

How One Treats Lateral Epicondylitis - A Survey Among Brazilian Orthopedists

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Abstract

Background:

Lateral epicondylitis (LE) or tennis elbow is the most common elbow painful condition. It affects around 1 to 3% of adults. There are various possibilities of treatment described in the literature, without evidence to support a gold standard management protocol. Therefore, the objective of this study is to evaluate how the Brazilian orthopedist diagnoses and treats lateral epicondylitis, to compare these results with the available evidence.

Methods:

This is an observational, analytical, cross-sectional study. A questionnaire has been prepared for information to the participants and with eight specific questions (2 on diagnosis and 6 on treatment). These had been answered voluntarily by participants at 3 major congresses of orthopedists in Brazil in 2018. The results were analyzed in accordance with the overall number of responses, and were evaluated among groups according to subspecialty.

Results:

We obtained a total of 501 questionnaires. Of these, 33 were excluded. The mean age was 38.67 years. The majority of respondents (91%) were male. We obtained 26.7% from specialists in hand surgery (Hand group), 36.5% from subspecialists in shoulder and elbow (Shoulder and Elbow group), and 36.8% were from generalists in orthopedics or from other subspecialties (General Orthopedists group). For diagnosis, 24.4% have not initially requested any imaging method. The most requested exam was ultrasonography (54.9%). The most prominent indication for initial treatment was physical therapy. For refractory cases, 78.3% of the respondents prefer doing a local infiltration. The most commonly used substance for local infiltrations is corticosteroids (89.6%). With respect to the surgical treatment option, 75.8% of those who recommend it prefer open techniques and 24.2% arthroscopic treatment. Of the total respondents, 12.8% do not recommend surgical treatment for LE.

Conclusion:

Most orthopedists begin the treatment of lateral epicondylitis with the use of non-steroidal anti-inflammatory drugs, physical therapy, and an indication of rest, but there is great variability between their recommendations. The use of corticosteroids for infiltration remains the main choice among Brazilian orthopedists, although evidence shows a better effect in the short term and a worse effect in the medium and long term, compared to other treatments.

Background

Lateral epicondylitis (LE), or tennis elbow, is widely studied because it is the most common painful condition of the elbow. It affects around 1 to 3% of adults [1], and has a higher incidence in patients whose activities require repetitive or excessive efforts [2] and, therefore, is an important cause of absenteeism [1], which leads to a socioeconomic impact. For these reasons, there are a large number of studies on the subject [3, 4, 13, 5–12]; in a quick search of the MEDLINE database (PubMed) in 2020, with the term LE, 2,459 studies were identified. Nevertheless, this reflects the uncertainty about the best way to manage this condition. Despite its prevalence and morbidity, there is still no single gold standard management guide for such a disorder.

The diagnosis is primarily clinical, however, imaging tests can help in handling the referred disorder. Radiographs can be used to exclude osteoarticular diseases. Ultrasound (US) allows assessment of the tendon injuries extent. Magnetic resonance imaging (MRI), which is more sensitive than US and with similar specificity [14], shows, in addition to tendon changes, the integrity of articular cartilage, the presence of synovial plica or loose bodies, which are differential diagnoses.

Non-surgical treatment is the choice for initial treatment, and may include patient education, behavioral modification, use of anti-inflammatory drugs, physical therapy, and orthoses [15]. The use of other non-invasive methods, such as the use of shock waves, laser therapy, ultrasound can also be combined. Other widely used resources are infiltrations, with various sorts of substances, as a measure in the initial treatment, or in the case of failure of non-invasive treatment.

The indication for surgical treatment is based on important and persistent symptoms with impairment in doing labor or physical activities, in patients who do not respond to non-surgical treatment. The open technique, more broadly used, was described by Nirschl et al. [16]. The arthroscopic technique was described in the year of 2000 by Baker et al. [17] and has been increasingly used as an alternative treatment. So far, there is no consensus on the superiority of any technique in term of functional results[18].

Due to this myriad of options to tackle this condition and the conflicting results of these various therapies [19–22], and as there is no single flowchart based exclusively on scientific evidence, the treatment in clinical practice is quite extensive and dependent on the choice and experience of the attending physician. Thus, it is necessary to map how this disorder is dealt with in our country, and confront those findings with the literature evidence.

