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1 **ORIGINAL ARTICLE**

2 **Video-Based Information About Plantar Fasciitis Reflect Current Treatment Guidelines**

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14 **Background:** Online health-related information has become increasingly popular. Social media
15 platforms have great potential to support and change patients' perspective. Plantar fasciitis (PF)
16 is a common disease which is one of the most frequently researched subjects in foot problems.
17 This study aimed to assess the content, quality and reliability of YouTube videos related to PF
18 and to evaluate if they reflect current PF treatment guidelines.

19 **Methods:** The descriptive cross – sectional study analyzed the most viewed 79 YouTube videos
20 retrieved by using the keyword “plantar fasciitis”. The quality, reliability and content of the

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21 videos were analyzed using Global Quality Scale (GQS), the modified DISCERN, JAMA and
22 content scoring system by two independent physiotherapist. The analyzed videos were divided
23 into three groups according to their GQS score as high, intermediate and low quality. Also,
24 video parameters were compared between the useful and misleading groups.

25 **Results:** Of the analyzed 79 videos, 26 (32.9%) were of low quality, 29 (36.7%) were of
26 intermediate quality and 24 were of (30.3%) high quality. Most of high quality videos were
27 uploaded by allied health professionals (39.4%). View ratio and video power index scores were
28 highest in patients. There were significant differences between useful and misleading videos in
29 terms of DISCERN, GQS and JAMA scores ($p = 0.000$, $p = 0.000$, $p = 0.020$, respectively). Almost all
30 of the evaluated videos contain at least one treatment approach.

31 **Conclusions:** This study demonstrates that the vast of majority YouTube videos on PF are useful
32 and comprehensive, also our results may propose that the vast majority of the videos reflect
33 current treatment guidelines. Video-based information about PF may provide valuable insight
34 to patients, especially in the absence of a direct access to healthcare stakeholders.

35 **Keywords:** Plantar fasciitis, YouTube, Reliability, Quality, Evidence-based recommendation

36
37 Plantar fasciitis (PF) is the most common cause of heel pain in adults and one in ten people is
38 diagnosed with PF in their lifetime.^{1,2} Plantar fascia is a band of tissue that runs from the
39 plantar medial tubercle of the calcaneus to forefoot. The fascial band supports the medial
40 longitudinal arch of the foot and provides force transfer during the walking period.³ Although
41 terminology refers to inflammation, it is considered as a degenerative pathology.⁴ Instead of
42 PF, the usage of the term fasciosis or fasciopathy are getting increased in the literature.⁵ PF can
43 be detected in athletes performing various kinds of sports especially in runners. The incidence

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44 is higher in women aged between 40 to 60 years in active individuals.⁶ The pathology is
45 characterized by pain commonly located in the medial heel after a long rest period or non-
46 weight bearing.⁷ Heel pain is described by exacerbation of pain after the first step in the
47 morning.⁸ PF is often described as a chronic injury because of the ongoing symptoms that
48 persist for more than a year.⁹ PF affects the perceived quality of life of many people.¹⁰

49 According to the report a systematic review, PF is the second most frequently published
50 topic in foot and ankle literature in many high-impact medicine journals between 2000-2017.¹¹
51 Plantar fasciitis can be perceived as a significant and common health problem leading to
52 approximately 1 million patient visits per year.² Seeking medical sources on the internet is
53 increasing by time.¹² Especially, sharing videos on various platforms has become widespread to
54 satisfy people's information needs. YouTube is a well-known, international and most popular
55 online video platform reached by over two million viewers every month.^{13, 14} Since population
56 can easily access YouTube for health-related videos, the number of medical information videos
57 is rapidly increasing.¹⁵ However, there is no sufficient control mechanism about the usefulness,
58 content, accuracy, quality and reliability of the videos uploaded on YouTube.^{16, 17} YouTube can
59 be used to disseminate health-related information in different diseases such as breast cancer,
60 rheumatoid arthritis, hallux valgus and diabetic foot.¹⁸⁻²¹ To the best of our knowledge, there is
61 no study examining the quality and accuracy of PF videos on YouTube. Thus, our study aimed to
62 evaluate the quality, reliability and content of the videos related to PF on YouTube in the
63 English language.

