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► To cite this version:

Romain Tourillon, Eamonn Delahunt, François Fourchet, Brice Picot, Massamba M'baye. Ankle scientific knowledge is not translated into physiotherapy practice: a thematic analysis of French-speaking physiotherapists clinical behaviors. *Journal of Athletic Training*, 2025, 10.4085/1062-6050-0575.23. hal-04940636

HAL Id: hal-04940636

<https://hal.science/hal-04940636v1>

Submitted on 11 Feb 2025

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Ankle scientific knowledge is not translated into physiotherapy practice: a thematic analysis of French-speaking physiotherapists clinical behaviors

Romain Tourillon, PT, MSc, CMP^{a,b,*}; Eamonn Delahunt, PT, PhD^{c,d};

François Fourchet, PT, PhD^{a,e}; Brice Picot, PT, PhD^{e,f}; Massamba M'Baye, PT, S&C^g

1. Physiotherapy Department and Motion Analysis Lab, Swiss Olympic Medical Center, La Tour Hospital, 1217 Meyrin, Switzerland
2. Univ Lyon, UJM-Saint-Etienne, Inter-university Laboratory of Human Movement Biology, EA 7424, F-42023, Saint-Etienne 42000, France
3. School of Public Health, Physiotherapy and Sports Science, University College, Dublin, Dublin 4, Ireland
4. Institute for Sport and Health, University College, Dublin, Dublin 4, Ireland
5. French Society of Sports Physical Therapist (SFMKS Lab), Pierrefitte-sur-Seine 93380, France
6. Inter-University Laboratory of Human Movement Biology (LIBM), Savoie Mont-Blanc University, Chambéry 73000, France
7. Kin'Aixpert, Viviers du Lac 73420, France

Corresponding author:

Romain Tourillon, PT, PhD, CMP

Physiotherapy Department and Motion Analysis Lab, Swiss Olympic Medical Center

La Tour Hospital

1217 Meyrin

Switzerland

Tel: 0041 22 719 60 81

e-mail: romain.tourillon@latour.ch

Romain Tourillon: @r_tourillon

Eamonn Delahunt: @EamonnDelahunt

François Fourchet: @FFfrunsanteperf

Brice Picot: @PicotBrice

Massamba M'Baye: @massnoir

Contribution:

RT, MM participated in the design of the study, contributed to data collection and data analysis and interpretation of results; FF participated in the design of the study, contributed to data analysis and interpretation of results; BP, ED contributed to interpretation of results. All authors contributed to the manuscript writing. All authors have read and approved the final version of the manuscript, and agree with the order of presentation of the authors.

Acknowledgments:

We thank all the physiotherapists who selflessly participated in the study

Disclosure of interest:

The authors declare that they have no competing interest.

Funding:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Protocol registration: Ethical exemption was received from the local Swiss ethical committee due to the anonymous nature of the questionnaire

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1 **Ankle scientific knowledge is not translated into physiotherapy practice: a thematic**
2 **analysis of French-speaking physiotherapists' clinical behaviors**

3 **Abstract**

4 **Context:** Chronic ankle instability (CAI) is prevalent amongst individuals who sustain a
5 lateral ankle sprain (LAS) injury. The persistent of the characteristic long-standing clinical
6 symptoms of CAI maybe attributable to the lack of adoption of evidence-informed clinical
7 guidelines.

8 **Objective:** To investigate to what extent French-speaking physiotherapists implement the
9 International Ankle Consortium Rehabilitation-Oriented-ASsessment (ROAST) framework
10 when providing clinical care for individuals with an acute LAS injury.

11 **Design:** Cross-sectional study.

12 **Setting:** We created an online survey informed by a Delphi process of foot-ankle experts, and
13 disseminated it to French-speaking physiotherapists in France, Switzerland, Quebec-Canada,
14 Belgium, and Luxembourg.

15 **Patients or Other Participants:** In total, 426 physiotherapists completed the online survey.

16 **Intervention:** N/A

17 **Main Outcome Measure(s):** The online survey comprised closed and open-ended questions
18 organized in 5 sections: (1) participants' demographics, (2) participants' self-assessment
19 expertise, (3) clinical diagnostic assessment (bones and ligaments), (4) clinical evaluation
20 after an acute LAS injury (ROAST framework), and (5) CAI. The qualitative data from the
21 open-ended questions was analyzed using best practice thematic analysis guidelines.

22 **Results:** Only 6% of the respondents could name all Ottawa Ankle Rules criteria. Only 25%
23 of the respondents cited or described "gold standard" tests from the literature to assess the
24 integrity of the ankle lateral ligaments. Less than 25% of the respondents used some of the

25 International Ankle Consortium ROAST recommended clinical evaluation outcome metrics to
26 inform their clinical care for individuals with an acute LAS injury. In general, the respondents
27 had a greater knowledge of the functional insufficiencies that associated with CAI when
28 compared to the mechanical insufficiencies.

29 **Conclusion:** A minority of French-speaking physiotherapists use the International Ankle
30 Consortium ROAST recommended clinical evaluation outcome metrics to inform their
31 clinical care for individuals with an acute LAS injury. This highlights the responsibility of the
32 scientific community to better disseminate evidence-informed research to clinicians.

34 **Keywords**

35 ankle sprain; chronic ankle instability; evidence-based practice; knowledge translation;
36 practice change

38 **Key Points**

- 39 1) A minority of French-speaking physiotherapists use the International Ankle
40 Consortium ROAST recommended clinical evaluation outcome metrics to inform their
41 clinical care for individuals with an acute LAS injury.
- 42 2) Non-English speakers are at a substantial disadvantage regarding their ability to
43 understand and correctly implement evidence-informed clinical research which is
44 published in English language scientific journals.
- 45 3) The foot-ankle research community should endeavor to better disseminate evidence-
46 informed research to clinicians in ways that can overcome constraints imposed by
47 language and geographical location.
- 48

50 **Body of manuscript**

51 **1 Introduction**

52 Acute lateral ankle sprain (LAS) injuries are the most common musculoskeletal injury
53 incurred by individuals who partake in sport or recreational physical activities.^{1,2} The
54 incidence of LAS injuries among the general population has reported to be as high as 2.15 per
55 1000 person-years². LAS injuries account for as many as 3% to 5% of all emergency room
56 visits per annum in the United Kingdom.³ However, this is likely an underestimation
57 considering that 50% to 64% of individuals who sustain an acute LAS injury do not seek
58 medical attention for their injury.^{4,5} Therefore, it unsurprising that the risk of LAS injury
59 recurrence is high.^{6,7} As many as 40% of individuals who incur a first-ever acute LAS injury
60 develop chronic ankle instability (CAI)⁸, which is characterized by self-reported episodes of
61 “giving-way” of the ankle joint, self-reported feelings of ankle instability, and recurrent
62 injuries.⁹ CAI has been reported to associate with the development of post-traumatic
63 osteoarthritis.¹⁰ The combination of this catastrophic cascade: first LAS injury, recurrent
64 injury, CAI, post-traumatic osteoarthritis development, and the associated economic costs⁶
65 makes the burden of LAS injury indisputable.¹

66

67 To reduce the impact of LAS and CAI on society and healthcare systems, the need for
68 continued research and dissemination of research-informed knowledge has been promoted by
69 the International Ankle Consortium.¹¹ This community has published consensus statements
70 with the aim of providing best practice and evidence-informed recommendations in relation to
71 the definition of CAI¹¹, as well as the prevalence, impact and long-term consequences of LAS
72 injury.¹ Furthermore, this community has developed the Rehabilitation-Oriented-ASsessmentT

73 (ROAST) framework for acute LAS injury.¹² The ROAST framework presents
74 recommendations on a minimum standard pragmatic clinical assessment, as well as a 10-point
75 guideline, by which clinicians can sharpen the focus of their rehabilitation planning to
76 specifically address insufficiencies that are known to associate with CAI. Despite growing
77 research related to LAS injury and CAI, it is well known that the research findings (evidence)
78 will not change health outcomes unless health care organizations, systems, and professionals
79 implement them in clinical practice.¹³ Knowledge translation is defined as the process of
80 moving from what has been learned through research to its application in different decision-
81 making contexts. It is considered to be an important process to provide more effective health
82 services.¹³ However, the translation of research findings into clinical practice remains
83 challenging with multiple barriers coming both from researchers or practitioners.¹⁴ This has
84 been shown in ankle research, whereby a previous study reported that Irish clinicians had a
85 limited understanding of the full spectrum of insufficiencies which associate with CAI.¹⁵ One
86 possible barrier to knowledge translation could be the lack of time that clinicians have to read
87 journal articles, and it has been reported that changes in their day-to-day clinical practices are
88 most commonly informed by knowledge acquired by attending courses.¹⁶ Another possible
89 barrier more related to international populations could be the difficulty of reading and
90 understanding English, which has become the dominant language in the global scientific
91 community.¹⁷ As a consequence, non-English speakers are at a disadvantage when trying to
92 understand and implement published research¹⁸ which is typically written in English for
93 higher impact reasons.¹⁹

94 In this context the present study aimed to: (1) investigate the extent to which French-speaking
95 (FR) physiotherapists implement the International Ankle Consortium Rehabilitation-Oriented-
96 ASsessment (ROAST) framework when providing clinical care for individuals with an acute
97 LAS injury and (2) investigate the knowledge of the (FR) physiotherapists regarding the

98 mechanical and functional insufficiencies that associate with CAI. Based on the previous
99 potential barriers mentioned earlier, we hypothesized that a large proportion of (FR)
100 physiotherapists would not routinely implement the International Ankle Consortium
101 Rehabilitation-Oriented-ASsessment (ROAST) framework when providing clinical care for
102 individuals with an acute LAS injury. We also hypothesized that they would have a limited
103 understanding of the mechanical and functional insufficiencies that associate with CAI.