Therefore, the objective of this study is to appraise how the Brazilian orthopedist diagnoses and treats lateral epicondylitis.

Methods

This is an observational, analytical, cross-sectional study. A questionnaire comprising eight specific questions, two on diagnosis and six on treatment, is summarized in Table 1. They had been answered voluntarily by participants at the 38th Brazilian Congress on Hand Surgery (MÃO), at the 12th Brazilian Congress on Shoulder and Elbow Surgery (CBCOC), and at the 50th Brazilian Congress on Orthopedics and Traumatology (CBOT), in 2018.

Table 1

– It summarizes the specific questions related to the diagnosis and treatment of LE, with the number of responses and possible alternatives that could be checked.

Question	Number of possible responses	Alternatives
Which complementary exam(s) do you use for diagnosis?	multiple	none, radiography, ultrasound, magnetic resonance, or other
Which maneuver(s) do you use in the physical exam?	multiple	palpation, Cozen, Mill's, Maudsley, other
What is(are) your option(s) for initial treatment?	multiple	Physiotherapy, Orthosis, Rest, Local infiltration, Surgery, Oral anti-inflammatory, Intramuscular anti-inflammatory
How long after initial treatment do you recommend a change in treatment?	multiple	Up to 1 month, 3–6 months, 6–12 months, > 12 months
If symptoms persist, what is your treatment option?	single	Physiotherapy, Orthosis, Rest, Local infiltration, Surgery, Oral anti-inflammatory, Intramuscular anti-inflammatory
When performing local infiltration, which is your choice substance?	single	do not perform, botulinum toxin, corticosteroids, autologous blood, sodium hyaluronate, prolotherapy, only anesthetics
How long after conservative treatment do you recommend surgery?	single	do not recommend, 3 months, 6 months, 12 months
What is your surgery option for lateral epicondylitis of the elbow?	single	open, arthroscopic

We included participants from the mentioned congresses, members of the Brazilian Society of Orthopedics and Traumatology (SBOT), who agreed to answer the questionnaire. Participants from other nationalities, non-medical participants, duplicated questionnaires, those with more than 3 specific answers not filled out, or without identification were excluded.

For result analysis, participants were divided into 3 groups regarding training: Hand specialists (Hand group), Shoulder and Elbow specialists (Shoulder and Elbow group), and general practitioners or orthopedists with other expertise (General Orthopedists group). A comparative analysis was carried out among the groups to assess the preference profile.

We tested the normality of the main outcome quantitative variables using the Kolmogorov-Smirnov (KS) test and verified a normal distribution. The overall quantitative answers were evaluated by the two proportions test and qualitative ones by the ANOVA test. To compare the answers among groups, the ANOVA test was used using variance of quantitative parameters, and the Chi-square test to assess possible statistical associations among qualitative responses. Significance was verified when the p-value of the results were $< 0,001$. The result confidence level was established with $p < 0.05$ and the confidence interval was 95%.

Results

We obtained a total of 501 questionnaires. Of these, 10 were excluded for presenting three or more incomplete answers; 16 were not included because they were from non-medical respondents; four for being foreigners; and one because it had been responded by the same person in different congresses. Of the 468 evaluated, 38.5% were obtained at *CBOT* 2018, 35.9% at *CBCOC* 2018, and 25.6% at *MÃO* 2018. The analysis of this number of questionnaires obtained allows a result with a 95% confidence interval and a margin of error of 4%, based on the 17,701 orthopedists registered in the Brazilian Society of Orthopedics and Traumatology in March 2020.

The majority of participants (91%) were male. We obtained 26.7% allocated into the Hand group, 36.5% into Shoulder and Elbow group, and 36.8% into General Orthopedists group. The results were analyzed for the overall number of responses, and were evaluated between groups, for possible differences between specialty profiles.

