The use of the Patient-Specific Functional Scale to measure rehabilitative progress in a physiotherapy setting

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Objective: The Patient-Specific Functional Scale (PSFS) and the Numeric Pain Rating Scale (NPRS) are two measures which the Accident Compensation Corporation (ACC) of New Zealand have made compulsory for physiotherapists to record at a patients initial visit and discharge. Therefore, it is important to assess clinicians' compliance to this reporting requirement, and whether research results regarding effectiveness of these measures are transferable to the clinic.
Method: A retrospective observational study that assessed compliance in recording these measures, and analyzed the changes in scores seen across 11 physiotherapy practices in New Zealand over a 12-month period.
Results: Overall compliance rates of 51.8% [95% confidence interval (CI): 50.7–52.9] for PSFS and 51.9% (95% CI: 50.7–53.0) for NPRS were reported. These figures increase to 85.3% (95% CI: 82.0–88.6) PSFS; and 85.1% (95% CI: 81.7–88.4) NPRS, when a full discharge for the patient was made. Mean change in PSFS scores were 5.1 (95% CI: 5.0–5.1) points representing an 85.2% (95% CI: 84.1–86.3) change in total score.
Discussion: The study has shown that when patients complete a prescribed course of rehabilitation, clinicians show good compliance in recording PSFS and NPRS. Change in PSFS score is, on average, above the minimal clinically important difference shown in previous studies.

Keywords: PSFS, Patient-Specific Functional Scale, Compliance, Rehabilitation, Outcome measures

Background

There is an increasing emphasis placed on evidence-based medicine in physiotherapy. This has led to the need for specific, valid, reliable, and sensitive outcome measures. These measures are used to assess the change in a patient's condition and to subsequently monitor the benefit of a treatment plan. Traditionally physiotherapists have relied on impairment measures such as joint range of motion and muscle strength to monitor the progress of a patient's rehabilitation.[1] In academia, specialization of research has led to the creation of region, disease, patient, and domain-specific outcome measures which, for the purposes of research, can be more sensitive to change and relevant for monitoring interventions. Increasingly, outcome measures have moved towards functional limitations and global body function in order to assess the impact of a given condition on a patient's ability to achieve their desired activities in their particular environment, and there is now a wide range of outcome measures that have been assessed and validated. A drawback of the variety of outcome measures is that it brings with it a wide range of scoring systems that can make recording and interpreting data a complicated process.

Beyond the analysis of reliability, validity, and minimal clinical important difference (MCID), it is important to ensure that these measures can be used effectively in a clinical setting and that research results are transferable to the clinic. Some of the barriers identified for the use of outcome measures were time-taken, difficulty of lengthy questionnaires, lack of knowledge about the outcome measure, and lack of participation in choice of measure.[2,3] Another study looked at completion compliance, and found the recording of outcomes at discharge to be virtually nil.[4]

A recent study[5] analysed the use of the Patient-Specific Functional Scale (PSFS)[6] and the Numeric Pain Rating Scale (NPRS)[7] with respect to completion compliance, ease of use, and usefulness as a measure of therapeutic success in a clinical setting. Results showed that it is feasible to use these two outcome measures in routine clinical practice, but

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due to a number of limitations such as the short timeframe for data collection (3 months), relatively high numbers of patients that were seen only once and low numbers of patients with complaints in certain body regions; compliance rates, and improvements in function and pain reduction were moderate; 70% completion rate; 71% improvement in function; 75% reduction in pain.

Considerations during development of the PSFS attempted to reduce some of the barriers that could limit the likelihood of such a validated outcome measure being adopted,[6] e.g. the time taken for completion. A study comparing nine different patient-specific outcome measures for musculoskeletal disorders found that the PSFS took an average of 4 minutes to complete, while the other eight measures took between 10 and 40 minutes.[8]

In New Zealand, the use of outcome measures in the clinical setting provides information to three broad interest groups, the recipients of rehabilitation (patients), the rehabilitation service providers (physiotherapists), and third party funders (Accident Compensation Corporation — ACC). Each of these groups have different motivators; patients, having ever easy access to health information on the web, want to know if the treatment they are receiving is effective in returning them to pre-injury functional levels; physiotherapists want to know how their patient is progressing and what is the evidence around a chosen intervention; and finally the funding agencies want to know how quickly patients can be restored to full function or pre-injury function ready for discharge. In order to standardize a measure for rehabilitative progress, ACC has introduced mandatory recording of a score from the PSFS[6] and the NPRS.[7] The introduction of outcome measures that can be applied to a range of conditions allows for a standard benchmark to be applied with a reduction in ambiguity and an increase of consistency in recorded data.

The PSFS focuses on the patient's opinion of their function, and requires the physiotherapist to ask the patient to list three activities that are limited by the condition for which they are seeking treatment, the overall PSFS score is an average of all three activities scores.[9] As the PSFS score is patient-specific, it also addresses issues that are often missed in other outcome measures with set content;[1] it relies on subjective data without fixed content, which has raised questions regarding the meanings of a mean score or comparisons of scores across different patients.[8] Due to this limitation, the PSFS is not traditionally used as an absolute measure of disability, but rather used as a measure to assess change over time, placing more weight on absolute and relative change from baseline. The MCID has been evaluated for certain conditions and has shown to be around 2.3 for Lower Back Pain (LBP)[10] and between 2 and 3 for cervical radiculopathy.[11,12] The acceptance of the use of the PSFS as an outcome measure is demonstrated by its increasing use in research as a tool for assessing the efficacy of treatments.[13–20]

The NPRS is a tool which can be administered by a clinician where a patient is asked to rate their pain on a scale from 'no pain' to 'extreme pain'.[7] Studies evaluating the MCID for NPRS scores have suggested that a two-point, or 30–35%, reduction in pain is required to be considered a clinically meaningful change.[21–23] The MCIDs reported have been calculated using either the anchor-based method, the distribution-based method, or both.[24] It must be noted that there is no one standard approach for the calculation of MCIDs.[24,25]

The purpose of this study is to provide further analysis of the criteria examined in an earlier study,[5] using a larger data set collected over a longer period. Specific aims are primarily to assess clinicians' compliance rates to completing the outcome measures and secondary, to provide analytical information regarding changes in PSFS and NPRS scores and the numbers of treatments given, as well as data around the numbers of patients achieving full functional restoration and pain abolition.

Method

Design and participants

The study design was a retrospective observational study of consecutive patients presenting to 11 physiotherapy practices from across New Zealand. These clinics provide treatment to the public for a variety of conditions over a large range of age groups. Participants in the study were new patients presenting with musculoskeletal disorders to the participating clinics within the 12-month study timeframe.

Outcome measures and procedure

The outcome measures used in this study are the PSFS[6] and the NPRS.[7] Both of these measures were administered using the structure as prescribed in the ACC outcome measurement guidelines found at http://www.acc.co.nz/for-providers/physiotherapy-services/index.htm#P10_1393. The PSFS and NPRS were administered by the treating physiotherapists at initial assessment and discharge. The PSFS and NPRS scores were recorded by the clinician and then entered into a Microsoft® Excel spreadsheet by the clinic administration staff.

Data analysis

Patient conditions were categorized into anatomical region using ACC Read codes where possible; invalid or not recorded read codes were classified as 'unknown'. Anatomical area attribution was made using ACC's classifications found on the ACC website at http://www.acc.co.nz/publications/index.htm?ssBrowseSubCategory=Read%20codes (extracted 16 November

2010). Unique patient identifiers were not recorded for patients; therefore, the information taken for this study was: age, sex, clinical area, ACC read code, initial PSFS score, initial NPRS score, PSFS score at discharge, NPRS score at discharge, and number of treatments. One clinic also recorded the reason for discharge. As this study looked at PSFS and NPRS completion rates at both initial visit and discharge, patients with only one visit were excluded from the data, as the inclusion of these visits will tend to understate completion rates. As much of the data was manually recorded, any PSFS or NPRS scores outside of the 0–10 range were entered as 'blank' as this erroneous data, for the purpose of analysis, essentially equates to incomplete information.