104 **2 Methods**

105 **2.1 Study design**

106 We conducted a cross-sectional study by administering an online survey to (FR)
107 physiotherapists working in several French-speaking countries. Ethical exemption was
108 received from the local [REDACTED] due to the anonymous nature of the
109 questionnaire. All responses were anonymous, no personal data were collected, and the
110 participants agreed (by answering to the survey) to the use of their answers for research
111 purposes.

112 **2.2 Population**

113 The eligible population comprised (FR) physiotherapists practicing in France, Switzerland,
114 Quebec-Canada, Belgium, or Luxembourg with the following inclusion criteria: aged 18 years
115 or older, registered in their respective national professional society and legally able to provide
116 consent to participate in the present study.

117

118 **2.3 Survey validation: modified Delphi process**

119 The survey was developed by two researchers who at the time were members of the executive
120 committee of the [REDACTED] two researchers experienced in

121 sports science [REDACTED] and one physiotherapist [REDACTED]. Based on previous methodology²⁰, our
122 survey validation was informed by a Delphi process amongst French speaking foot-ankle
123 experts. We sent an email to all the experts from our network seeking their participation in the
124 Delphi process. They were required to complete the 1st round of the Delphi process within 6
125 weeks after receiving the invitation email. A reminder email was sent to all individuals 3
126 weeks after the initial invitation email. Twenty-two experts based in France (n=12),
127 Switzerland (n=5), Belgium (n=3), and Quebec-Canada (n=2) participated in a Delphi
128 process. The panel comprised physiotherapists (n=13), surgeons (n=3), physicians (n=4), a
129 podiatrist (n=1), and a scientist (n=1). The experts were requested to express their agreement
130 to each question on the survey on a Likert scale of 1-5 (1=strongly disagree; 2=disagree; 3=no
131 opinion; 4=agree; 5=strongly agree). They also had the opportunity to elaborate their own
132 question' modification when agreement was not reached. To establish the level of agreement,
133 the total percentage of 'strongly agree' (5 on the Likert scale) and 'agree' (4 on the Likert
134 scale) responses was calculated for each question. A cut-off score of $\geq 75\%$ agreement was
135 required for consensus agreement. After two rounds, all experts agreed with the final survey
136 which was then pilot tested.

137 **2.4 Survey data collection and diffusion**

138 The final version of the survey was hosted by SurveyMonkey
139 (<http://www.surveymonkey.com>) and comprised of five sections: (1) participants'
140 demographics (age, sex, country, employment status, qualification, etc..), (2) participants'
141 self-assessed expertise in the clinical assessment, diagnosis, and treatment of patients with
142 acute LAS injury and/or CAI, (3) clinical diagnostic assessment of the ankle (bones and
143 ligaments), (4) clinical evaluation after acute LAS injury (International Ankle Consortium
144 ROAST framework), and (5) CAI (definition, mechanical and functional insufficiencies). The
145 English translation of the survey is presented in as an online supplement (see Appendix A).

146

147 The self-assessment section asked participants to rate their expertise on a 10-point Likert scale
148 with 10 being the highest level of expertise. The definition of clinical assessment, diagnosis,
149 and treatment were provided to the participants in the online survey (see Appendix A). The 3rd
150 section concerning clinical diagnostic assessment (i.e., bones^{21,22} and ligaments^{12,23}) included
151 both closed and open-ended questions. Clinical evaluation after an acute LAS injury (4th
152 section) included open-ended questions in relation to the International Ankle Consortium
153 ROAST framework.¹² In this section, participants were questioned on their use of each
154 framework item during the rehabilitation process/period (acute, sub-acute, functional and
155 return to sport phase) for acute LAS injury patients.. Finally, the 5th section included open-
156 ended questions, which sought participants' own definition of CAI¹¹, as well as their
157 knowledge of the mechanical and functional insufficiencies that associate with CAI.^{24,25}

158

159 The invitation to complete the questionnaire on Survey Monkey was distributed separately in
160 each country between the 12 October 2020 and 28 September 2021. This was a reasonable
161 period of time for data collection because no further requests to complete the survey were
162 apparent after this time. In each country, the distribution was made using either national
163 and/or regional authorities newsletter diffusion and/or scientific or continuing education
164 organizations mailing list diffusion. This strategy permitted to have an email sent to
165 approximately 13 053 (FR) physiotherapists all over the five countries.

166 **2.5 Statistical Analyses**

167 Descriptive statistics were generated by SurveyMonkey Software and subsequently imported
168 into Microsoft Excel 2016 (Microsoft Corp., Redmond, WA, USA) to facilitate development
169 of figures and tables. Closed questions were appraised with descriptive analysis and
170 summarized as narrative text. Qualitative data generated from the open-ended questions were

171 translated verbatim and compiled into Excel. The analysis of qualitative data from the open-
172 ended questions followed thematic analysis guidelines and was separated in five steps: (1)
173 compiling, (2) disassembling, (3) reassembling, (4) interpreting, and (5) concluding.^{26,27}
174 During the process, two researchers [REDACTED] independently created a set of codes
175 (categories/subcategories) from the participants' answers for each open-ended questions.
176 When agreement was not reach, a third researcher [REDACTED] was used to reach a consensus.
177 Similarly, descriptive analysis of participants' response rate in each category/subcategory was
178 summarized as narrative text.

179

180 **3 Results**

181 From a potential list of 13 053 (FR) physiotherapists, a total of 763 (FR) physiotherapists
182 accessed the survey (5.8%) between 12 October 2020 and 28 September 2021. Of the 763
183 (FR) physiotherapists, a total of 426 (55.8%) fully completed all questions and sections.
184 Descriptive statistics of the 426 respondents/participants for sections 1 and 2 are detailed in
185 Table 1. A large majority (77.5%) of respondents have a post-graduate qualification. The
186 overall mean level of participants' self-assessment regarding their expertise in the clinical
187 assessment, diagnosis, and treatment of patients with acute LAS injury and/or CAI was
188 6.6/10.

189

190

TABLE 1

191

192 The principal results of section 3 of the online questionnaire are detailed in Table 2.
193 Concerning the clinical assessment of the skeletal tissues of the ankle joint, 48.5% of
194 respondents cited the Ottawa Ankle Rules (OAR), but only 6.3% were able to correctly list all

195 of the criteria. Alarming, 36.6% of the respondents were unable to cite any of the OAR
196 criteria. Additionally, only 24.6% of respondents had an accurate knowledge of the sensitivity
197 and specificity of the OAR. Instead of using the OAR to assess the skeletal tissues of the
198 ankle joint, a substantial proportion (40.4%) of the respondents proposed their own
199 assessments which included, visual observation, percussion, and subjective quantification of
200 gait. Concerning the clinical assessment of the ligaments of the ankle joint, only 25.6% of
201 respondents mentioned the “anterior drawer test” or the “talar tilt test”. A similarly low
202 number of respondents mentioned the “squeeze test” or the “external rotation test” (17.1%
203 and 15.3%, respectively) for the clinical assessment of the syndesmosis ligaments. Instead of
204 these tests, a large proportion (46.9% to 56.8%) of respondents proposed their own tests,
205 which included, general observation, mobilization of the ankle joint, and ligament stress tests
206 in non-specific positions (see Appendix B).

207 .