Diagnosis

The median found for the number of maneuvers performed in the clinical diagnosis was 3, the most common being the Cozen test (80.1%), local palpation (74.6%), and Mill's test (60.2%). There was a statistically significant difference between the groups of specialties for the mean number of maneuvers ($p\text{-value} < 0.001$). Thus, Tukey's Multiple Comparison (post hoc) was used to compare the groups in pairs. The difference occurred between the General Orthopedists group, with the lowest mean for number of maneuvers, at 1.99, compared with the Hand group, with a mean of 2.75 ($p\text{-value} < 0.001$), and also in comparison with the Shoulder and Elbow group mean of 2.92 ($p\text{-value} < 0.001$).

For diagnosis, 24.4% do not initially request any imaging method. The most commonly requested exam is ultrasound, indicated in 54.9% of the responses. The associations between the number of exams and the types of exams requested are shown in Table 2. While 19.2% of the General Orthopedists request an exam, 31.2% from the Hand group and 31% from the Shoulder and Elbow group do.

Table 2

Relationship among the number of exams ordered, percentage in the sample, and the result stratified by the combination of exams and their representativeness in the number of exam groups. XR: radiographs, US: ultrasound, MRI: Magnetic resonance imaging;

Number of exams ordered	Group percentage, (number of exams)	Result stratified by exam types	Percentage of combinations in relation to the total
None	24.4%	None	24.4%
1 exam	40.4%	XR	5.1%
		US	25.9%
		MRI	9.4%
2 exams	23.5%	XR + US	7.3%
		XR + MRI	6.2%
		US + MRI	10.0%
3 exams	11.7%	XR + US + MRI	11.7%
TOTAL :	100.0%		100.0%

Treatment

Regarding the choice of initial treatment, the two most commonly interventions were physical therapy (86.7%) and use of oral anti-inflammatory drugs (NSAIDs) (74.1%). Another relevant data point is that 11.3% of the participants perform local infiltration as first line therapy. The General Orthopedist group indicate the use of oral NSAIDs more frequently than Hand or Shoulder and Elbow specialists ($p < 0,001$). Furthermore, the Hand group prescribes more orthosis than the others ($p < 0,001$). No participant responded recommending surgery initially. The most frequent associations of overall responses, are shown in CHART 1.

Regarding the period until treatment change, for persistent cases, the General Orthopedist group change it 21,6% in the first month, and 51,5% in 1 to 3 months. The Shoulder and Elbow group, tend to wait more, with the more frequent answers (44,6%) been between 3 to 6 months until turn. With respect to the new treatment, 78.3% of the overall respondents prefer to perform a local infiltration, 14.4% prefer doing surgery.

The substances most frequently used for local infiltration, both initially and in the persistence of symptoms, are the corticosteroids (89.6%). The subspecialists in the Hand and General Orthopedists groups use it more than 90% of the time, and for the subspecialists in the Shoulder and Elbow group, 83.1%, without significant statistical difference in comparison. Sodium hyaluronate (4.8%), platelet-rich plasma (0.7%), local anesthetics only (0.7%), and botulinum toxin (0.2%) were also mentioned.

Respondents were then asked how long the non-surgical treatment has been maintained. Most of them said they recommend surgical treatment in cases of refractory response to conservative treatment after 6 months (55.1%). As for the other possible answers, 10.8% recommend it after 3 months and 34.1% after 12 months.

With respect to the surgical treatment option, 12.8% do not recommend it. About those who do recommend, 75.8% prefer open techniques and 24.2% arthroscopic treatment. The Hand group indicate open operative treatment more frequently than the others ($p < 0,001$). The comparative analysis among the groups regarding the specific questions aforementioned is shown in Table 3.

Table 3

Distribution of specific questions, by subspecialty groups (n: number of responses, %: percentage)