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67 **Methods**

68 This study was exempted from the ethics approval because all obtained data all freely available
69 for the public. In this cross-sectional study, YouTube (www.youtube.com) was searched on 15
70 January 2022 for the keyword: ‘plantar fasciitis’ in English. Google Chrome browser was used
71 while searching videos. Before starting to search, all cookies were removed to avoid bias in the
72 videos. The goal of our search was to determine the most popular videos that people prefer to
73 watch. Studies show that a large percentage of users watch the videos on the first three pages
74 of the search results.²² Therefore videos were sorted by view and the most viewed 100 videos
75 were evaluated by two researchers on the same day. Inclusion criteria of the videos were as
76 follows; (1) language used in English (2) primary content related to plantar fasciitis. The
77 exclusion criteria were as follows; (1) use other than the English language (2) only music videos
78 (3) poor audio and video quality (4) duplicate videos.^{23, 24}

79 All videos were analyzed in terms of their content, reliability, and quality. The following
80 information related to the analyzed videos were as; duration, upload date, uploader’s name,
81 view count, number of comments, number of likes, number of dislikes, like ratio, view ratio,
82 video power index (VPI), Global Quality Score (GQS), DISCERN score, Journal of the American
83 Medical Association (JAMA) benchmark score. The reliability, content and quality information
84 were extracted by two authors on the same day and time. Based on the source of content, the
85 videos were categorized into six groups: (1) academic (2) physician, (3) patient, (4) commercial,
86 (5) health-related website, (6) allied health professionals. The videos were divided into 6 groups
87 according to the speaker of the video: (1) physical therapist, (2) physician, (3) massage
88 therapist, (4) chiropractic, (5) patient, (6) other (layperson, personal trainer, yoga therapist).

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89 We have separated the uploader source and speaker in order not to cause a confusion in the
90 video analysis and to conduct a clearer data analysis.

91 All selected videos were classified based on as follows: Useful Information (Group 1) if
92 the videos contained useful, scientifically correct and accurate information about topic were
93 included in this group. Misleading information (Group 2) if the videos that shared any
94 inaccurate or scientifically unproven information according to currently available scientific
95 evidence were classified as misleading. If the videos included partially misleading and partially
96 useful information, it was accepted and classified as misleading.^{2, 25-27}

97 The VPI was calculated using the formula as follows: $[(\text{number likes} * 100) / (\text{number of}$
98 $\text{likes} + \text{dislikes})] * [\text{views per day}] / 100$.^{28, 29} A comprehensive checklist was prepared to record the
99 video-related information by authors according to literature and the videos were scored for
100 general information and treatment recommendations of PF. (Table 1)

101 The reliability of the videos was evaluated with the modified DISCERN scale which was
102 adapted by Singh et al.¹⁹ The modified DISCERN score contains yes/no responses for five
103 questions. Each yes response gets one point, each no response gets zero points and the
104 maximum score is five. A higher score is an indication of better reliability.³⁰ (Table 1)

105 The GQS was used to analyze the video quality which is a five-point scale. The worst
106 score is one which means the video is of poor quality, most information is missing and not
107 helpful for patients. The best score is five which means the video is of excellent quality and flow
108 and very useful for patients.²⁸ (Table 1) The videos rated with 4 or 5 were considered as
109 highquality videos, rated with 3 were considered as moderate-quality videos, and rated with 1
110 or 2 were considered as low-quality videos.