208 TABLE 2

209

210 Section 4 of the questionnaire included questions related to the clinical evaluation of acute
211 LAS injury and specifically the ROAST framework. The results of this section revealed that
212 except for patient reported outcome measures (PROMs) questionnaires (only 16.7% of
213 respondents reported that they used a PROMs questionnaire on a regular basis, whilst only
214 50% of this group of responders were able to name a specific ankle PROMs questionnaire), a
215 majority of respondents displayed knowledge of each of the ROAST framework items
216 (Figures 1-2). However, it is apparent from the results that the clinical assessment methods
217 used by respondents to evaluate each of the ROAST items are heterogenous and in most
218 instances do not align with the recommendations proposed by the International Ankle
219 Consortium in their ankle clinical evaluation framework.¹² For example, only 28% of

220 respondents reported using the “figure-of-8 test” to evaluate ankle joint swelling; only 37% of
221 respondents reported using the “weight bearing lunge test” to evaluate ankle joint dorsiflexion
222 range of motion and only 23.7% of respondents reported using the “star excursion balance
223 test” to evaluate dynamic postural balance (Figures 1-2).

224 FIGURE 1

225 FIGURE 2

226

227 Section 5 of the questionnaire sought participants’ own definition of CAI, as well as their
228 knowledge of the mechanical and functional insufficiencies that associate with CAI.
229 Regarding the definition of CAI, 62.4% of respondents included reference to “*recurrent*
230 *sprain*”. 37.1% of respondents defined CAI as the presence of “*sensorimotor deficits*”
231 following LAS injury. 25.1% of respondents defined CAI as the presence of “*ankle laxity*”
232 following LAS injury and 29.8% of respondents defined CAI as the presence of a “*feeling of*
233 *instability*” following LAS injury. With respect to the functional insufficiencies that associate
234 with CAI, 55.6% of respondents mentioned the generic term “*sensorimotor deficits*” (Figure
235 3A). The three most identified “*sensorimotor deficits*” included: “*balance deficits*” (52.3%),
236 “*strength deficits*” (44.3%), and “*proprioception deficits*” (36.3%). With respect to the
237 mechanical insufficiencies that associate with CAI, 41.7% of respondents mentioned the
238 generic term “*sensorimotor deficits*” (Figure 3B). In parallel to that, the two most identified
239 mechanical insufficiencies included: “*ankle laxity*” (32.2%), and “*ankle dorsiflexion range of*
240 *motion deficits*” (28.6%).

241

242 FIGURE 3

243 **4 Discussion**

244 The main finding of this study was that less than a quarter of (FR) physiotherapists (1) used
245 the International Ankle Consortium Rehabilitation-Oriented-ASsessment (ROAST)
246 framework when providing clinical care for individuals with an acute LAS injury, (2) have a
247 clear understanding of the full spectrum of mechanical and functional insufficiencies
248 associated with CAI development. These results are surprising considering that a large
249 proportion of the respondents had a post-graduate qualification in sports physiotherapy,
250 musculoskeletal physiotherapy, foot-ankle joint complex and/or manipulative therapy. We
251 have also noted a remarkable distortion between the low level of evidence-based answers
252 provided by the respondents in comparison to their high self-assessed expertise in the clinical
253 assessment, diagnosis, and treatment ($\approx 7/10$) as this level is close to that of the expert panel
254 members of the International Ankle Consortium ($\approx 8/10$).¹² These findings highlight the gap in
255 knowledge between the best available scientific evidence and actual clinical practice in
256 French-speaking countries regarding acute LAS injury and/or CAI management.

257 **4.1 Section 3: Clinical diagnostic assessment of the ankle**

258 The OAR are the most commonly used clinical prediction rules as they are simple and quick
259 to implement in practice.²¹ Even though the OAR were published almost thirty years ago²²,
260 and have been taught for years in (FR) school/university of physiotherapy, a small proportion
261 of (FR) physiotherapists (24.6%) do know how to implement the OAR in clinical practice.
262 This result potentially arises due to the physician first-contact in the French medical system.
263 Indeed, nowadays the first-contact clinical diagnostic assessment after LAS is made for a
264 large proportion by medical doctors in the emergency department or in private practice.
265 Therefore, for a decade the implementation and realization of the OAR in daily practice is not
266 a prerogative for (FR) physiotherapists which could explain our results. However, if the
267 presence of (FR) physiotherapists into primary care team is rare, we think that the

268 implementation OAR should be known by every (FR) physiotherapists as its utilization in
269 specific case conditions in daily practice is relevant from our experience (live game, no rapid
270 medical availability, etc). Regarding lateral ligament integrity assessment, half of the
271 respondents ($\approx 51.9\%$) specified that they used their own “modified” version of reference
272 tests. This could be problematic, as “modified” versions of reference test lack psychometric
273 validity and could lead to a wrong diagnosis of ligaments integrity in practice. Additionally,
274 very few respondents ($\approx 3.7\%$) reported using a cluster of tests (e.g., palpation + stress test)
275 which is known to increase the efficacy of ankle diagnostic tests.²³ For the assessment of the
276 integrity of the syndesmosis ligaments, a similar response pattern was observed (48,8% of
277 respondents reported using an “modified” test, while only 2.3% of respondents used a cluster
278 of at least 2 reference tests).^{12,28} This could possibly lead to an under-diagnosis of
279 syndesmosis ligament injuries by not seeking additional imaging or arthroscopy when these
280 tests are positive. Then it could also lead to potential long-term residual deficits as these “high
281 ankle sprains” are associated with prolonged pain, disability and premature ankle arthritis.²⁹

282 **4.2 Section 4: Clinical evaluation after a LAS injury**

283 It has been proposed that LAS recurrence might be due to inadequate rehabilitation.^{1,12} The
284 International Ankle Consortium have suggested that the ROAST guidelines should be
285 implemented by clinicians when managing acute ankle sprain injuries – the proposition is that
286 a rehabilitation program based on objectively identified injury-associated impairments could
287 help reduce the risk of recurrent injuries (a key feature of chronic ankle instability).¹² Our
288 results indicate that a large proportion of respondents likely over-estimated their self-
289 perceived expertise related to the clinical assessment of acute ankle sprain injuries. A
290 minority of respondents reported performing evidence-informed objective impairment-based
291 clinical assessments during their rehabilitation process after acute LAS injury. This is
292 evidenced by the fact that 68.7% of respondents used subjective manual muscle tests to

293 determine the absence/presence of shank muscle strength impairments. The use of subjective
294 manual muscle tests is questionable and the results obtained from such clinical assessments
295 are likely to lead to unreliable findings. Our results reinforce the need to teaching and
296 claiming the importance of using objective impairment-based clinical assessments in French
297 physiotherapy curricula and continuing education courses Finally, in this section, it seems
298 crucial not to overlook that a large majority of responders (83.3%) reported that they do not
299 used important PROMs questionnaires such as the “Foot ankle and ability measure” or the
300 “Cumberland ankle instability tool”.^{30,31} Although they are now available and validated in
301 French^{32,33} this underutilization reduces the ability of (FR) physiotherapists to properly detect
302 patient self-reported functional deficits, functional ankle instability, and severity of the
303 instability.^{30,31}

304 **4.3 Section 5: Chronic Ankle Instability**

305 The accepted definition of CAI endorsed by the International Ankle Consortium is the
306 presence of residual symptom such as self-reported episodes of giving way of the ankle joint,
307 and/or self-reported feelings of ankle joint instability, and/or self-reported recurrent sprains
308 following the occurrence of at least one significant ankle sprain injury.¹¹ Our results suggest
309 that a thorough understanding of the concept of CAI is lacking amongst (FR)
310 physiotherapists; giving way was only identified by 14.3% of respondents, feelings of ankle
311 joint instability was only identified by 29.8% of respondents, while recurrent sprains was
312 identified by 67.8% of respondents. Additionally, our results show that (FR) physiotherapists
313 don't have a thorough comprehension of the difference between functional and mechanical
314 insufficiencies as “*sensori-motor deficits*” was the best cited thematic for each one. The 2002
315 model of CAI proposed that CAI results from the interaction of mechanical instability (MI) –
316 defined as a pathological laxity after ankle-ligament injury – and functional instability (FI) –
317 defined as the occurrence of recurrent ankle instability and the sensation of joint instability

318 due to the contribution of proprioceptive and neuromuscular deficits.²⁴ Therefore, including
319 “*sensori-motor deficits*” as a key thematic for both MI and FI illustrates that physiotherapist
320 are likely to be unaware of the range of different mechanical insufficiencies that can
321 contribute to the development of CAI (e.g., degenerative changes, tissue adaptations).^{24,25}
322 Such as misunderstanding could result in the implementation of sub-optimal treatment, such
323 that important mechanical insufficiencies are never addressed as part of the rehabilitation
324 process. This in turn could perpetuate the cascade of chronic symptoms and prolonged long-
325 term deficits.^{1,12}