Percentage changes in PSFS and NPRS scores were calculated by taking the actual change in score divided by the possible change to achieve 100% resolution. For example, a patient moving from a 2 to an 8 in PSFS score would have a 75% resolution (a change of 6 out of a possible 8), whereas a patient moving from a 6 to an 8 in PSFS score would show a 50% resolution (a change of 2 out of a possible 4). For the purposes of this study, scores are displayed as mean with 95% confidence intervals (CIs). Correlation coefficients were calculated for the percentage change and absolute changes methods for calculating change in PSFS and NPRS scores as a sensitivity analysis, and to determine if there was a relationship between the two outcome measures. The relationship between number of visits and percentage change in PSFS or NPRS was also explored using correlation statistical tests. Level of correlation was judged on the following criteria:[26]

- 0–0.25: no relationship;
- 0.25–0.5: fair relationship;
- 0.5–0.75: good relationship;
- above 0.75: excellent relationship.

Ethics

Observational ethics approval was sought and obtained from the Lower South Regional Ethics Committee on 5 October 2010.

Results

Nine thousand, six hundred and twenty-eight patients were seen for an initial assessment and were discharged within the specified 12-month period. Of these 9628 patients, 7670 of them were seen for more than one treatment. The PSFS and NPRS completion rates at the initial visit were 84.2% (95% CI: 83.4–85.0) and 83.4% (95% CI: 82.6–84.2) respectively (Table 1). A full breakdown of completion rates by anatomical region can also be seen in Table 1. At discharge, these figures dropped to 54.8% (95% CI: 53.7–55.9) for PSFS completion and 54.7% (95% CI: 53.6–55.8) for NPRS completion. The PSFS completion rates at both

Table 1 Summary of PSFS and NPRS completion at initial visit, discharge, and full completion at both initial visit and discharge for each condition. Means expressed as a percentage of total numbers with 95% CIs displayed in brackets

		PSFS			NPRS		
Body area	Number of patients	PSFS completion at initial visit (%)	PSFS completion rate at discharge (%)	PSFS compliance rate (complete at initial and discharge) (%)	NPRS completion at initial visit (%)	NPRS completion rate at discharge (%)	NPRS compliance rate (complete at initial and discharge) (%)
Ankle and foot	1081	85.9 (83.9–88.0)	57.5 (54.6–60.5)	54.7 (51.7–57.6)	85.6 (83.5–87.7)	57.8 (54.9–60.8)	55.7 (52.7–58.7)
Chest and ribs	57	84.2 (74.7–93.7)	47.4 (34.4–60.3)	45.6 (32.7–58.5)	84.2 (74.7–93.7)	47.4 (34.4–60.3)	45.6 (32.7–58.5)
Elbow	182	83.5 (78.1–88.9)	54.9 (47.7–62.2)	50.5 (43.3–57.8)	84.6 (79.4–89.9)	54.9 (47.7–62.2)	51.6 (44.4–58.9)
Hand	66	80.3 (70.7–89.9)	51.5 (39.5–63.6)	48.5 (36.4–60.5)	78.8 (68.9–88.7)	53.0 (41.0–65.1)	50.0 (37.9–62.1)
Hip, groin and upper leg	434	82.9 (79.4–86.5)	53.2 (48.5–57.9)	48.8 (44.1–53.6)	82.7 (79.2–86.3)	54.4 (49.7–59.1)	50.5 (45.8–55.2)
Knee	834	84.2 (81.7–86.6)	55.2 (51.8–58.5)	52.4 (49.0–55.8)	83.5 (80.9–86.0)	54.1 (50.7–57.5)	51.2 (47.8–54.6)
Lower leg	244	83.6 (79.0–88.3)	59.8 (53.7–66.0)	53.7 (47.4–59.9)	82.8 (78.1–87.5)	59.0 (52.8–65.2)	53.3 (47.0–59.5)
Shoulder	854	86.2 (83.9–88.5)	58.5 (55.2–61.9)	55.0 (51.7–58.4)	84.2 (81.7–86.6)	58.1 (54.8–61.4)	55.4 (52.1–58.7)
Spine (including neck)	2578	85.3 (83.9–86.6)	54.2 (52.2–56.1)	51.4 (49.5–53.4)	84.6 (83.2–86.0)	54.4 (52.5–56.3)	51.7 (49.7–53.6)
Wrist	150	83.3 (77.4–89.3)	57.3 (49.4–65.2)	54.0 (46.0–62.0)	82.7 (76.6–88.7)	56.0 (48.1–63.9)	52.7 (44.7–60.7)
Other	88	83.0 (75.1–90.8)	56.8 (46.5–67.2)	54.5 (44.1–64.9)	80.7 (72.4–88.9)	55.7 (45.3–66.1)	52.3 (41.8–62.7)
Unknown	1102	79.8 (77.4–82.1)	50.1 (47.1–53.0)	47.9 (45.0–50.9)	78.6 (76.2–81.0)	49.5 (46.5–52.4)	46.9 (44.0–49.9)
Grand total	7670	84.2 (83.4–85.0)	54.8 (53.7–55.9)	51.8 (50.7–52.9)	83.4 (82.6–84.2)	54.7 (53.6–55.8)	51.9 (50.7–53.0)

initial visit and discharge were 51.8% (95% CI: 50.7–52.9) and 51.9% (95% CI: 50.7–53.0) for NPRS completion (Table 1).

For patients with complete data at initial visit and discharge, the average percentage change in PSFS score was 85.2% (95% CI: 84.1–86.3) ranging from a 79.1% average change for wrist conditions and a 93.1% change for lower leg conditions (Table 2). The average percentage change for NPRS scores were 83.7% (95% CI: 85.2–84.8) with the highest average again for the lower leg (92.3%) and the lowest for the wrist (75.7%). The absolute change in PSFS and NPRS scores were 5.1 (95% CI: 5.0–5.1) and 4.2 (95% CI: 4.2–4.3) respectively (Table 2). Correlation coefficients displayed a fair relationship (0.46) when comparing PSFS and NPRS scores using the percentage change method, whereas a lower correlation was found (0.38) when comparing the two measures using relative change.

Full functional restoration, indicated by a score of 10 for PSFS, occurred in 60.7% (95% CI: 59.2–62.2) of patients (Table 2). Full abolition of pain, indicated by a NPRS score of 0, occurred in 65% (95% CI: 63.6–66.5) of patients.

The average number of visits for patients included in this study was 5.8 (95% CI: 5.8–5.9) with a low of 4.8 for hand injuries and a high of 6.8 for lower leg and shoulder injuries (Table 2). As patients with only one visit were excluded in this study, average patient visit numbers in the results are only for patients who had two or more visits.

In one clinic, information regarding the reason for patient discharge was obtained in order to assess the impact this has on NPRS and PSFS completion rates. When a patient was present for and went through complete discharge, the completion rates for PSFS and NPRS were 85.3% (95% CI: 82.0–88.6) and 85.1% (95% CI: 81.7–88.4) respectively (Table 3).

Discussion

The primary aim of this study was to assess the rate of compliance to recording of standardized outcome measures by clinicians. The compliance rates of 52% (Table 1) for PSFS and NPRS completion in this study were lower than expected and lower than the figure found in the previous study (70%).[5] The data were collected retrospectively and covered the first 12 months of the mandatory reporting period; therefore, clinicians did not have any lead in time to change their behaviour and 'get up to speed' with the recording of outcomes before data collection began. Thus, the low completion rates reflect on the quality of the data collected with regards to representation of the true state of a patient's condition, and therefore this must be taken into account when interpreting some of the secondary aims of this study. Two studies looking at outcome measure compliance showed

Table 2 Number of visits, change in PSFS and NPRS scores, full functional restoration, and full pain abolition by body area (mean with 95% CIs expressed in brackets). Change scores expressed as a percentage of total numbers and absolute values