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111 JAMA benchmark was used to evaluate the quality of videos.³¹ JAMA benchmark
112 assesses online websites and consists of four individual items (authorship, attribution, currency,
113 and disclosure), each item has one point. A maximum score of four indicates high reliability and
114 a minimum score of zero indicates poor quality.³² (Table 1)

115

116 **Statistical Analysis**

117 The analysis was performed using IBM SPSS Statistics for Windows, version 22.0 (IBM Corp.
118 Armonk, NY). Data distribution for normality was assessed using a Shapiro–Wilk test.
119 Descriptive data were reported as mean, standard deviation and median. Cohen’s kappa (κ)
120 coefficient was calculated to assess the degree of agreement between the two reviewers. For
121 the comparison of categorical variables, the Chi-square was used. The Mann–Whitney U test
122 was used for the comparison of two groups and the Kruskal–Wallis test for the comparison of
123 more than two groups in terms of non-normally distributed data. Dunn- Bonferroni post hoc
124 test was carried out for pairwise comparisons following the Kruskal–Wallis test to determine
125 which groups were significantly different. $p < 0.05$ was accepted as statistically significant.

126

127 **Results**

128 The top 100 most watched videos were screened and 79 videos were included in the final
129 analysis. The 21 videos with off-topic, audiovisual problems, duplicate contents and a language
130 other than English were eliminated. The videos were divided into two groups that contain
131 misleading information and useful information. Descriptive data of groups are presented in
132 Table 2. There were significant differences between the groups in terms of DISCERN, GQS and

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133 JAMA benchmark scores ($p = 0.000$, $p = 0.000$, $p = 0.026$, respectively). In addition, general
134 information, treatment recommendation, and total content scores of the videos in useful
135 information group were significantly higher than misleading information video group. ($p < 0.05$)

136 According to the GQS, of the 79 videos, 26 (32.9%) were of poor quality, 29 (36.7%)
137 were of moderate quality, 24 (30.3%) were of high quality. The high-quality videos were mostly
138 uploaded by allied health professionals (39.4%), whereas the low-quality videos were uploaded
139 by commercials (56.3%). No significant differences were found in terms of the quality of the
140 videos according to the uploaded sources ($p < 0.214$) (Figure 1).(Table3)

141 Significant difference was found for the DISCERN score between the source of content
142 ($p < 0.05$), however VPI, like ratio, view ratio, JAMA and content scores were failed to show
143 statistically significant difference ($p > 0.05$).(Table 4) DISCERN scores of the commercial videos
144 were lower than the allied health professionals ($p = 0.010$) and health-related websites
145 ($p = 0.020$).

146 When the videos were analyzed according to the speaker, nearly half of the videos were
147 presented by physical therapists (44.3%) (Figure 2). According to the treatment
148 recommendations, the most handled treatment approach was stretching (65.8%), followed by
149 massage (44.30%), orthotic approaches (40.5%) and physical agents (30.37%). The least used
150 treatment approach in the videos was dry needling. (Figure 3) Only 3 of the 79 videos reviewed
151 did not have treatment recommendations. Finally, κ was calculated to assess the inter-observer
152 reliability and found as 0.83, 0.84 and 0.87 for GQS, DISCERN and JAMA, respectively.

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154 Discussion

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155 The present study evaluated the quality, reliability and content of YouTube videos for patients
156 with PF according to the information source. Our results showed that the proportion of the
157 videos was similar in terms of their quality. Also, nearly half of the analyzed videos were
158 uploaded by allied health professionals which showed higher quality compared with other
159 sources. It was determined that the groups that uploaded the least proportion of the videos
160 were patients, physicians and academicians.

161 YouTube is a popular social media platform where patients reach right or wrong
162 information about their diseases. Also, they may share their experiences to help other people
163 who suffer from the same condition. Patients tend to get informed from online platforms.
164 Some researchers have reported that patients believe that the reliability of information
165 obtained from online sources is equal or even greater than that provided by physicians.³³ The
166 quality of the online information display variety. General information and treatment options
167 about diseases disseminated from different health care sources may lead to misdirection of
168 patients and deterioration of the relationship between clinician and patient. On the other hand,
169 accurate and valid information enables patients to make the right decisions about the disease
170 process and to reduce their anxiety levels.^{34,35} Thus it is important to evaluate the reliability,
171 accuracy and quality of the content of the information provided through the YouTube platform.