326 **4.4 Implications:**

327 (FR) physiotherapists’ gap in knowledge between the best available scientific evidence and
328 their actual clinical practice has implications both for researchers, practitioners and journal
329 editors. First, it highlights the potential problem of the language barrier¹⁸ and the disadvantage
330 for (FR) physiotherapists to understand English language articles. To overcome this barrier,
331 French translation of a well-known international continuing education website blog (@Physio
332 Network) have been created for several years including infographics, research reviews and
333 podcasts. However, if the OAR, the ROAST framework¹² and the first model of CAI²⁴ have
334 been translated in French³⁴ this currently is not enough in regard to our results and some other
335 options have to be considered. As proposed by Emerging Themes in Epidemiology journal
336 abstracts in alternative languages, wiki-open translation or international board of translator-
337 editors could be valuable options for journal editors.¹⁸ In parallel to English translation, we
338 believe that these results underscore the responsibility of researchers to disseminate the
339 clinical applications of their findings to clinicians considering their lack of time to read
340 journal articles. Therefore, one possible strategy of dissemination could be the better use of
341 easy to understand and viewer friendly media such as infographics, article synthesis, website
342 blogs which are also now more and more translated in French. Outside conventional journal

343 publication, it's important to notice that instead of reading articles, attendance at courses is
344 the biggest source of practice-changing information for practitioners as highlighted by
345 Whiteley et al.¹⁶ However, as we don't know if this also the preference of our respondents, we
346 think that social media³⁵ or courses are also insightful options for enhanced knowledge
347 translation to bridge the gap between research and practice. On one side, it is incumbent upon
348 individual who teach continuing professional development courses to make sure that the
349 material that they deliver to practitioners is contemporaneous and evidence informed. On the
350 other side, it is incumbent upon practitioners to integrate these new scientific evidences into
351 their practice and to learn continually and sustainably.

352 **4.5 Limitations:**

353 Our investigation has several limitations that should be underlined. Firstly, the dissemination
354 of our study was only provided by official, scientific, or education authorities of each country
355 and not generalized with social media. This was decided a priori, in order to avoid inclusion
356 bias, but the total number of responders could be considered as low regarding the
357 demographic of physiotherapist in overall countries. Secondly, it could be expected that (FR)
358 physiotherapists who volunteered to participate in this survey were more interested in LAS
359 and therefore more educated and more aware of recent clinical guidelines. Thirdly, although
360 the psychosocial aspects are essential in the management of lateral ankle sprains, as
361 highlighted in the updated model of CAI²⁵, in this study we focused solely on the 'bio' aspect
362 of the "biopsychosocial" model during clinical assessment. This is partly due to the fact that
363 the optimal length of a questionnaire should not exceed 25 min in order to have the highest
364 rate of responders.³⁶ Lastly, it should be noted that we recruited solely from the five biggest
365 French-speaking countries (number of physiotherapists) and most of whom were from France
366 and work/ed in private practice which make our results not generalizable to physiotherapist
367 working other (FR) physiotherapy populations. However, it is worth noting that the

368 educational systems (based on internships) and modes of professional practice (employment
369 in institutions or independent self-employment) are sufficiently analogous in the five chosen
370 countries, allowing, in our view, the derivation of overarching conclusions from our study.

371 **5 Conclusion**

372 Our results suggest that a minority of (FR) physiotherapists use evidence informed clinical
373 assessment approaches for patients with acute LAS injuries and CAI. Their lack of knowledge
374 of the insufficiencies that associate with CAI is concerning and suggests that several
375 important insufficiencies are likely never addressed as part of the rehabilitation process. This
376 in turn could perpetuate the cascade of chronic symptoms. More efforts are needed from both
377 researchers and clinicians to improve knowledge translation from science to clinical practice.
378 Without such efforts it is likely that the prevalence of CAI will remain high.

382 **Appendix A. Supplementary data**

383 Supplementary document: English translation of the online survey

385 **Appendix B. Supplementary data**

386 Supplementary document: Thematic analysis of the online survey' for each open-ended
387 question

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References

- 400 1. Gribble PA, Bleakley CM, Caulfield BM, et al. Evidence review for the 2016
401 International Ankle Consortium consensus statement on the prevalence, impact and long-
402 term consequences of lateral ankle sprains. *Br J Sports Med.* 2016;50(24):1496-1505.
403 doi:10.1136/bjsports-2016-096189
- 404 2. Waterman BR, Owens BD, Davey S, Zacchilli MA, Belmont PJ. The epidemiology of
405 ankle sprains in the United States. *J Bone Joint Surg Am.* 2010;92(13):2279-2284.
406 doi:10.2106/JBJS.I.01537
- 407 3. Cooke MW, Lamb SE, Marsh J, Dale J. A survey of current consultant practice of
408 treatment of severe ankle sprains in emergency departments in the United Kingdom.
409 *Emerg Med J.* 2003;20(6):505-507. doi:10.1136/emj.20.6.505
- 410 4. McKay G, Goldie P, Payne W, Oakes B. Ankle injuries in basketball: injury rate and risk
411 factors. *Br J Sports Med.* 2001;35(2):103-108. doi:10.1136/bjism.35.2.103
- 412 5. Hiller CE, Nightingale EJ, Raymond J, et al. Prevalence and impact of chronic
413 musculoskeletal ankle disorders in the community. *Arch Phys Med Rehabil.*
414 2012;93(10):1801-1807. doi:10.1016/j.apmr.2012.04.023
- 415 6. Verhagen E, van Tulder M, van der Beek AJ, Bouter L, van Mechelen W. An economic
416 evaluation of a proprioceptive balance board training programme for the prevention of
417 ankle sprains in volleyball. *Br J Sports Med.* 2005;39(2):111-115.
418 doi:10.1136/bjism.2003.011031
- 419 7. Hubbard-Turner T. Lack of Medical Treatment From a Medical Professional After an
420 Ankle Sprain. *Journal of Athletic Training.* 2019;54(6):671-675. doi:10.4085/1062-6050-
421 428-17
- 422 8. Doherty C, Bleakley C, Hertel J, Caulfield B, Ryan J, Delahunt E. Recovery From a First-
423 Time Lateral Ankle Sprain and the Predictors of Chronic Ankle Instability: A Prospective
424 Cohort Analysis. *Am J Sports Med.* 2016;44(4):995-1003.
425 doi:10.1177/0363546516628870

- 426 9. Delahunt E, Coughlan GF, Caulfield B, Nightingale EJ, Lin CWC, Hiller CE. Inclusion
427 criteria when investigating insufficiencies in chronic ankle instability. *Med Sci Sports*
428 *Exerc.* 2010;42(11):2106-2121. doi:10.1249/MSS.0b013e3181de7a8a
- 429 10. Hirose K, Murakami G, Minowa T, Kura H, Yamashita T. Lateral ligament injury of the
430 ankle and associated articular cartilage degeneration in the talocrural joint: anatomic study
431 using elderly cadavers. *J Orthop Sci.* 2004;9(1):37-43. doi:10.1007/s00776-003-0732-9
- 432 11. Gribble PA, Delahunt E, Bleakley C, et al. Selection criteria for patients with chronic
433 ankle instability in controlled research: a position statement of the International Ankle
434 Consortium. *Br J Sports Med.* 2014;48(13):1014-1018. doi:10.1136/bjsports-2013-
435 093175
- 436 12. Delahunt E, Bleakley CM, Bossard DS, et al. Clinical assessment of acute lateral ankle
437 sprain injuries (ROAST): 2019 consensus statement and recommendations of the
438 International Ankle Consortium. *British Journal of Sports Medicine.* 2018;52(20):1304-
439 1310. doi:10.1136/bjsports-2017-098885
- 440 13. Curran JA, Grimshaw JM, Hayden JA, Campbell B. Knowledge translation research: the
441 science of moving research into policy and practice. *J Contin Educ Health Prof.*
442 2011;31(3):174-180. doi:10.1002/chp.20124
- 443 14. Sussman S, Valente TW, Rohrbach LA, Skara S, Pentz MA. Translation in the health
444 professions: converting science into action. *Eval Health Prof.* 2006;29(1):7-32.
445 doi:10.1177/0163278705284441
- 446 15. Kerin F, Delahunt E. Physiotherapists' Understanding of Functional and Mechanical
447 Insufficiencies Contributing to Chronic Ankle Instability. *Athletic Training and Sports*
448 *Health Care.* 2011;3(3):125-130. doi:10.3928/19425864-20101029-03
- 449 16. Whiteley R, Napier C, Dyk N van, et al. Clinicians use courses and conversations to
450 change practice, not journal articles: is it time for journals to peer-review courses to stay
451 relevant? *Br J Sports Med.* 2021;55(12):651-652. doi:10.1136/bjsports-2020-102736
- 452 17. Ofori-Adjei D, Antes G, Tharyan P, Slade E, Tamber PS. Have Online International
453 Medical Journals Made Local Journals Obsolete? *PLoS Med.* 2006;3(8):e359.
454 doi:10.1371/journal.pmed.0030359
- 455 18. Fung ICH. Open access for the non-English-speaking world: overcoming the language
456 barrier. *Emerg Themes Epidemiol.* 2008;5:1. doi:10.1186/1742-7622-5-1
- 457 19. Garfield E, Welljams-Dorof A. The microbiology literature: Languages of publication and
458 their relative citation impact. *FEMS Microbiology Letters.* 1992;100(1-3):33-37.
459 doi:10.1111/j.1574-6968.1992.tb05678.x
- 460 20. Bossard DS, Remus A, Doherty C, Gribble PA, Delahunt E. Developing consensus on
461 clinical assessment of acute lateral ankle sprain injuries: protocol for an international and
462 multidisciplinary modified Delphi process. *Br J Sports Med.* 2018;52(23):1539-1539.
463 doi:10.1136/bjsports-2017-099007
- 464 21. Barelds I, Krijnen WP, van de Leur JP, van der Schans CP, Goddard RJ. Diagnostic
465 Accuracy of Clinical Decision Rules to Exclude Fractures in Acute Ankle Injuries:

- 466 Systematic Review and Meta-analysis. *J Emerg Med.* 2017;53(3):353-368.
467 doi:10.1016/j.jemermed.2017.04.035
- 468 22. Stiell IG, Greenberg GH, McKnight RD, et al. Decision rules for the use of radiography in
469 acute ankle injuries. Refinement and prospective validation. *JAMA.* 1993;269(9):1127-
470 1132. doi:10.1001/jama.269.9.1127
- 471 23. Gribble PA. Evaluating and Differentiating Ankle Instability. *J Athl Train.*
472 2019;54(6):617-627. doi:10.4085/1062-6050-484-17
- 473 24. Hertel J. Functional Anatomy, Pathomechanics, and Pathophysiology of Lateral Ankle
474 Instability. *J Athl Train.* 2002;37(4):364-375.
- 475 25. Hertel J, Corbett RO. An Updated Model of Chronic Ankle Instability. *J Athl Train.*
476 2019;54(6):572-588. doi:10.4085/1062-6050-344-18
- 477 26. Castleberry A, Nolen A. Thematic analysis of qualitative research data: Is it as easy as it
478 sounds? *Curr Pharm Teach Learn.* 2018;10(6):807-815. doi:10.1016/j.cptl.2018.03.019
- 479 27. Elo S, Kyngäs H. The qualitative content analysis process. *J Adv Nurs.* 2008;62(1):107-
480 115. doi:10.1111/j.1365-2648.2007.04569.x
- 481 28. Netterström-Wedin F, Bleakley C. Diagnostic accuracy of clinical tests assessing
482 ligamentous injury of the ankle syndesmosis: A systematic review with meta-analysis.
483 *Physical Therapy in Sport.* 2021;49:214-226. doi:10.1016/j.ptsp.2021.03.005
- 484 29. Lin CF, Gross MT, Weinhold P. Ankle Syndesmosis Injuries: Anatomy, Biomechanics,
485 Mechanism of Injury, and Clinical Guidelines for Diagnosis and Intervention. *J Orthop*
486 *Sports Phys Ther.* 2006;36(6):372-384. doi:10.2519/jospt.2006.2195
- 487 30. Carcia CR, Martin RL, Drouin JM. Validity of the Foot and Ankle Ability Measure in
488 athletes with chronic ankle instability. *J Athl Train.* 2008;43(2):179-183.
489 doi:10.4085/1062-6050-43.2.179
- 490 31. Hiller CE, Refshauge KM, Bundy AC, Herbert RD, Kilbreath SL. The Cumberland ankle
491 instability tool: a report of validity and reliability testing. *Arch Phys Med Rehabil.*
492 2006;87(9):1235-1241. doi:10.1016/j.apmr.2006.05.022
- 493 32. Geerinck A, Beudart C, Salvan Q, et al. French translation and validation of the
494 Cumberland Ankle Instability Tool, an instrument for measuring functional ankle
495 instability. *Foot and Ankle Surgery.* 2020;26(4):391-397. doi:10.1016/j.fas.2019.05.002
- 496 33. Borloz S, Crevoisier X, Deriaz O, Ballabeni P, Martin RL, Luthi F. Evidence for validity
497 and reliability of a french version of the FAAM. *BMC Musculoskelet Disord.* 2011;12:40.
498 doi:10.1186/1471-2474-12-40
- 499 34. Banihachemi JJ. Cheville instable: démarche diagnostique et thérapeutique. In: Bendahou
500 M, Saidi K, Besch S, Khiami F, eds. *Traumatisme de la cheville.* Références en médecine
501 d'urgence. Collection de la SFMU. Springer; 2013:241-256. doi:10.1007/978-2-8178-
502 0352-4_21

503 35. Maloney S, Tunnecliff J, Morgan P, et al. Translating Evidence Into Practice via Social
504 Media: A Mixed-Methods Study. *Journal of Medical Internet Research*.
505 2015;17(10):e4763. doi:10.2196/jmir.4763

506 36. Revilla M, Ochoa C. Ideal and Maximum Length for a Web Survey. *International*
507 *Journal of Market Research*. 2017;59(5):557-565. doi:10.2501/IJMR-2017-039

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512 **Legends to tables**

513 Table 1. Physiotherapists demographics and self-assessment.

514 Table 2. Results of thematic analysis for bones and ligamentous integrity.

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Legends to figures

Figure 1. Thematic analysis of clinical evaluation after an acute lateral ankle sprain (ROAST framework items). A: Ankle joint swelling set of thematics; B: Ankle joint range of motion set of thematics; C: Ankle joint muscle strength set of thematics; D: Ankle joint arthrokinematics set of thematics.

Figure 2. Thematic analysis of clinical evaluation after an acute lateral ankle sprain (ROAST framework items). A: Static postural balance set of thematics; B: Dynamic postural balance set of thematics; C: Ankle joint specific “patient-reported outcome measures” (PROMS) set of thematics.

Figure 3. Top described thematic concerning functional and mechanical insufficiencies that contribute to chronic ankle instability. A: The four most described thematic regarding functional insufficiencies; B: The three most described thematic regarding mechanical insufficiencies.

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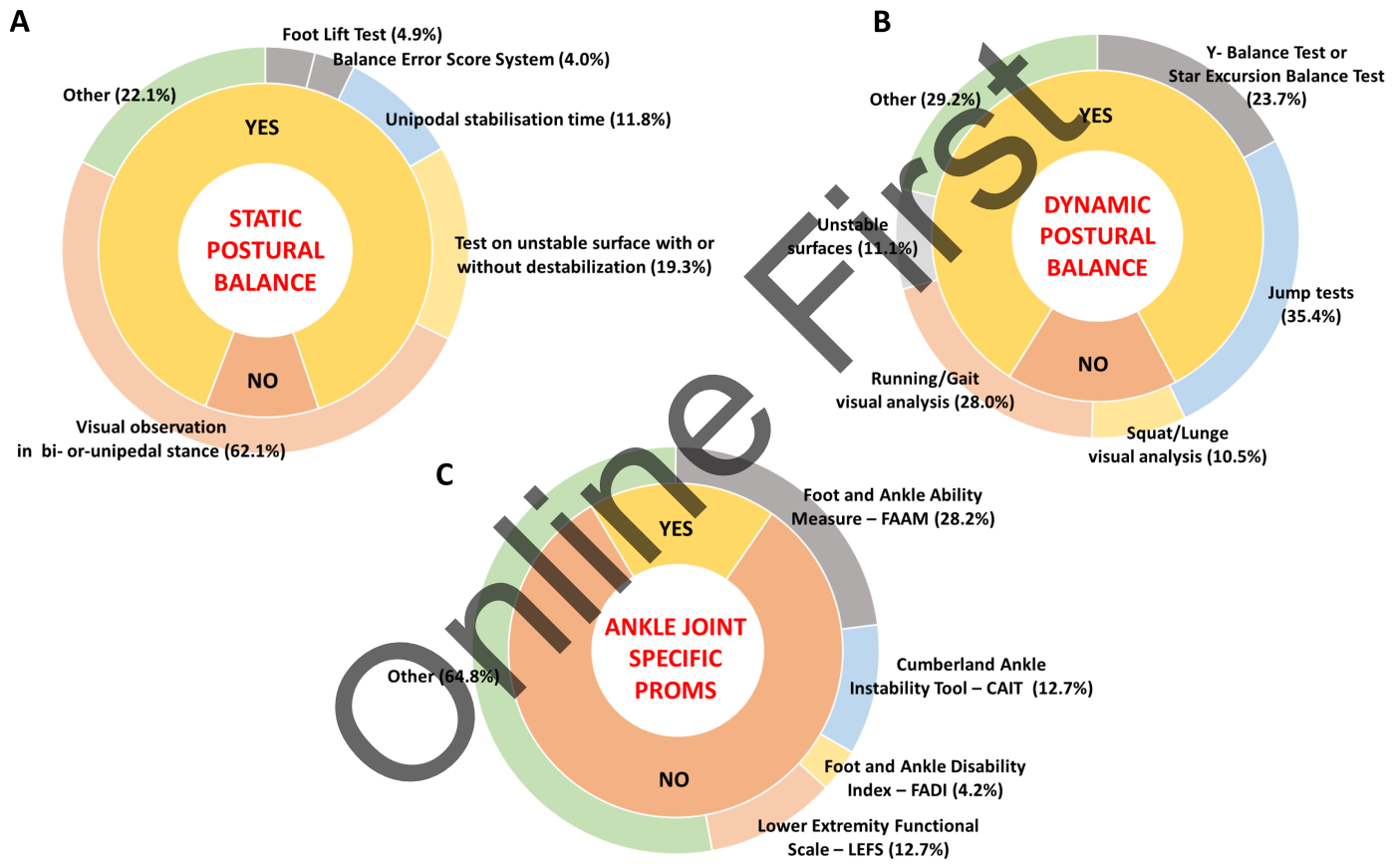
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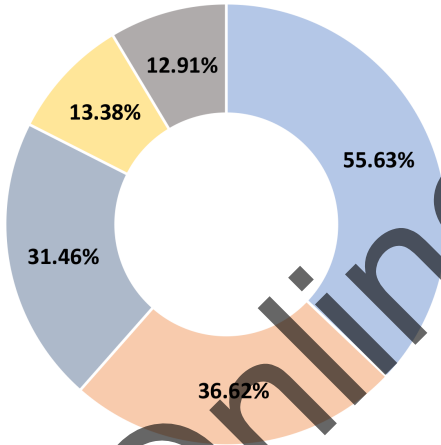
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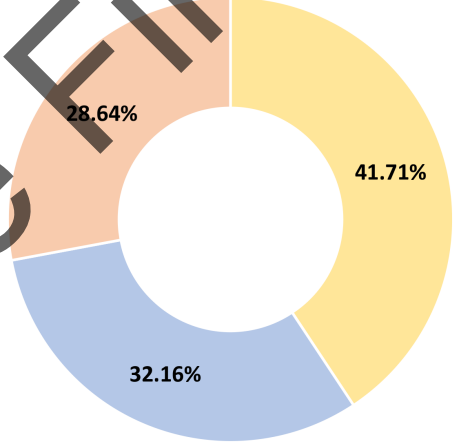


