spe*) use more pain assessment scales, assess the ability to engage in functional tasks and ankle range of motion more, while assessing the mechanical ankle instability less than the physicians without Sports Medicine specialization (*NoSpe*). On the other hand, the years of experience and the percentage of athletes treated do not seem to have a significant influence on physicians' choices.

4.1. Pain perception

Pain is one of the most frequent residual symptoms after a LAS which could explain why physicians often have to deal with pain in a RTP decision context [9]. In general, the most common scales used are the visual analogue scale (VAS) and the numeric rating scale for pain (NRS). VAS is a continuous scale comprised of a line usually measuring 10 cm where 0 is described as no pain and 10 as

the worst imaginable pain [10]. NRS is a segmented numeric version of the VAS [10]. In our study, a large proportion of physicians selected pain (90%) and the *Spe* group seem more aware of the need to use these pain scales ($p = 0.03$). They should not only be used for safe RTP decision, but also for patient follow-up and treatment adjustments during rehabilitation.

4.2. Functional ankle instability perception

Another way to follow and adjust the patient's rehabilitation is to objectively assess functional ankle instability with the use of validated questionnaires [6]. The Functional Ankle Ability Measure (FAAM), the Cumberland Ankle Instability Tool (CAIT) and the Ankle Instability Instrument (All) are appropriate evaluative instruments to quantify functional ankle instability after a LAS [11–13]. Although the functional ankle instability RTP criterion was frequently selected by physicians, only 4% of them are using a questionnaire. This discrepancy could be explained by two factors. First, the validated French versions of these questionnaires are rather recent (less than 10 years for the FAAM and less than one year for the CAIT and the All) [14–16] and the delayed transfer of research knowledge into daily practice is an unfortunate and common challenge. Secondly, these scales could be cumbersome in daily practice when physicians often have a limited amount of time with their patients [17].

Using scales in daily practice could help to obtain quantitative scores of ankle instability perception but also of pain perception. These reports are required to make more relevant RTP decisions for the patients. The majority of physicians orally assess the perceived ankle instability and the perceived pain during their medical consultation, but the subjective perceptions from both patient and physician can be discordant, especially during recovery, due to the patient's fear of re-injury [18]. The use of a questionnaire or a scale will help physicians to be more objective but will also be more relevant in the RTP follow-up process. These assessments do not always require the presence of physicians. To save time, a questionnaire of functional ankle instability could be implemented in the waiting room or, for instance, with an online questionnaire a day before the consultation.

4.3. Ability to engage in functional tasks

The functional assessment is not just about the perception of the ankle. During rehabilitation, therapists also consider the ability to engage in functional tasks. Sports Medicine education (*Spe*) appeared to enable physicians to be more considerate in assessing these abilities ($p = 0.002$). Hence, it seems to play a role in

knowledge and possibly application of these assessments. However, only 31% of physicians are using the previous measures and/or reference measures of hop tests, balance test, gait and sports movement analysis. Several recommended functional assessments are reliable and valid (e.g. Y Balance Test, Hop test) [19]. Nevertheless, space and/or materials are often required to assess the ability to engage in functional tasks, further limiting the assessment.

4.4. Range of motion

LAS often leads to a decrease of ankle range of motion that negatively impacts functional ability [20,21]. Moreover, this limitation (particularly in dorsiflexion) increases the risk of being re-injured [22]. In our study, only 27% of surveyed physicians selected a goniometer or other measurement tool to assess this ankle range of motion, although it is advised that dorsiflexion range of motion is assessed with a measurement tool—the weight-bearing lunge test (WBLT) [6]. The WBLT is a reliable and valid measurement tool, which can be easily implemented in daily practice. In a RTP context, it is recommended that a full range of motion is recovered [23]. For example, for the WBLT, a difference of 2–3 cm between the right and the left ankle is considered to be normalized asymmetry [24]. As for the ability to engage in functional tasks, a higher proportion of the *Spe* group selected ankle range of motion criteria for their RTP decisions compared to the *NoSpe* (72% vs. 51%, respectively, $p=0.02$). However, in this case, the range of motion could almost always be assessed early in the rehabilitation, and the required materials and/or space are not as extensive when engaging in functional task assessments.

4.5. Strength

Muscle weakness, similar to the limitation of range of motion, can negatively influence the ability to engage in functional tasks [22]. However, only 38% of the physicians selected strength for their safe RTP decision. Moreover, muscle weakness could also be a risk factor for LAS [4]. Muscle strength seems to be more widely studied for knee injury rehabilitation and RTP decision making [25,26]. The lower consideration of the level of ankle muscle strength could be explained by the lack of clear consensus on its assessment. Although isokinetic-dynamometer assessment is well described in the literature, the ROAST recommendations suggest a hand-held dynamometer assessment [6]. However, despite being validated with good intra-rater reliability, it is not as specific as the isokinetic-dynamometer and requires more studies on the inter-rater reliability [27,28].

4.6. Mechanical ankle instability

In the acute phase of LAS, a mechanical ankle instability evaluation is recommended to help clinicians diagnose an injury, but the ROAST did not include this specific assessment during rehabilitation [6]. In our study, few physicians assess mechanical ankle instability for a RTP decision as well (39%). Moreover, mechanical instability is not only selected less by *Spe* compared to *NoSpe*, but it is also selected less by the *Ath80+* compared to the *Ath20* ($p=0.01$ for both). Thus, Sports Medicine education and treating a large proportion of athletes appear to influence the low consideration of the mechanical ankle instability criterion in a RTP decision. Although the mechanical ankle instability could be considered as a non-modifiable criterion with conservative treatment, this is an area of concern as mechanical instability could (in association with other factors) be a predictor for re-injury [29].

4.7. Swelling

Swelling assessment, which is not only recommended in the acute LAS phase but also during the rehabilitation process, was the criterion least selected by the physicians (31%). Moreover, only 24% of physicians use the Esterson figure-of-8 test recommended by the ROAST [6]. Swelling can be a recurrent residual symptom that requires objective testing [3]. The low consideration of some criteria and the low application of recommended measures further underline the discrepancy between the available guidelines and reported field practice.

4.8. Limitations

This study includes several limitations which should be considered before generalizing the results. Only French speakers' physicians were surveyed; however, the sample is representative of three countries: Belgium, France and Swiss. The entire survey is available and could be translated in other language to other community. Secondly, participants were asked to select a maximum of five of the most important criteria, which could have impacted the low proportion of some criteria selection but allow to decrease the time necessary to answer the entire questionnaire. Finally, proprioception (deep sensitivity) is one component of global postural ability. This is not mentioned in the ROAST recommendations but the proprioception (deep sensitivity) could be assessed and could be considered as potential criterion to RTP [30].

5. Conclusion

Although French speaking physicians seem aware of assessing the important ankle-related criteria to select a safe RTP after a LAS, few of them are using the ROAST recommendations in their daily practice. Assessing patients with quantitative and qualitative measures could be of great help to physicians making a RTP decision. Nonetheless, so far, few physicians surveyed seem to use quantitative measures with patients. Sports Medicine education appears to be a factor that increases the use of quantitative methods, but this is not true for all criteria. Additionally, it is surprising that the strength criterion is given so little attention, especially because it could be considered a modifiable risk factor to avoid re-injury.

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Conflict of interest

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <https://doi.org/10.1016/j.fas.2021.03.023>.

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