



## Subjective criteria associated with return-to-play in sports physical therapy

*Critérios subjetivos associados com o retorno ao esporte na fisioterapia esportiva*

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### Abstract

**Introduction:** The Subjective Daily Assessment Scale (ESAD) is based on the visual analog scale (VAS) and assesses six parameters (pain, edema, heat, mobility, sensitivity, and confidence). **Objective:** This study aimed to examine the association between the analyzed variables as assessed by the ESAD and physical therapy clinical discharge and return-to-play of injured athletes. **Method:** Eighty-one patient records of athletes were analyzed; mean sample age was  $23.9 \pm 6.3$  years. The athletes received treatment through the Sports Physical Therapy program of Santa Catarina State University, Brazil, between 2008 and 2011. Six parameters were ranked on a scale from 0 to 10, with 0 being the best possible condition and 10 the worst. Data analysis was conducted using stepwise Cox regression. **Results:** At the time of the injury, the mean score for confidence was  $5.82 \pm 0.48$ , and at the time of return-to-play, it was  $0.48 \pm 1.1$ ; the mean score for pain decreased from  $3.7 \pm 2.64$  to  $0.34 \pm 0.83$ . However, due to the strong association between pain

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and confidence, only confidence remained in the final model. For each reduction in the value reported for confidence, the probability of return-to-play was 0.62 times greater. **Conclusion:** The results showed that confidence was the best variable for predicting athlete return-to-play.

**Keywords:** Confidence. Pain measurement. Subjective parameters.

### Resumo

**Introdução:** A Escala Subjetiva de Avaliação Diária (ESAD) é uma escala baseada na Escala Analógica Visual (EVA), que avalia seis parâmetros (dor, edema, calor, mobilidade, sensibilidade e confiança). **Objetivo:** Este estudo tem como objetivo analisar a associação das variáveis analisadas a partir da ESAD com a liberação da fisioterapia. **Método:** Foram utilizados 81 prontuários de atletas com média de idade de  $23,9 \pm 6,3$  anos, que foram atendidos entre 2008 e 2011 no Projeto de Fisioterapia Desportiva da Udesc e que responderam a ESAD, classificando os seis parâmetros numa escala de 0 a 10, sendo que 0 significa a melhor condição e 10 a pior. Os dados foram analisados a partir da regressão de Cox, por meio do método stepwise. **Resultados:** No momento da lesão, a confiança, em média, era de  $5,82 \pm 0,48$  e, no momento do retorno ao esporte, passou para  $0,48 \pm 1,1$ , e a dor de  $3,7 \pm 2,64$  foi para  $0,34 \pm 0,83$ , porém devido à forte associação entre dor e confiança, apenas a confiança permaneceu no modelo final. A cada diminuição do valor relatado na confiança a chance de retorno ao esporte aumenta 0,62 vezes. **Conclusão:** Os resultados demonstraram que a confiança é a variável que melhor prediz a liberação do atleta.

**Palavras-chave:** Confiança. Medição da dor. Parâmetros subjetivos.

## Introduction

During physical therapy, it is important that professionals constantly monitor the condition of patients and their injuries. Several aspects can be measured; however, the most commonly assessed during treatment are those associated with the inflammatory process of the injury and with the mental state of patients and their perception of how the injury affects their activities. According to Williams and Myers (1), patient self-perception of evolution is just as important as the physical assessments and clinical observations conducted by therapists. It could be said that such perception is proportional to the self-confidence demonstrated by patients about returning to their regular activities.

The visual analog scale (VAS) is a very commonly used tool for monitoring patient evolution in physical therapy. It is an ordinal scale based on subjective assessments and is used in the clinical and research fields. Moreover, it is applicable in many situations, such as in the assessment of anxiety (2, 3), mood (4), and dyspnea (5, 6). However, its greatest applicability lies in pain measurement (7-10). Recently, the VAS has also gained increasing application in the

assessment of patient perception of improvement after treatment (11).

The Subjective Daily Assessment Scale [Escala Subjetiva de Avaliação Diária – ESAD] was created as a response to the need for an instrument to gauge the daily evolution of patients undergoing physical therapy. This scale is based on the VAS and analyzes the main criteria involved in treatment: signs of injury inflammation according to the perception of the physical therapist (edema and heat); and how the injury is inhibiting functionality according to the perception of the patient (pain, mobility, sensitivity, and confidence). Monitoring response to treatment on a daily basis is fundamental for good patient evolution. This is particularly true when patients are athletes. In sports, there is great pressure for athletes to return to play. Such pressure can come both from the athletes themselves, who do not wish to stay away from competitions or are afraid of losing their place on the team, and from their teams, which want them back as soon as possible.

Objective criteria are fundamental for discharging athlete patients and must be used to ensure the safety of their return. Nonetheless, subjective assessments, even if influenced by multiple factors, can serve as

one more criterion used to determine return-to-play. In addition to representing a different form of analysis, subjective criteria are a viable way of evaluating the confidence and pain felt by patients. However, there is a paucity of studies that have verified the use and accuracy of subjective assessments (12). In this context, the aim of the present study was to evaluate the association between ESAD parameters and physical therapy clinical discharge of athletes.