FUNCTIONAL INSUFFICIENCIES



- Ankle stiffness
- Ankle pain
- Deficits during activities of daily living
- Deficits during sporting activities
- Sensori-motor deficits

MECHANICAL INSUFFICIENCIES



- Sensori-motor deficits
- Ankle laxity
- Ankle dorsiflexion ROM deficit

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Table 1. Physiotherapists demographics and self-assessment.

	Overall Physiotherapists (n=426)	
	N (%)	
	Mean	±SD
Female	202	(46.7%)
Age (years)	37.1	±10.96
Country		
Belgium	26	(6.1%)
France	230	(53.9%)
Luxembourg	45	(10.6%)
Quebec-Canada	61	(14.3%)
Switzerland	64	(15.0%)
Employment status		
Private practice	377	(88.5%)
Public hospital	20	(4.7%)
Private clinic	16	(3.8%)
Rehabilitation center	24	(5.6%)
Sports structures	29	(6.8%)
Others	19	(4.5%)
Clinical experience (years)	13.2	± 10.8
Research activity	17	(4.0%)
Senior research fellow	1	(0.2%)
Post-doctoral researcher	2	(0.5%)
PhD candidate researcher	6	(1.4%)
Research assistant	4	(0.9%)
Others	4	(0.9%)
Post-graduate qualification	330	(77.5%)
Sport physiotherapy	149	(35.0%)
Musculoskeletal physiotherapy	200	(46.9%)
Foot-ankle joint complex	92	(21.6%)
Manipulative therapy	62	(14.6%)
Number of patients with LAS/CAI treated		
1 per month	146	(34.3%)
1 per week	131	(30.8%)
2 to 6 per week	142	(33.3%)
>6 per week	7	(1.6%)
Level of expertise self-assessment (10-point LS)		
Clinical assessment	6.4	± 1.6
Diagnosis	6.3	± 1.7
Treatment	7.0	± 1.4

CAI, chronic ankle instability; LAS, lateral ankle sprain; LS, likert-scale;

Table 2. Results of thematic analysis for bones and ligamentous integrity.

	Overall Physiotherapists (n=426)
	N (%)
Part 1: Bones integrity	
Ottawa Ankle Rules	205 (48.1%)
Bernese Ankle Rules	18 (4.2%)
Tuning-fork test	66 (15.5%)
General observations excluding OAR	172 (40.4%)
Walking or weight bearing status excluding OAR	134 (31.5%)
Manual bones percussions	71 (16.7%)
Declare “do not know”	15 (3.5%)
Part 2: Ligamentous integrity	
Anterior Talo-Fibular-Ligament (ATFL)	
Name or describe anterior drawer test	109 (25.6%)
Name or describe ligament palpation	82 (19.2%)
Other	242 (56.8%)
Declare “do not know”	75 (17.6%)
Cluster: ADT and palpation	13 (3.1%)
Calcaneo-fibular-ligament (CFL)	
Name or describe talar tilt test	109 (25.6%)
Name or describe ligament palpation	70 (16.4%)
Other	200 (46.9%)
Declare “do not know”	97 (22.8%)
Cluster: TTT and palpation	18 (4.2%)
Syndesmosis ligaments	
Name or describe squeeze test	73 (17.1%)
Name or describe external rotation test	65 (15.3%)
Describe weight bearing dorsiflexion test	18 (4.2%)
Name or describe ligament palpation	55 (12.9%)
Other	208 (48.8%)
Declare “do not know”	105 (24.6%)
Cluster: ST or ERT and palpation	10 (2.3%)

ADT, Anterior Drawer Test; ERT, External Rotation Test; OAR, Ottawa Ankle Rules; ST, Squeeze Test; TTT, Talar Tilt Test;

Supplementary material A: English translation of the online survey

SECTION 1: PARTICIPANTS' DEMOGRAPHICS

1- Are you a physiotherapist?

Answer (closed type): Yes / No (if the answer is no, the survey stops directly)

2- In which country are you currently employed?

Answer: Preferably a drop-down menu with: France / Switzerland / Belgium / Luxembourg / Quebec-Canada

3- What is your age?

Answer: Preferably a drop-down menu with: numbers from 18 onwards

4- What is your sex?

Answer: Preferably a drop-down menu with: Male/Female/Prefer not to say

5- What is your current employment? (Tick all that apply)

Answer: Preferably a drop-down menu with: Liberal Clinical Practice / Salaried Clinical Practice / Teacher in initial training – pre graduate / Continuing education teacher/ Other

6- If you work clinically what is your employment status? (Tick all that apply)

Answer: Preferably a drop-down menu with: Private practice / Public Hospital / Private Clinic / Rehabilitation Center/ Sports structures (federation, clubs, CREPS etc) / Other

7- How many years of clinical experience do you have in your field (since graduation)?

Answer: Preferably a drop-down menu with: numbers from <1year onwards

8- Do you have a research activity linked to a laboratory or an institution?

Answer (closed type): Yes / No

8bis – If yes to question 8, what is your current rank?

Answer: Preferably a drop-down menu with: Senior Research Fellow/ Research Fellow/ Post-doctoral Researcher/ Graduate Research Student (PhD or MSc)/ Research Assistant/ Other

9- Did you have a formal qualification in? (tick ALL that are applicable)

Answer: Preferably a drop-down menu with : Long qualification in sports physiotherapy: minimum of 5 days (40h) / Short specific course for the ankle joint complex / Long

qualification in musculoskeletal physiotherapy: minimum of 5 days (40h) / Diploma of osteopath or chiropractor or etiopath / None of these 4 qualifications proposals

10- Do you have a particular interest in the ankle joint? (research of literature, congress, podcast, webinar on the subject)

Answer: Yes / No

11- If you work clinically how many patients on average per week do you assess with ankle injuries?

Answer: Preferably a drop-down menu with: 1 per month / 1 per week / 2 to 6 per week / >6 per week

12- If you work clinically which level patients do you work with? (tick ALL that are applicable)

Answer: Preferably a drop-down menu with: General population / Amateur athletes / College-level athletes/ High school-level athletes / Semi-professional athletes / Professional athletes

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SECTION 2: PARTICIPANTS' SELF-ASSESSMENT

13- Rate your level of expertise in the clinical assessment of patients with lateral ankle sprain injury and/or chronic ankle instability?