GROUPS:		Hand		Shoulder and Elbow		General Orthopedists		Total	
QUESTION:	ANSWER:	N	%	N	%	N	%	N	%
How long after the initial treatment do you recommend a change in it?	Up to 1 month	10	8.1%	9	5.4%	37	21.6%	56	12.1%
	1 to 3 months	53	42.7%	57	33.9%	88	51.5%	198	42.8%
	3–6 months	41	33.1%	75	44.6%	37	21.6%	153	33.0%
	6–12 months	14	11.3%	21	12.5%	8	4.7%	43	9.3%
	> 12 months	6	4.8%	6	3.6%	1	0.6%	13	2.8%
If symptoms persist, what is your treatment option?	Surgery	22	17.6%	27	16.1%	18	10.5%	67	14.4%
	Local Infiltration	94	75.2%	130	77.4%	140	81.4%	364	78.3%
	Other	9	7.2%	11	6.5%	14	8.1%	34	7.3%
When infiltrating, which is your substance of choice?	Corticosteroids	109	91.6%	133	83.1%	153	94.4%	395	89.6%
	Sodium Hyaluronate	2	1.7%	15	9.4%	4	2.5%	21	4.8%
	Platelet-Rich Plasma	0	0.0%	1	0.6%	2	1.2%	3	0.7%
	Anesthetics and perforations only	7	5.9%	11	6.9%	3	1.9%	21	4.8%
	Botulinum Toxin	1	0.8%	0	0.0%	0	0.0%	1	0.2%
How long after conservative treatment do you recommend surgery?	3 months	8	7.6%	10	6.6%	26	17.2%	44	10.8%
	6 months	59	56.2%	84	55.3%	82	54.3%	225	55.1%
	12 months	38	36.2%	58	38.2%	43	28.5%	139	34.1%
What is your surgery option for lateral epicondylitis of the elbow?	Open	104	91.2%	120	73.2%	105	67.3%	329	75.8%
	Arthroscopic	10	8.8%	44	26.8%	51	32.7%	105	24.2%

Discussion

This is the first study to assess how the Brazilian orthopedist diagnoses and treats lateral epicondylitis. This type of evaluation is important for mapping and comparing the results with the current evidence about diagnosis and treatment, in order to warn about possible discrepancies. In addition, it can serve as a reference for the development of comparative studies, especially when there is no definitive evidence about which are the best interventions, as in the case of LE treatment. Similar surveys have been conducted in other populations of professionals, on how the management of lateral epicondylitis is carried out, and they allow physicians to be aware of that, comparing the found results with the available evidences [23–25].

The diagnosis of lateral epicondylitis (LE) is clinical. Painful palpation of the lateral epicondyle is suggestive of the condition, and specific tests such as the Cozen test and Mill's test can be used, despite the lack of an accuracy study in this regard [26]. The change in grip strength, measured with a dynamometer, with the wrist in flexion and extension, indicates the diagnosis, as normal individuals do not present a difference. A sensitivity of 78% and specificity of 90% were estimated for patients with a 10% loss of strength when extended [27].

Ultrasonography (US) has a sensitivity of 64.52%, specificity of 85.19%, and an accuracy of 72.73% in comparison to Magnetic resonance (MRI)[28]. MRI is the gold standard for diagnostic imaging of LE, associated lesions, and for excluding differential diagnoses, but its cost is still high compared to other methods. Its use is relevant, especially in refractory cases, and when it is desired to have a better assessment of the extent of the lesion in the common extensor tendon origin and associated lesion[28]. Although It is suggested that there is a correlation between the severity of symptoms and changes in the MRI[29], the values of those finds still have to be ore elucidated.

Many patients present impact on engaging in physical or work activities and require treatment. Because of the self-limiting nature of the pathology, with resolution of around 90% of the cases within one year [30], there is consensus that non-surgical treatment should be indicated as the treatment of choice, and our sample corroborated it.

In respect to the use of oral and topical NSAIDs, evidence is limited for drawing conclusions about the benefits or harm in the treatment of LE [31]. Physical therapy treatment was the most commonly recommended modality in our series as well as in similar studies [23, 24]. In a meta-analysis [32], the benefit of using pain reduction physiotherapy has been demonstrated. Exercises are rarely used in an isolated way and can be done in a concentric, eccentric, or isometric way, with no differences amongst them [33].

As for the use of orthoses, there are several devices available, with no evidence of effectiveness, for medium and long term, by any. Despite this, its use is often indicated in treatment, more frequently for the Hand surgeons as we verified.

Our results shows that local infiltrations are a major therapeutic arsenal in the treatment of refractory LE. Notwithstanding the main substance chosen by our participants being corticosteroids (CS), there is

evidence against the practice. Smidt et al. [34] concluded that CS infiltration presents improvement in the short term, but the result after one year is better with physiotherapy and a "wait-to-see policy". There is also evidence of improvement in the first month and no difference in the result when compared to placebo at 6 months [35].