172 When we examine the literature, different classifications are used in the analysis of
173 YouTube videos. Similar to the study conducted by Elongovan et al., we categorized the
174 analyzed videos into two groups as useful and misleading according to their contents.²⁷ Our
175 results showed that the useful videos had higher GQS, DISCERN and JAMA benchmark scores
176 compared to misleading videos, which is in line with the results of the study by Singh et al.³⁶

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177 Also, the number of comments, number of likes and view ratio of the useful videos were
178 higher and the durations were longer than misleading videos. However, the number of views
179 were higher in misleading videos. The reason for this may be the upload dates of the misleading
180 videos are older and they may reach more people in a longer period of time.

181 People can leave comments freely and explain their feelings as like or dislike in Youtube
182 platform. Useful videos had a significantly higher number of likes in many studies.³⁷ In our
183 study the number of likes of the useful videos was higher than misleading videos, however the
184 number of dislike of the useful videos was higher than misleading videos. We think people find
185 misleading videos more entertaining and interesting. On the other hand, the reason for the high
186 dislike numbers may be related to the duration of the useful videos which were longer than the
187 misleading videos.

188 Examination of the most-watched YouTube videos revealed that the rates of low,
189 intermediate and high quality videos were very close to each other. PF is a common pathology
190 with a high incidence among foot problems and PF accounts for 15% of foot pathologies
191 therefore³⁸, demand for PF videos is expected to be high. However, very few reports have been
192 published investigating the quality and reliability of YouTube videos about foot problems. When
193 our study was compared with the studies on foot problems, the number of views of PF videos
194 was found to be higher than other studies.^{21, 39, 40} From this point of view, 67% of the uploaded
195 videos in our study are of medium and high quality which enables the patients to be informed
196 appropriately by these videos.

197 In our study, a high proportion of the videos were uploaded by allied health
198 professionals and 75.8% of these videos were of medium and high quality. Commercial and
199 physician videos were found to be of low quality. The literature shows that the source of the

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200 upload, academic and physician videos had relatively higher quality.⁴¹ In our study the ratio of
201 low quality of physician videos is more. The reason for this may be that physicians only
202 uploaded three videos. In addition, although the number of physician videos is low, its view
203 ratio, VPI and total content scores were higher compared to other videos except the patient
204 video.

205 When the analysis results of the videos were examined, it was seen that the JAMA score
206 of useful and misleading videos was below two. Also, when the videos were assessed according
207 to the source of content, no differences were detected between the videos in terms of JAMA
208 score. JAMA score was found lower than the literature.⁴² We think that uploading videos with
209 higher scores in terms of JAMA scores and examining the videos in this respect is necessary for
210 future videos.

211 Treatment steps of PF include conservative and non-conservative treatment approaches
212 and PF is a foot problem in which different treatment options are used. A comprehensive
213 checklist including these treatment approaches has been prepared by us according to the
214 literature.²⁵ Calf and plantar fascia stretching (65.82%) are the most included methods in the
215 analyzed videos. Moderate evidence has been shown that the effect of plantar fascia or calf
216 stretching has a great effect in the treatment of plantar fascia according to the literature.⁴³ In
217 this respect, the video contents are in parallel with the literature.

218 In the literature, ICC values or kappa scores are used for inter-observer reliability. We
219 preferred to use the kappa score in our study. Kidy et al. reported the kappa value as 0.74 for
220 DISCERN in their similar study.⁴⁴ Gaş et al. reported an average kappa score of 0.84 for overall
221 inter-observer agreement.⁴⁵ The inter-observer reliability assessed by the κ score for all three
222 (GQS, DISCERN, JAMA) scorings in the present study was similar with the literature.