			PSFS			NPRS		
Body area	Number of patients	Mean number of visits	Change in PSFS score (%)	Mean change in PSFS score (absolute)	Full functional restoration (%)	Change in NPRS score (%)	Mean change in NPRS score (absolute)	Full pain restoration (%)
Ankle and foot	1081	6 (5.8–6.3)	87.4 (84.8–90.1)	5.2 (5–5.4)	62.3 (58.4–66.2)	83.9 (80.9–86.8)	4 (3.9–4.2)	65.4 (61.6–69.2)
Chest and ribs	57	5.3 (4.5–6.1)	86.3 (73.1–99.5)	5.2 (4.2–6.2)	73.1 (56.0–90.1)	82.1 (67.4–96.8)	5.5 (4.8–6.1)	61.5 (42.8–80.2)
Elbow	182	6.4 (5.8–7.1)	82.9 (75.2–90.6)	4.8 (4.3–5.2)	54.3 (44.2–64.5)	83.5 (76.0–91.0)	4.1 (3.8–4.4)	55.3 (45.3–65.4)
Hand	66	4.8 (4–5.6)	85.7 (73.6–97.9)	5.4 (4.6–6.2)	59.4 (42.4–76.4)	90.2 (80.0–100.3)	4.3 (3.7–5)	69.7 (54.0–85.4)
Hip, groin and upper leg	434	5.4 (5.1–5.7)	83.0 (77.9–88.0)	5.2 (4.8–5.6)	62.7 (56.2–69.2)	85.3 (80.6–90.0)	4 (3.7–4.2)	68.9 (62.8–75.1)
Knee	834	5.9 (5.7–6.2)	82.3 (78.7–85.8)	5 (4.8–5.3)	62.0 (57.5–66.6)	85.5 (82.1–88.8)	4.1 (3.9–4.3)	67.0 (62.5–71.4)
Lower leg	244	6.8 (6.2–7.3)	93.1 (88.8–97.4)	5.8 (5.5–6.2)	74.8 (67.4–82.2)	92.3 (87.7–96.9)	4.6 (4.3–4.9)	78.5 (71.4–85.5)
Shoulder	854	6.8 (6.5–7.1)	86.0 (82.9–89.2)	5.2 (4.9–5.4)	60.4 (56.0–64.8)	82.4 (79.0–85.9)	4.3 (4.2–4.5)	64.9 (60.6–69.2)
Spine (including neck)	2578	5.7 (5.6–5.9)	86.8 (85.0–88.6)	5.1 (4.9–5.2)	63.6 (61.0–66.2)	84.7 (82.7–86.6)	4.7 (4.6–4.8)	66.4 (63.8–68.9)
Wrist	150	4.9 (4.4–5.4)	79.1 (70.2–87.9)	4.4 (3.8–5)	56.8 (46.0–67.6)	75.7 (66.3–85.2)	3.7 (3.3–4.2)	59.5 (48.7–70.3)
Other	88	7.4 (6–8.8)	87.5 (78.1–96.8)	5.6 (5–6.3)	60.4 (46.6–74.3)	84.3 (73.7–94.8)	4.2 (3.6–4.7)	67.4 (53.8–80.9)
Unknown	1102	5.2 (5–5.4)	80.4 (77.0–83.7)	4.7 (4.5–4.9)	47.5 (43.3–51.8)	78.4 (74.9–82.0)	3.5 (3.3–3.6)	56.9 (52.6–61.1)
Grand total	7670	5.8 (5.8–5.9)	85.2 (84.1–86.3)	5.1 (5–5.1)	60.7 (59.2–62.2)	83.7 (82.5–84.8)	4.3 (4.2–4.3)	65.0 (63.6–66.5)

Table 3 Summary of PSFS and NPRS completion rates listed by discharge reason. Data in this table is only for patients seen in one clinic (n=1216). Mean with 95% CI expressed in brackets

	PSFS			NPRS		
	PSFS complete at initial visit	PSFS complete at discharge	PSFS complete at initial and discharge	NPRS complete at initial visit	NPRS complete at discharge	NPRS complete at initial visit and discharge
Cancelled better	86.7 (74.5–98.8)	36.7 (19.4–53.9)	36.7 (19.4–53.9)	93.3 (84.4–102.3)	36.7 (19.4–53.9)	36.7 (19.4–53.9)
Discharged; complete	94.3 (92.1–96.4)	85.6 (82.3–88.9)	85.3 (82.0–88.6)	95.2 (93.2–97.2)	85.8 (82.5–89.1)	85.1 (81.7–88.4)
DNR/Canx no reason	91.1 (86.3–95.9)	5.2 (1.4–8.9)	5.2 (1.4–8.9)	93.3 (89.1–97.5)	5.2 (1.4–8.9)	5.2 (1.4–8.9)
Other	83.1 (73.5–92.6)	37.3 (24.9–49.6)	37.3 (24.9–49.6)	89.8 (82.1–97.5)	40.7 (28.1–53.2)	40.7 (28.1–53.2)
Therapist forgot	56.8 (46.0–67.6)	37.0 (26.5–47.6)	37.0 (26.5–47.6)	59.3 (48.6–70.0)	35.8 (25.4–46.2)	35.8 (25.4–46.2)
Not recorded	72.4 (68.4–76.5)	44.7 (40.2–49.2)	44.2 (39.7–48.7)	75.6 (71.8–79.5)	45.3 (40.8–49.8)	45.1 (40.6–49.6)
Grand total	82.2 (80.1–84.4)	53.9 (51.1–56.7)	53.6 (50.8–56.4)	84.7 (82.7–86.7)	54.3 (51.5–57.2)	54.0 (51.2–56.8)