Answer: 0 = no level of expertise ... 10 = highest level of expertise

Clinical assessment refers to the clinician's ability to evaluate the patient's injury and associated prognosis based on information gathered from physical examinations/tests and the patient's medical history.

14- Rate your level of expertise in the diagnosis of patients with lateral ankle sprain injury and/or chronic ankle instability?

Answer: 0 = no level of expertise ... 10 = highest level of expertise

Medical diagnosis refers to the clinician's ability to determine which condition (injured structure/s) likely explains the patient's symptoms.

15- Rate your level of expertise in the treatment/rehabilitation of patients with lateral ankle sprain injury and/or chronic ankle instability?

Answer: 0 = no level of expertise ... 10 = highest level of expertise

Expertise in treatment/rehabilitation is defined by the clinician's ability to implement a management strategy that will allow the patient to recover full function without limitation in future activities and with a minimum chance of injury recurrence.

The purpose of sections 3, 4 and 5 is to objectively assess your personal knowledge of clinical diagnostic assessment of patients with acute ankle sprain injuries and chronic ankle instability. We remind you that it is necessary for us that you answer these questions without any resources at your side (books, course materials, websites).

I have read this instruction

SECTION 3: CLINICAL DIAGNOSTIC ASSESSMENT OF THE ANKLE

Q1- A patient presents to you in 1st intention following an acute trauma of the foot/ankle complex. Without medical imaging, how do you clinically assess the probability that this patient will have a fracture?

Answer: Open to type (100 words max)

Q2- Can you cite all the Ottawa ankle rules?

Answer: Open to type (100 words max)

Q3- From a clinimetric properties point of view, the Ottawa criteria are criteria that present:

** Clinimetric properties: In the musculoskeletal field, we can define clinimetric properties as the evaluation of clinical tests by studies. These make it possible to assess the reliability (reproducibility), validity and interest that they can bring to the exam (inclusion or exclusion).*

Answer (closed type):

- ⇒ A strong sensitivity and a strong specificity
- ⇒ A strong sensitivity and a weak specificity
- ⇒ A strong specificity and a weak sensitivity
- ⇒ A weak specificity and a weak sensitivity
- ⇒ I don't know

Q4- During my clinical exam, my patient has 2 positive Ottawa' criteria, what can I say?

Answer (closed type):

- ⇒ My patient has a high probability to have a fracture
- ⇒ My patient has a high probability to have no fracture
- ⇒ I can't conclude about the presence of a fracture

Q5- During my clinical exam, my patient has NO positive Ottawa' criteria, what can I say?

Answer (closed type):

- ⇒ My patient has a high probability to have a fracture
- ⇒ My patient has a high probability to have no fracture
- ⇒ I can't conclude on the presence of a fracture

Q6a- Can you cite or describe the clinical tests allowing to objectify a lesion of the “anterior talofibular ligament”?

Answer: Open to type (100 words max)

Q6b- Can you cite or describe the clinical tests allowing to objectify a lesion of the “calcaneofibular ligament”?

Answer: Open to type (100 words max)

Q6c- Can you cite or describe the clinical tests allowing to objectify a lesion of the “syndesmosis ligaments”?

Answer: Open to type (100 words max)

Online First

**SECTION 4: CLINICAL EVALUATION AFTER AN ACUTE LATERAL ANKLE
SPRAIN INJURY**

Q7a- As part of the management of lateral ankle sprain injury, do you assess ankle-joint swelling?

Answer (closed type): Yes / No

If yes, how?

Answer: Open to type (100 words max)

Q7b- As part of the management of lateral ankle sprain injury, do you assess ankle-joint range of motion?

Answer (closed type): Yes / No

If yes, how?

Answer: Open to type (100 words max)

Q7c- As part of the management of lateral ankle sprain injury, do you assess ankle-joint muscle strength?

Answer (closed type): Yes / No

If yes, how?

Answer: Open to type (100 words max)

Q7d- As part of the management of lateral ankle sprain injury, do you assess ankle-joint arthrokinematics?

Answer (closed type): Yes / No

If yes, how?

Answer: Open to type (100 words max)

Online First

Q7d- As part of the management of lateral ankle sprain injury, do you assess ankle-joint arthrokinematics?

Answer (closed type): Yes / No

If yes, how?

Answer: Open to type (100 words max)

Q7e- As part of the management of lateral ankle sprain injury, do you assess static postural balance?

Answer (closed type): Yes / No

If yes, how?

Answer: Open to type (100 words max)

Q7f- As part of the management of lateral ankle sprain injury, do you assess dynamic postural balance?

Answer (closed type): Yes / No

If yes, how?

Answer: Open to type (100 words max)

Q7g- As part of the management of lateral ankle sprain injury, do you assess specific patient-reported outcome measures?

Answer (closed type): Yes / No

If yes, how?

Answer: Open to type (100 words max)

SECTION 5: CHRONIC ANKLE INSTABILITY

Q8- In your own words, can you give a definition of chronic ankle instability?

Answer: Open to type (100 words max)

Patients with chronic ankle instability often present with established functional insufficiencies and mechanical insufficiencies.

Q9-Can you list the functional insufficiencies which are often present in a patient with chronic ankle instability?

Answer: Open to type (100 words max)

Q10- Can you list the mechanical insufficiencies which are often present in a patient with chronic ankle instability?

Answer: Open to type (100 words max)

Online First

Supplementary material B: Thematic analysis of the online survey' for each open-ended question

In this supplementary material, you can find all the themes addressed by the respondents during the open-ended questions.

SECTION 3: CLINICAL DIAGNOSTIC ASSESSMENT OF THE ANKLE

Q1- A patient presents to you in 1st intention following an acute trauma of the foot/ankle complex. Without medical imaging, how do you clinically assess the probability that this patient will have a fracture?

Answer: Open to type (100 words max)

Code	N	%
Code 0: Declare "do not know"	15	3.5
Code 1: Mention "Ottawa Ankle Rules" (OAR)	205	48.1
Code 2: Mention "Bernese Ankle Rules"	18	4.2
Code 3: Mention "Tuning-fork test"	66	15.5
Code 4: Describe general observations excluding OAR	172	40.4
Code 5: Describe observation of walking and weight bearing status excluding OAR	134	31.5
Code 6: Mention manual bones' percussions	71	16.7
Code 7: Mention the use of ultrasound	12	2.8
Code 8: Mention age as an evaluation criteria	20	4.7
Code 9: Other	6	1.4

Q2- Can you cite all the Ottawa ankle rules?

Answer: Open to type (100 words max)

For this question each correct answer gives a percentage score (10 or 18%). If all the items were present in the answer, the respondent had the maximal score of 100%.

Item	% score
Item 1: Mention the palpation of the external malleolus	18%
Item 2: Mention the palpation of the internal malleolus	18%
Item3: Mention the palpation of the posterior surface of the malleolus	10%
Item 4: Mention the incapacity to walk 4 steps (and more)	18%
Item 5: Mention the palpation of the navicular bone	18%
Item 6: Mention the palpation of the fifth metatarsal bone	18%

Score	N	%
100%	27	6.3
90%	29	6.8
82%	17	4.0
72%	72	16.9
64%	9	2.1
54%	54	12.7
46%	4	0.9
36%	45	10.6
28%	2	0.5
18%	11	2.6
0%	156	36.6

Q6a- Can you cite or describe the clinical tests allowing to objectify a lesion of the “anterior talofibular ligament”?

Answer: Open to type (100 words max)

Code	N	%
Code 0: Declare “Do not know”	75	17.6
Code 1: Name or describe the “anterior drawer test”	109	25.6
Code 2: Name or describe ligament’ palpation	82	19.2
Code 3: Other	242	56.8
Cluster: code 1 + code 2	13	3.1

Q6b- Can you cite or describe the clinical tests allowing to objectify a lesion of the “calcaneofibular ligament”?

Answer: Open to type (100 words max)

Code	N	%
Code 0: Declare “Do not know”	97	22.8
Code 1: Name or describe the “talar tilt test”	109	25.6
Code 2: Name or describe ligament’ palpation	70	19.2
Code 3: Other	200	56.8
Cluster: code 1 + code 2	18	4.2

Q6c- Can you cite or describe the clinical tests allowing to objectify a lesion of the “syndesmosis ligaments”?

Answer: Open to type (100 words max)

Code	N	%
Code 0: Declare “Do not know”	105	24.6
Code 1: Name or describe the “squeeze test”	73	17.1
Code 2: Name or describe the “external rotation test”	65	15.3
Code 2: Name or describe the “weight bearing dorsiflexion test”	18	4.2
Code 3: Name or describe ligament’ palpation	55	12.9
Code 4: Other	208	48.8
Cluster: code 1 + code 2 + code 4	2	0.5
Cluster: code 1 + code 2 + code 3 + code 4	3	0.7

Online First

**SECTION 4: CLINICAL EVALUATION AFTER AN ACUTE LATERAL ANKLE
SPRAIN INJURY**

Q7a- As part of the management of lateral ankle sprain injury, do you assess ankle-joint swelling?