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223 There is a need to evaluate the quality and reliability of YouTube videos with more
224 objective methods by establishing multidisciplinary teamworks. Also, it may be a better choice
225 to create videos including more accurate information. Secondary problems may occur because
226 of misdirecting patients, especially with the videos uploaded in the medical field.

227

228 **Limitation**

229 The present study has several limitations. The videos were searched only in English language,
230 the instruments were subjective and may be influenced by the researchers' perspectives. It was
231 a cross-sectional study that evaluated YouTube videos at a certain moment. Due to the nature
232 of YouTube, new videos are currently uploading and video interaction parameters can rapidly
233 change.

234

235 **Conclusion**

236 This is the first study to analyze the reliability, quality and content of PF videos uploded on
237 YouTube. The present study demonstrated that PF YouTube videos present useful and
238 comprehensive information for patients. More than half of the videos were moderate and high
239 quality. The number of physican and academic videos is very low contrast to the high number
240 of videos uploaded by health-related professionals and health-related web site. These findings
241 may indicate that PF videos in English language appear to be sufficient to increase awareness
242 and knowledge of the disease and may provide supplementary information to patients.

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244 **Financial Disclosure:** None reported.

245 **Conflict of Interest:** None reported.

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361 **Table 1** Evaluation tools for global quality, reliability and content coverage of the YouTube videos on
362 Plantar Fasciitis

Global quality scale (GQS)		<ol style="list-style-type: none"> 1. Poor quality, poor fow, most information missing, not helpful for patients 2. Generally poor, some information given but of limited use to patients 3. Moderate quality, some important information is adequately discussed 4. Good quality good fow, most relevant information is covered, useful for patients 5. Excellent quality and excellent fow, very useful for patients
Reliability DISCERN		<ol style="list-style-type: none"> 1. Are the explanations given in the video clear and understandable? 2. Are useful reference sources given? (Publication cited, from valid studies) 3. Is the information in the video balanced and neutral? 4. Are additional sources of information given from which the viewer can benefit? 5. Does the video evaluate areas that are controversial or uncertain?
JAMA scoring system	Authorship	Authors and contributors, their affiliations, and relevant credentials should be provided
	Attribution	References and sources for all content should be listed clearly, and all relevant copyright information should be noted
	Disclosure	“Ownership” should be prominently and fully disclosed, as should any sponsorship, advertising, underwriting, commercial funding arrangements or support, or potential conflicts of interest
	Currency	Dates when content was posted and updated should be indicated
Plantar Fasciitis Content Score		
General Information		Points
	Diagnosis – Defination –Differential Diagnosis	1
	Risk factors	1
	Symptoms	1
	History taking and physical examination – Assessment	1
Treatment Recommendations		
	Therapeutic Exercise	1
	Stretching	1
	Manual Therapy	1
	Taping (rigid – elastic tape taping)	1
	Massage	1

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Orthotic Approaches (Suitable shoes, insoles, heel pads, night splints)	1
Physical Agents (iontophoresis, low laser therapy, ice, intermittent radiofrequency, ESWT)	1
Dry needling, Acupuncture	1
NSAID	1
Injection	1
Other (Prolotherapy, PRP)	1
Education	1
Surgery	1

JAMA: Journal of the American Medical Association. ESWT: Extracorporeal shock wave therapy,
PRP: platelet-rich plasma

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368 **Table 2** General of features of videos

Characteristic	Useful video (n=66)	Misleading video(n=13)	p*
	Mean±SD Median	Mean±SD Median	
Duration	7.34±7.43 5.36	5.94±5.26 5.19	.338
Time since upload (day)	2027.54±1095.75 1788	2362.75±1432.68 3008	.680
Number of views	982612.83±1335887.49 509416	986942.62±864662.81 498859	.376
Number of Comments	512.50±940.430 247	439.08±460.32 301	.625
Number of likes	11192.02±23145.77 5550	7303.31±9324.81 4500	.513
Number of dislike	393.11±621.18 214	298.92±311.10 165	.937
Like ratio	95.78±2.42 96.37	94.92±2.53 95.73	.210
View ratio	615.62±862.09 328	567.06±507.42 329	.776
VPI	590.90±844.12 315.04	543.82±496.03 311.13	.806
Content score General Information	1.71±1.24 2	1±1.52 0	.041
Content score Treatment	3.30±2.05 3	2.07±1.55 1	.029
Recomendations			
Total content score	5.01±2.83	3.07±2.84	.013