Another study [36] suggests that even after the publication of high impact articles [37] [38] contraindicating infiltration of corticosteroids (CS) for treatment, the practice has not yet been abandoned. These articles demonstrate that these infiltrations present improvement in the short term, but less effect, or even a worsening in the medium and long term, compared to other treatments. In the clinical and cost-effectiveness assessment, the use of CS for infiltrations is also contraindicated [39].

Another survey with orthopedists has shown the use of CS in infiltrations by around 71% of the professionals in the United States [23]. In the United Kingdom, 21% use it routinely for most patients, and only 40% never use it [24]. Whereas in a survey of surgeons from around the world, 38% recommended infiltration with CS as the first line therapy [25]. The result of our work corroborated that despite the evidence, the practice is still vastly used in our country, even more frequently than in other populations.

As alternatives to corticosteroids in infiltrations, the following has been described: botulinum toxin (BT), hyaluronic acid (HA), prolotherapy (PL), local anesthetics, autologous blood (AB), platelet-rich plasma (PRPs). Some systematic reviews reinforce the evidence of improvement of symptoms in the short term with the use of CS infiltrations, but better results in the medium and long term with AB and PRPs [40], and even better with PL and AH [9, 41]. These same authors also suggest that further studies are needed to confirm the effectiveness of these substances.

Surgical treatment is an option for persistent cases, and has been estimated that around 2% of diagnosed patients will undergo surgical treatment[42]. The study by Sanders et al. [43] concluded that those that do not get better within 6 months are more likely to be treated surgically. There is no acknowledge superiority between arthroscopic and open techniques in terms of improving function and reducing symptoms, despite a greater number of minor complications with the open technique [18]. In our analysis, Hand specialists perform more open surgical procedures, then others orthopedists.

We can compare our results to those of other populations in the indication of surgical treatment. In the study carried out with upper limb specialists in the USA, 5% of the participants do not recommend surgery, and of those who do, 75% prefer the open technique [23]. In the research with surgeons in the United Kingdom, 11% never recommend surgery, a result similar to that of our paper, with the majority waiting at least 12 months for this recommendation [24]. In the survey of surgeons from all over the world, only 10% of them recommended surgical treatment [25], nonetheless the treatment time was not evaluated, nor was the first and second line treatment differentiated on those studies.

As limitations of this study, we have the evaluation only from participants of congresses and members of the *SBOT*. However, this form allows a representative sample of how the Brazilian orthopedist treats the pathology. We also did not include in the study other professionals who can treat LE, such as family

doctors, occupational doctors, and rheumatologists. The questions were done in a generic way, as it is very difficult to administer a questionnaire that involves all possible treatment variables, such as patient requirements and symptom intensity.

As a strength of this work, we can relate the diagnosis and treatment options with the evidence in literature. This evaluation allows comparison of the more common practices with the available evidence, in the sense of making professionals aware about for an informed practice. Another positive point is the possibility of comparing the practices with those of other populations, although there are few studies about the subject, such as those already mentioned [23][24][25].

Conclusion

Most orthopedists begin treatment of lateral epicondylitis with the use of non-steroidal anti-inflammatory drugs, physical therapy, and an indication of rest, but there is great variability among their recommendations. The use of corticosteroids for infiltration remains the main choice among Brazilian orthopedists, although evidence shows a better effect only in the short term, and a worse effect in the medium and long term, compared to other treatments.

Declarations

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Ethics approval and consent to participate: Approval was obtained from the ethics committee of Federal University of São Paulo, under opinion number 2.795.802. The procedures used in this study adhere to the tenets of the Declaration of Helsinki. Additional informed consent was obtained from all individual participants at the same time the questionnaire was applied, for whom identifying information was assessed in this article.

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Contributions

RFL is the guarantor of the survey and drafted the manuscript. RFL, LFSC, FTM, JCB and MJST conceptualized the methods and the questionnaire. RFL, IAAF, LFSC and RAZ contributed for the collection of the questionnaires, and tabulated the data obtained. All authors reviewed several drafts of the manuscript for critical content and also approved the final version.