Answer (closed type): Yes / No

Answer	N	%
Yes	353	89.1
No	43	10.9

If yes, how?

Answer: Open to type (100 words max)

Code	N	%
Code 0: Declare “Do not know”	2	0.5
Code 1: Mention perimeter’ measurement by specifying "figure of 8"	99	25.0
Code 2: Mention perimeter’ measurement without specifying a specific method	133	33.6
Code 3: Mention the “pitting test”	86	21.7
Code 4: Mention visual observation, redness or heat	148	37.4
Code 5: Other	31	7.8

Q7b- As part of the management of lateral ankle sprain injury, do you assess ankle-joint range of motion?

Answer (closed type): Yes / No

Answer	N	%
Yes	384	97.5
No	10	2.5

If yes, how?

Answer: Open to type (100 words max)

Code	N	%
Code 0: Declare “Do not know”	8	2.0
Code 1: Mention the “weight bearing lunge test”	142	37.0
Code 2: Mention dorsiflexion or plantarflexion angle’measurements in non-weight bearing position	189	49.2
Code 3: Mention between limb visual comparison	125	32.6
Code 4: Mention the “start excursion balance test” or “Y balance test”	3	0.8
Code 5: Mention using subjective manual’ assessments	72	18.8
Code 6: Other	20	5.2

Q7c- As part of the management of lateral ankle sprain injury, do you assess ankle-joint muscle strength?

Answer (closed type): Yes / No

Answer	N	%
Yes	335	85.5
No	57	14.5

If yes, how?

Answer: Open to type (100 words max)

Code	N	%
Code 0: Declare "Do not know"	8	2.4
Code 1: Mention using an hand held dynamometer	46	13.7
Code 2: Mention using manual testing	230	68.7
Code 3: Mention using "fatigability specific tests"	35	10.5
Code 4: Mention using "functional tests"	62	18.5
Code 5: Mention using isokinetic dynamometer	5	1.5
Code 6: Other	41	12.2

Q7d- As part of the management of lateral ankle sprain injury, do you assess ankle-joint arthrokinematics?

Answer (closed type): Yes / No

Answer	N	%
Yes	268	68.5
No	123	31.5

If yes, how?

Answer: Open to type (100 words max)

Code	N	%
Code 0: Declare "Do not know"	9	3.4
Code 1: Mention the "posterior talar glide test"	4	1.5
Code 2: Mention manual subjective glide assessment of bones	233	86.9
Code 3: Mention symptom' modification or patient'clinical response	4	1.5
Code 4: Other	24	9.0
For your information : code 5, 6, 7 and 8 are subcategories of code 2		
Code 5: Mention anterior or posterior talar positional fault	50	18.7
Code 6: Mention mobility of the foot joints	34	12.7
Code 7: Mention mobility of the distal and/or proximal tibiofibular joint	31	11.6
Code 8: Mention mobility of the subtalar joint	16	6.0

Q7e- As part of the management of lateral ankle sprain injury, do you assess static postural balance?

Answer (closed type): Yes / No

Answer	N	%
Yes	348	89.0
No	43	11.0

If yes, how?

Answer: Open to type (100 words max)

Code	N	%
Code 0: Declare "Do not know"	24	6.9
Code 1: Mention using the "foot lift test"	17	4.9
Code 2: Mention using the "balance error score system"	14	4.0
Code 3: Mention using unipodal stabilization time	41	11.8
Code 4: Mention using test on unstable surface with or without destabilization	67	19.3
Code 5: Mention using visual observation in bi-or-unipedal stance	216	62.1
Code 6: Mention using "start excursion balance test"	15	4.3
Code 7: Other	62	17.8

Q7f- As part of the management of lateral ankle sprain injury, do you assess dynamic postural balance?

Answer (closed type): Yes / No

Answer	N	%
Yes	325	83.3
No	65	16.7

If yes, how?

Answer: Open to type (100 words max)

Code	N	%
Code 0: Declare "Do not know"	19	5.8
Code 1: Mention using "start excursion balance test" or "y-balance test"	77	23.7
Code 2: Mention using "jump tests"	115	35.4
Code 3: Mention using visual observation during squat and/or lunge movements	34	10.5
Code 4: Mention using visual observation during walking and/or running gait	91	28.0
Code 5: Mention using tests on unstable surface	36	11.1
Code 7: Other	95	29.2

Q7g- As part of the management of lateral ankle sprain injury, do you assess specific patient-reported outcome measures?

Answer (closed type): Yes / No

Answer	N	%
Yes	71	18.2
No	319	81.8

If yes, how?

Answer: Open to type (100 words max)

Code	N	%
Code 0: Declare "Do not know"	2	2.8
Code 1: Mention using the "Cumberland Ankle Instability Tool"	9	12.7
Code 2: Mention using the "Foot and Ankle Ability Measure"	20	28.2
Code 3: Mention using the "Ankle Instability Instrument"	1	1.4
Code 4: Mention using the "Identification of Functional Ankle Instability"	1	1.4
Code 5: Mention using the "Foot and Ankle Disability Index"	3	4.2
Code 6: Mention using the "Lower Extremity Functional Scale"	9	12.7
Code 7: Mention using others "patient-reported outcome measures"	18	25.4
Code 8: Mention using personal questionnaires	19	26.8
Code 9: Declare "Don't remember the name"	7	9.9

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SECTION 5: CHRONIC ANKLE INSTABILITY

Q8- In your own words, can you give a definition of chronic ankle instability?

Answer: Open to type (100 words max)

Code	N	%
Code 0: Declare "Do not know"	9	2.1
Code 1: Mention a person with recurrent ankle sprain	266	62.4
Code 2: Mention a person with giving way	61	14.3
Code 3: Mention a person with feeling of instability	127	29.8
Code 4: Mention a person with ankle stiffness	14	3.3
Code 5: Mention a person with ankle hyperlaxity	107	25.1
Code 6: Mention a person with sensori-motor impairments	158	37.1
Code 7: Mention a person with ankle pain	62	14.6
Code 8: Mention a person with cartilage degeneration and post-traumatic osteoarthritis	6	1.4
Code 9: Mention PROMS (patient-reported outcome measures)	1	0.2
Code 10: Mention a person with psychological impairments and/or fear of movement and/or apprehension	35	8.2
Code 11: Other	50	11.7

Patients with chronic ankle instability often present with established functional insufficiencies and mechanical insufficiencies.

Q9-Can you list the functional insufficiencies which are often present in a patient with chronic ankle instability?

Answer: Open to type (100 words max)

Code	N	%
Code 0: Declare "Do not know"	47	11.0
Code 1: Mention a person with recurrent ankle sprain	23	5.4
Code 2: Mention a person with giving way	18	4.2
Code 3: Mention a person with feeling of instability	41	9.6
Code 4: Mention a person with ankle stiffness	55	12.9
Code 5: Mention a person with ankle hyperlaxity	19	4.5
Code 6: Mention a person with sensori-motor impairments	237	55.6
Code 6a: Mention strength deficits	105	44.3*
Code 6b: Mention proprioception deficits	86	36.3*
Code 6c: Mention postural balance deficits	124	52.3*
Code 7: Mention a person with ankle swelling	9	2.1
Code 8: Mention a person with deficits during activities of daily living	134	31.5
Code 9: Mention a person with deficits during sporting activities	156	36.6
Code 10: Mention a person with proximal joint impairments	26	6.1

Code 11: Mention a person with foot-ankle kinematic changes	35	8.2
Code 12: Other	46	10.8
* represent the total percentage of the 237 respondents with the code 6		

Q10- Can you list the mechanical insufficiencies which are often present in a patient with chronic ankle instability?

Answer: Open to type (100 words max)

Code	N	%
Code 0: Declare "Do not know"	52	13.1
Code 1: Mention a person with talus'or talocrural joint mobility restriction	68	17.1
Code 2: Mention a person with subtalar joint mobility restriction	30	7.5
Code 3: Mention a person with dorsiflexion range of motion deficit	114	28.6
Code 4: Mention a person with proximal joint impairments	32	8.0
Code 5: Mention a person with ankle hyperlaxity	128	32.2
Code 6: Mention a person with sensori-motor impairments	166	41.7
Code 7: Mention a person with fibular mobility restriction	33	8.3
Code 8: Mention a person with cartilage degeneration and post-traumatic osteoarthritis	17	4.3
Code 9: Mention a person with ankle swelling	14	3.5
Code 10: Mention a person with foot joints mobility restriction	38	9.5
Code 11: Mention a person with functional impairments	8	2.0
Code 12: Other	92	23.1

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