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	5	2	
GQS	3.11±1.02	1.92±0.76	.000
	3	2	
DISCERN	2.82±0.85	1.62±0.5	.000
	3	2	
JAMA score	1.98±0.54	1.62±0.50	.026
	2	2	

VPI: Video Power Index, GQS: global quality score JAMA: Journal of the American Medical Association.

p* Mann–Whitney U test

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372 **Table 3** The Global Quality Scale assessment according to the source of content

	Low quality	Intermediate quality	High quality	Total
Physican	2 (66.7)	0 (0)	1 (33.3)	3 (3.79)
Academic	0 (0)	2 (66.7)	1 (33.3)	3 (3.79)
Allied health professionals	8 (24.2)	12 (36.4)	13 (39.4)	33 (41.7)
Health- related web site	7 (30.4)	8 (34.8)	8 (34.8)	23 (29.1)
Patient	0 (0)	1 (100)	0 (0)	1 (1.26)
Commercial	9 (56.3)	6 (37.5)	1 (6.3)	16 (20.25)
Total	26 (32.9)	29 (36.7)	24 (30.3)	79 (100)

Data were presented as n (%).

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376 **Table 4** Video quality assessments according to the source of the video.

	Physician	Academic	Allied Health Professional	Health- related web site	Patient	Commercial	P*
Like ratio	92.96	95.15	96.33	96.77	90.36	96.05	.535
View ratio	506.18	242.07	323.15	326.83	857.61	164.13	.140
VPI	467.08	230.34	309.39	313.23	774.95	158.88	.551
JAMA	2	2	2	2	3	2	.101
DISCERN	3	3	3	3	2	2	.016
Content Score	8	6	5	4	10	3.5	.516

Data were presented as median.

JAMA: Journal of the American Medical Association

Note Note: Results are presented as median (min–max).

*Kruskal-Wallis test.

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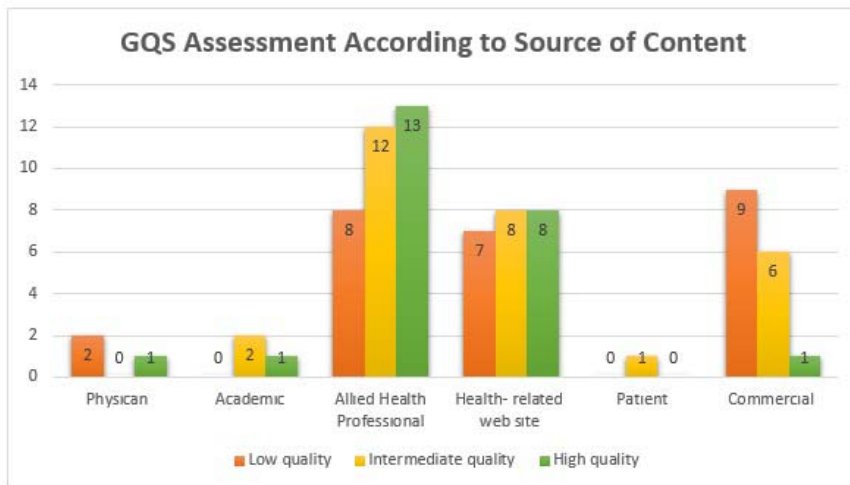
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388 Figure 1 GQS Assessment According to Source of Content