Note: DNR: did not return; Canx: cancelled.

rates ranging from 53%.[27,28] The rates in this study can be, in part, attributed to the reason for a patient discharge. In many instances, a patient will either call to cancel their last appointment, not make a final appointment, or fail to return to the clinic. In these circumstances, it may not be possible for a clinician to obtain final PSFS and NPRS scores. It was found that when a complete discharge was made, the compliance rate rose from 54 to 85% for both the PSFS and NPRS (Table 3).

In 94% of cases, the therapist will either administer both of the outcome measures or neither of them. Of the 3802 cases where both the PSFS and NPRS were completed, the percentage change of both measures was compared. In order to assess the validity of using the relative change method for recording the difference in NPRS and PSFS scores as opposed to absolute change, the correlation coefficients, comparing NPRS and PSFS, for each method were calculated. There was a fair relationship between the percentage change in the PSFS and NPRS, with a correlation coefficient of 0.46. When looking at the absolute change in score the relationship was weaker with a correlation coefficient of 0.38. This suggests that using a relative change, rather than an absolute change may be a better indicator of the change in a patient's condition as opposed to absolute change in score. In the 6% of cases where only one of the measures was taken, there appeared to be no preference as to which of the measures was used. The lack of preference indicates that neither the PSFS nor the NPRS appear to be more or less demanding than the other.

In the 3926 patients who had completed PSFS scores at initial visit and discharge, the average change in PSFS score was 5.1 points which represented an 85.2% resolution of functional capacity. All body areas looked at in this study had an average change in PSFS score of at least 4.4, which were all therefore above PSFS MCIDs found for LBP and cervical radiculopathy in previous studies.[10–12] Of the patients with complete PSFS scores, 61% achieved full functional restoration as indicated by an average score of 10, when rating their 'full ability to perform the tasks to the same level as they could before the onset of symptoms'.[9] For the 3932 patients that had NPRS scores taken at both the initial visit and discharge, the average change in NPRS score was 4.3 points which represents an 83.7% reduction in pain from the injury. Sixty-five per cent of these patients also recorded full abolition of pain at discharge by indicating a score of 0 out of 10 on the pain rating scale. These scores suggest that physiotherapy treatment is achieving desirable functional gains and pain reduction outcomes. At the point where a high level of function and low level of pain is achieved, many physiotherapists and/or patients decide to discharge for a home management program or they are satisfied with the results they have achieved.

The average number of visits found in our sample was 5.8 and did not vary greatly depending on the body area treated. It must be noted that these figures did not include patients receiving only one treatment and thus overstate treatment numbers. If single visit data was added the average number of visits would have fallen to 4.9. There was no relationship found between the number of patient visits and the percentage of change in either PSFS or NPRS scores with correlation coefficients of 0.01. The lack of correlation in these figures suggests that patients are being discharged based on the condition of their recovery rather than a standard number of treatments.

Limitations

A number of limitations were identified in this study; the retrospective survey of the first 12 months of mandatory reporting of outcome measures did not enable clinicians to get into the habit of using said outcomes on a regular basis and therefore influenced the compliance rates. There was no exploration of cause and effect with regards to compliance rates, and the low compliance rates weakened any inferences with regards to the secondary aims of the study.

Conclusion

The results of this study have shown that the PSFS and NPRS are responsive indicators of change in the patient conditions when attending for physiotherapy. The study has also highlighted some of the difficulties in recording PSFS and NPRS scores, in particular, the need to take into account the reason for patient discharge when looking at outcome measure compliance rates. Physiotherapists in New Zealand are treating patients, on average six times and achieving improvements in pain and function well above MCID, at which time physiotherapists and/or patients are deciding to discharge for a home management program; this may be an indication of the pressures on the health system in New Zealand.

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