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Figures

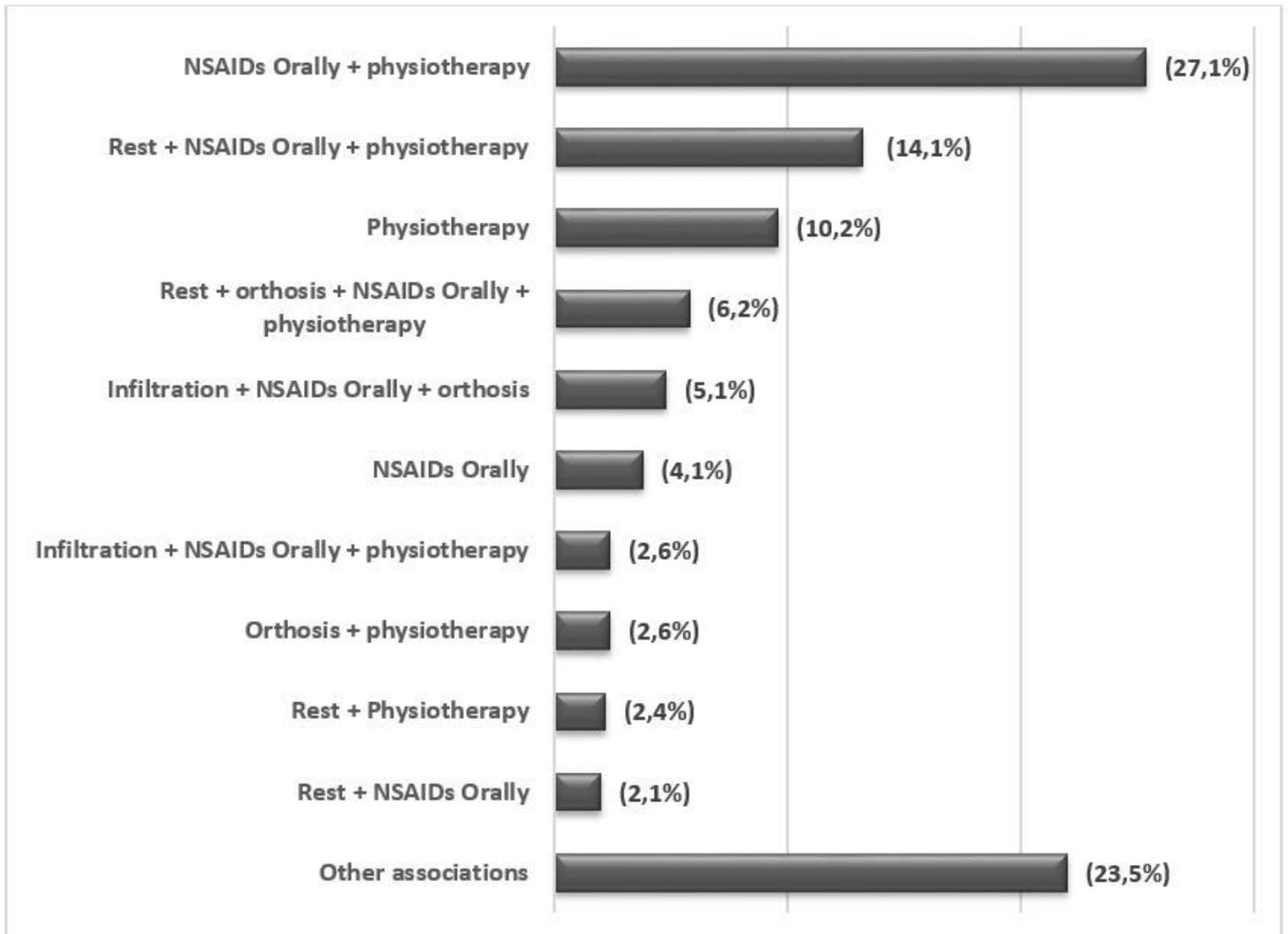


Figure 1

Most frequent associations in the initial treatment of lateral epicondylitis. In the caption, the percentages of the sample related to the total answers. NSAIDs Orally: oral non-steroidal anti-inflammatory drugs. OTHER ASSOCIATIONS refer to the sum of other associations answered with a frequency of less than 2%.