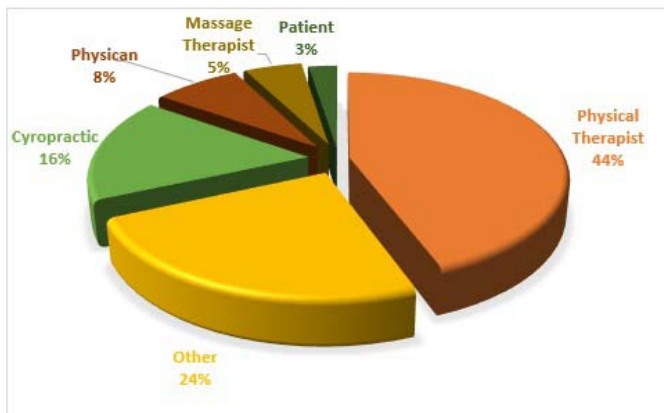


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391 Figure 2 Scoring Distribution by Speaker Source



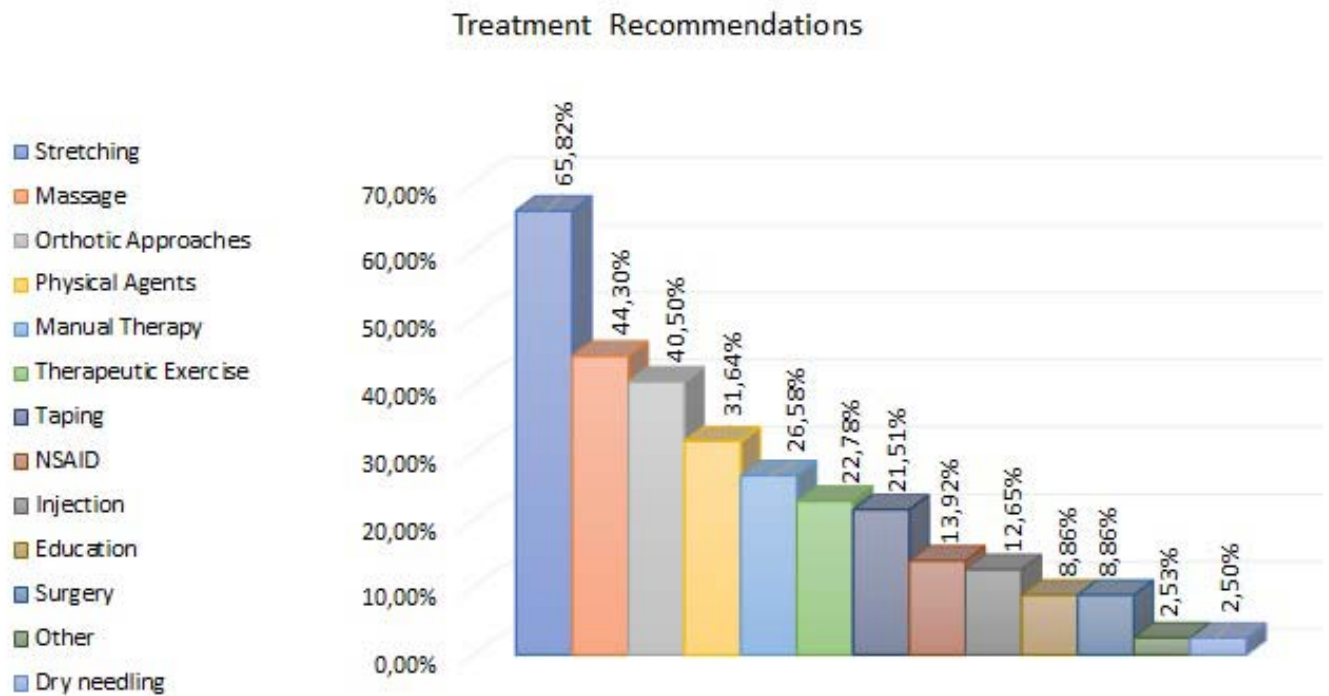
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394 Figure 3 Treatment Recommendations

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