## Materials and methods

This was a descriptive study based on document analysis.

### Population

The population of this study consisted of athletes who received treatment as part of the Sports Physical Therapy Extension Project between March 2009 and December 2011. They were treated at the university's physical therapy teaching clinic, part of the Center for Health and Sport Sciences (CEFID/UEDESC).

### Sample

Between 2009 and 2011, 154 patients received physical therapy treatment. The sampling process was purposive, and 81 athlete records were selected based on the following criteria: patients had completed their physical therapy until return-to-play; and treatment lasted a minimum of two weeks.

We excluded the records of athletes who had abandoned or given up on treatment, and those whose treatment was interrupted for more than four consecutive days or five alternate days during the treatment period.

### Procedures

The present study was approved by the human research ethics committee of Udesc, under reference number 157/2008. A numeric code was assigned to each patient record to preserve subject anonymity.

Based on these records, we collected data on the history of the presenting complaint, injury characteristics, and ESAD data (pain, heat, edema, mobility,

sensitivity, and confidence). We also counted the number of sessions and duration of treatment.

### Subjective Daily Assessment Scale (ESAD)

This scale consists of subjective assessments of pain, heat, edema, mobility, sensitivity, and confidence. Participants were given the scale at the beginning of each session and were asked to self-evaluate based on the six parameters.

These parameters were ranked on a scale of 0 to 10, where 0 represented the best condition and 10 the worst. In terms of pain, 0 represented no pain and 10 the worst pain ever felt by the patient. Regarding mobility, 0 characterized complete range of motion and 10 inability to perform any movement. Sensitivity was assessed preferentially by comparing the injured limb with the non-injured limb, with 0 being the same as that of the contralateral limb and 10 very different (insensitivity or hypersensitivity). Confidence was classified as 0 when patients felt as prepared to return to play as they were before the injury and 10 when they felt there was no way they could return at that specific point in the treatment.

The parameters assessed by the therapist (edema and pain), were also ranked on a scale of 0 to 10. Edema was classified as 0 when patients presented no visible edema in comparison to the other limb and 10 when they presented the greatest edema possible for the injury, according to the therapist's experience. Heat was measured by comparing the temperature of the affected limb to that of the contralateral limb or that of other body parts if both limbs were injured. In this case, 0 corresponded to equivalent temperatures and 10 to the highest possible temperature for the injury according to the therapist's experience (Annex A).

### Data analysis

The dependent variable was defined as: 0 = return to play and 1 = injury; independent variables were the scores obtained for pain, heat, edema, mobility, sensitivity, and confidence. We used a stepwise Cox regression to analyze the predictor variables for athlete discharge. The criterion to retain a variable in the model was  $p < 0.05$ , and for removal  $p > 0.10$ . Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 17.0.

## Results

Eighty-one patient records were analyzed, of which five were in reference to two injuries. Mean patient age was  $23.9 \pm 6.3$  years. The most prevalent type of injury was muscle strain (37%), followed by ligament (30%), joint (10%), and fracture (12%) injuries. The mean number of sessions was  $30 \pm 22$ , lasting an average of  $9 \pm 7$  weeks. Treatment sessions lasted one hour and 30 minutes.

Table 1 presents the means and standard deviations of the subjective parameters assessed during treatment, based on the first day of treatment (injury)

and at the time of return-to-play. Pain and confidence presented the most variation in scores between the first and last day of treatment.

Table 2 demonstrates steps 5 and 6 of the Cox regression. Of all the independent variables that were initially analyzed, only pain and confidence presented a correlation with return-to-play. Only confidence remained in step 6 (final) because of the strong correlation between pain and confidence ( $0.67$ ;  $p = 0.001$ ). On the other hand, the odds ratio was correlated to the probability of return-to-play. Each change in level (for example, from 1 to 2) in confidence made the probability of patient return-to-play decrease in 0.62.

**Table 1** - Mean and standard deviation of ESAD variables on the first and last day of treatment

Parameter	Injury	Return-to-play
Pain	$3.70 \pm 2.64$	$0.34 \pm 0.83$
Edema	$1.38 \pm 1.94$	$0.27 \pm 0.77$
Heat	$0.86 \pm 1.41$	$0.04 \pm 0.21$
Mobility	$2.98 \pm 2.95$	$0.25 \pm 0.64$
Sensitivity	$0.64 \pm 0.12$	$0.12 \pm 0.63$
Confidence	$5.82 \pm 0.48$	$0.48 \pm 1.10$

**Table 2** - Results of stepwise Cox regression for constructing the final model of association between ESAD variables and return-to-play

	Independent variables	Regression coefficients	Standard error	Odds ratio (95% CI)	p
Step 5	Pain	-0.204	0.140	0.816 (0.621–1.072)	0.145
	Confidence	-0.382	0.099	0.683 (0.562–0.829)	0.001*
Step 6	Confidence	-0.476	0.084	0.622 (0.528–0.732)	0.001*

Note: \*  $p < 0.05$ .

## Discussion

After analyzing the patient records included in this study, the results showed that confidence was the parameter most associated with return-to-play. Especially in sports, in which athletes suffer great pressure to return to their activities, confidence is of extreme importance. Athletes who return prematurely

without being emotionally secure enough to fulfill their functions, especially in contact sports, have greater chances of reinjury (13). When treating patients with low confidence levels, therapists must aim to stimulate and monitor the relationship between patient confidence and health condition during the rehabilitation process (1). Adjusting this process is a significant step toward the safe discharge of athletes.

According to Mendiguchia and Brughelli (14), there is a difference between the perception of athletes of whether or not they are able to return to their activities and the actual possibility of their return. In clinical practice, some standards have been observed regarding the adjustment for each type of injury in terms of patient perception. An illustration of such adjustment can be seen in the case of muscle sprain injuries, in which athletes feel ready to return to their prior activities before tissue healing is complete. Thus, such injuries require a great amount of caution and gradual testing until the time of athlete return-to-play. In contrast, patients with sprained ankles usually feel pain even after they are able to return to their activities. However, in the latter case, this situation can lead to lack of athlete confidence, interfering in their functionality and thereby compromising the return-to-play process.

Another important factor in athlete recovery and return-to-play is the time of athlete discharge. Duration of treatment must be adjusted to the clinical conditions and willingness of patients (15). In professional sports, treatment abandonment is rare; however, in amateur sports, many patients abandon treatment before being truly able to conduct their normal activities. Such abandonment can be explained by several factors, such as the external influence of coaches, fellow athletes, sponsors, family and, quite often, pressure from the patients themselves (16). Premature return-to-play and not following through with the treatment program can increase the likelihood of reinjury or worsen the already existing injury (17). Using the ESAD and determining athlete confidence can help clinicians to adjust and patients to adhere to the treatment program. Furthermore, it can help establish the most appropriate time for return-to-play.

According to Beatti and Nelson (18), conducting daily evaluations, such as with the ESAD, is a form of reaching a more reliable prognosis. This must be taken into consideration, especially if we observe the results presented by the confidence parameter, which can vary significantly during treatment. Nevertheless, Beatti and Nelson (18) emphasized that therapists must not disregard demographic factors, such as age and specific injury characteristics, stage of disease progression, severity, and biobehavioral comorbidities.

Of the six criteria assessed by the ESAD, we initially believed that pain would be strongly correlated

with discharge in physical therapy. However, the results of the present study did not show such a relation. Pain is considered a reference parameter throughout the entire course of treatment. The progression of many injuries is greatly correlated with the level of pain, as is the case in the evolution of postoperative treatment for anterior cruciate ligament reconstruction (19). Todd et al. (20) stated that, throughout the course of treatment, there must be at least a 1.3-point difference on the VAS in order for it to be considered clinically significant. On the other hand, Lee et al. (21) consider a difference of at least 3 points as clinically significant. In the present study, a comparison between the first day of treatment and the time of return-to-play revealed a difference of 3.4 points. Even with such a clinically significant difference, pain did not remain a factor in the final model. This finding can be explained in two ways: first, in the case of some injuries, athletes return to play still feeling a little pain; and second, pain and confidence are strongly correlated, and thus one variable interferes with the other in the final model. If we remove confidence, pain will remain in the model. However, it is essential to observe that perhaps the focus of treatment, especially in sports, which tends to be based on the subjective assessment of pain, could be based on confidence, as it proved to be a more reliable predictor variable for return-to-play.

The ESAD is an additional assessment tool that must be used together with other objective forms of evaluation. These include assessing muscle strength, stability, neuromuscular control, dynamic function, and any other assessments that are needed and are part of the service's evaluation protocol. Such objective assessments generate parameters that underpin the decision to athletes' return-to-play so that they can carry out their activities as before the injury (22). By using the ESAD, we have one more criterion for determining discharge in physical therapy, one that subjectively gauges how individuals perceive their injury and provides more support and certainty to the return to normal activity.

## Conclusion

Among the subjective criteria assessed by the ESAD, confidence was the only parameter associated with return-to-play. Further studies are needed to verify the parameters, whether objective or subjective,

on which physical therapists can base their treatment, and to provide safe parameters for determining the most appropriate time for return-to-play.

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Annex A



SPORTS PHYSICAL THERAPY PROJECT  
SUBJECTIVE DAILY ASSESSMENT SCALE - ESAD



Name: \_\_\_\_\_

Date																				
1. Pain																				
2. Edema																				
3. Heat																				
4. Mobility																				
5. Sensitivity																				
6. Confidence																				
Total																				
Sessions	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Date																				
1. Pain																				
2. Edema																				
3. Heat																				
4. Mobility																				
5. Sensitivity																				
6. Confidence																				
Total																				
Sessions	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

Observations:

Observations:

