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The Impact of Personal Functional Goal Achievement on Patient Satisfaction with Progress One Year Following Completion of a Functional Restoration Program for Chronic Disabling Spinal Disorders

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Abstract

Study Design—This prospective cohort study investigated personal goal achievement and satisfaction with progress in patients with chronic disabling spinal disorders (CDS).

Objective—This study examined the relationships between satisfaction with progress and several alternative outcome measures for CDS patients at least 1 year after completing a functional restoration program (FRP).

Summary of Background Data—Treatment outcome measures for CDS commonly include pain, physical capacities, and functional/vocational status. These factors are weakly correlated and may not reflect individual patients' perspectives and priorities.

Methods—Upon enrollment in the FRP, patients' pre-treatment functional, work, and recreation goals were recorded. Pre- and end-of-program clinical measures included: pain, disability, fear avoidance, lifting, trunk flexibility, and treadmill endurance. At least 1 year after program completion surveys were mailed to consecutive FRP graduates. Non-responders were surveyed by telephone when possible. Surveys included each patient's personal pre-treatment goals, and assessed Average Pain, SF-36 Physical Function, and satisfaction "with the progress made with your pain problem." Each patient indicated levels of importance and achievement for each personal goal, and these scores were integrated to yield a goal achievement score (GAS). Linear regression was used to test the relationships between 1-year satisfaction with progress and the following variables: baseline to end-of-program change in clinical measures, and 1-year pain, physical function, and GAS.

Results—Of the 106 surveys mailed, 89 (84%) were returned and 86 (81%) had complete data for analysis. None of the pre-post program clinical measures was significantly correlated with satisfaction (overall $R^2=0.013$, $p<0.74$). In contrast, year-end Average Pain ($R^2=0.28$), Physical Function ($R^2=0.29$), and GAS ($R^2=0.29$) were each significantly correlated ($p<.0001$) with satisfaction, with a combined $R^2=0.43$, $p<.0001$. Of these variables, GAS had the highest unique contribution to satisfaction.

Conclusions—For CDS D patients one year after completing rehabilitation, compared to more traditional outcomes, goal achievement scores provided the greatest unique contribution to patient satisfaction. Goal achievement may be a valuable patient-centered measure of treatment outcome.

INTRODUCTION

For many years treatment outcomes for people with chronic disabling spinal disorders (CDS Ds) have included pain, physical capacities, socioeconomic well-being, and work status. Recently, there has been a shift toward using patient self-assessments, and patient satisfaction has emerged as a widely used treatment outcome measure. The diversity of outcome measures used in research studies of spinal disorders has complicated the comparison of study results, prompting recommendations to develop a standardized panel of measures including back-specific function, generic health status, pain, work disability, and patient satisfaction. (1, 2)

Although standardization of measurement may provide important benefits for the interpretation of group studies, the fundamental problem of choosing a patient-centered measure to evaluate treatment success per individual remains unsolved. Correlations between clinical variables (e.g., pain, physical impairment and disability) before and after treatment are generally weak. (1, 3–9) Generic health indexes such as the SF-36 may obscure important personal differences in pain and functional outcomes, and none of the traditional measures accounts for patients' preferences or priorities regarding outcomes. Patient satisfaction with progress may come closest to this target. However, it is by definition retrospective, and therefore has limited capacity to guide treatment decision-making in real time.

Previous studies have shown that patient satisfaction following rehabilitation for CDS Ds correlates weakly with pain, physical capacity and work outcomes, and that satisfaction relates more closely to the extent to which individuals retrospectively feel they have achieved their goals regarding pain relief and physical capacity gains. (4, 5) Simply having a return to work goal was the best predictor of eventual work status in a sample of patients participating in a chronic pain management program. (10)

This study examines the relative contributions of personal functional goal achievement and more traditional clinical measures to patient satisfaction with progress for people with CDS Ds one year after completing a Functional Restoration Program (FRP). The central hypothesis is that personal functional goal achievement will demonstrate the strongest relationship with patient satisfaction with progress.

MATERIALS AND METHODS

Patient Selection

This study involved CDS D patients at least one year following completion of a three-week FRP. Patients were initially referred from community-based medical practices in Vermont and New Hampshire for evaluation by practitioners in the Dartmouth- Hitchcock Medical Center's Spine Center. These practitioners in turn referred patients to the FRP on the basis of meeting the following criteria: 1) more than 3 months' disabling back pain; 2) absence of a clear surgically correctable lesion or cardiovascular co-morbidity restricting activity; 3) psychological capacity to engage in group activities; and 4) treadmill, lifting and flexibility tests indicating significant deficits compared to the patient's personal functional goals. Pre-admission evaluations focusing on these inclusion criteria were conducted by a medical doctor or nurse practitioner. The study was approved and monitored by the Committee for

the Protection of Human subjects at the Dartmouth-Hitchcock Medical Center and Dartmouth College.

FRP Protocol

The FRP consisted of 13 eight-hour sessions over three weeks. Each session included physical training, educational classes, and cognitive therapy as previously described.(11) On the first day of the treatment program, all patients completed the following questionnaires: a pain visual analog scale (VAS);(12–14) the Oswestry Disability Index (ODI);(15, 16) Physical Function subscale (PF) of the Medical Outcomes Study SF-36; (17) the Center for Epidemiologic Studies Depression Scale (CESD);(18, 19) and the Fear Avoidance Beliefs Questionnaire (FABQ).(20, 21)

The following physical capacity tests were also conducted: sagittal trunk flexibility measured by inclinometer (ROM);(22) Progressive Isoinertial Lifting Evaluation (PILE), (23) in which the patient performed a repetitive lifting task; and aerobic performance (METS), in which the patient walked on a treadmill, with speed and inclination increased per protocol to maximum tolerance or target heart rate ($0.8 \times 220\text{-age}$).

On the first day of the FRP an occupational therapist recorded each patient's response to the question, "What is your goal for work 3 months from now?" This question was repeated and response recorded for recreation and for activities of daily living. On the second day the program director reviewed the test results and the goals with each patient, confirming the accuracy of the stated goals or editing them according to the patient's request. All of the first-day tests and measures were repeated on day 13 of the FRP. On the final day, the program director met with each patient to review the final results relative to initial results and goals. Initial and end-of-program clinical measures were entered into a computer database by administrative staff.

Follow-up Protocol

A survey was developed to evaluate health status and patient satisfaction one year after completing the FRP. Surveys were customized using a mail merge feature to insert each patient's personal goals as recorded verbatim during the FRP into separate boxes within the survey for the Work, Recreational and Daily Activities domains.

Survey Content assessed

1. Pain magnitude: worst pain in the last week, average pain over the last week, and current pain using the Iowa Pain Thermometer, a 13-point modified Likert scale (24)
2. The Physical Function subscale of the SF-36
3. Current work status, level (full v. part time), and capacity
4. Worker's Compensation and Social Security Disability status
5. "Satisfaction with the progress made with your pain problem" using a 6-point Likert scale ranging from "strong satisfaction" to "strong dissatisfaction"
6. Goal Achievement: the patient's assessment of how completely they had met their goals for work, recreation and daily activities on a 7-point Likert scale ranging from "completely met" to "not at all met"
7. Goal Importance: the patient's assessment of how important each goal was on a 7-point Likert scale ranging from "very high importance" to "no importance"

Goal Achievement Scoring—The 7-point goal achievement scale was scored as 7, 5, 3, 1, -1, -3, -5 and the 7-point goal importance scale was scored as 7, 6, 5, 4, 3, 2, and 1. For each of the three goal domains (work, recreation, activities of daily living) the achievement and importance scores were multiplied to produce a domain score. Multiplying these two scales could produce up to 49 unique domain scores with a directional range from +49 (7×7 , indicating a very important goal completely met) to -35 (-5×7 , indicating an very important goal not at all met). Linear transformation $[(\text{score} + 35) / 84] \times 100$ gave positive scores ranging from 0 to 100. For each patient the three domain scores were averaged yielding a composite goal achievement score (GAS). For patients who did not provide a goal for all three domains, the GAS was the average of the two domain scores they did have.

Recruitment Protocol—The individualized surveys were mailed to 106 consecutive graduates from the FRP who had completed the program at least 1 year prior to the inception of the study. A second survey was mailed to all non-responders after two weeks. Clinical research staff attempted to contact all remaining non-responsive subjects by phone to read the survey to the subjects and record their responses.

Statistical Analyses

Data Entry: Clinical data from the FRP program were entered monthly during the treatment portion of the study into an Excel™ spreadsheet. Data from the follow-up survey were entered into a separate Excel™ spreadsheet. All of these values were entered by FRP administrative personnel. Double data entry was done to ensure accuracy.

Analysis Plan: Potential differences between responders and non-responders were evaluated by comparing patient demographics and functional capacities during the program. Continuous variables were compared using analysis of variance and categorical variables using chi-square tests. The internal consistency of the GAS was assessed using Cronbach's alpha (25) for those patients who had provided goal attainment scores in all three domains.

We used linear regression analyses to evaluate the relationship between satisfaction at one year and three sets of variables: 1) Clinical Measures: pre-post FRP changes in Pain, Oswestry, CESD, FABQ, lifting, treadmill endurance, and trunk flexibility; 2) Pain and Physical Function as reported on the 1-year follow-up survey; and 3) Goal Achievement Score (GAS). Simple and multiple regression of satisfaction on each outcome assessed the relationship between satisfaction and each variable, by comparing the amount of satisfaction variance explained by each variable and combinations of variables.

All analyses were computed using SAS™ (SAS Institute, Cary, North Carolina) version 9.1.3 running under the Windows XP® Professional operating system.

RESULTS

Data Quality—The overall inconsistency rate from the double data entry per datum entered was 0.18%. All inconsistencies were resolved by referring back to the source document.

Sample and Non-response—Of the 106 patients who had completed the FRP program at least 1 year prior to this study, 83.9% (89/106) agreed to participate in the study. Of the 17 remaining: 3 declined to participate; 5 could not be reached by phone; and 9 could not be located. Table 1 summarizes patient characteristics for responders and non-responders. For these 89 patients, the average length of follow-up was 1.8 years and ranged from 1.05 to 2.57 years. No significant differences were observed between responders and non-responders for pre-post FRP changes in clinical measures or in gender, but non-responders

were significantly younger than responders [37.3 (8.64) vs. 42.2 (9.15), $p < .048$]. Three of the 89 were excluded from year-end analysis because of missing responses in their follow-up surveys.

The personal and health demographics for the 86 patients who made up the 1 year post FRP cohort are summarized in Table 2 and Table 3 displays their work and compensation status. Table 4 presents summary statistics for the dependent variable of patient satisfaction and the relative contributions of pain, physical function and GAS.

Relationships Between Outcomes and Patient Satisfaction with Progress

Pre-post FRP Changes in Clinical Measures—Changes in pre-post FRP clinical measures, individually or in combinations, were not significantly related to satisfaction with progress at one-year (overall $R^2 = 0.013$, $p < 0.74$).

Pain, Function and Goal Achievement after at least 1 year—Table 5 summarizes the univariate regression model of satisfaction with progress on the pain, function and GAS variables, as well as intercorrelations among these variables. Average Pain and Physical Function scores at 1-year had weak to moderate and statistically significant relationships with satisfaction ($R^2 = 0.28$, $p < 0.0001$ and $R^2 = 0.30$, $p < .0001$, respectively). Some patients did not provide a goal for all three domains: work($n=2$), recreation($n=9$) and activities($n=14$). The internal consistency based on Cronbach's alpha(25) for those patients who did have GAS in all three domains was 0.78. GAS also demonstrated weak to moderate and statistically significant association with satisfaction ($R^2 = 0.29$, $p < .0001$).

Combined Model and Unique Contributions to Patient Satisfaction

In the multiple regression model, Average Pain, SF-36 Physical Function and GAS after 1 year together explained 43.5% of the variance in satisfaction ($p < .0001$). The unique contributions of each variable to 1-year satisfaction are illustrated in Figure 1. GAS made the greatest unique contribution to satisfaction: GAS 7.35%, Physical Function 4.21%, and Average Pain 2.90%.

Discussion

This study showed that for CDS patients at least one year completing a functional restoration program, satisfaction with progress was more strongly related to personal functional goal achievement than to more traditional outcome measures including pain, disability, fear avoidance, lifting, trunk flexibility, and treadmill endurance. These findings are consistent with previous work that assessed treatment goal achievements short-term, with a smaller sample (six weeks, $n= 59$). (5) Similarly, Tan et al. found that return-to-work goals were predictive of return to work in a sample of patients participating in a chronic pain management program. (10)

Although goal-setting has been used for several decades in the field of psychology to provide feedback and motivation to patients, and for program evaluation, (26) most applications include provider-nominated goals. In contrast, our rehabilitation practice emphasizes the patient's role in clinical decision-making and program evaluation processes, and therefore targets patient-nominated goals.

Research in other health areas has examined the performance of goal attainment scaling as an outcome measure compared to more traditional measures. (27, 28) Oldridge, et al. compared goal attainment (yes or no) to generic and specific health-related quality of life measures and exercise tolerance in post-myocardial infarction patients randomized to

rehabilitation or usual care. In that study, there were no differences between those outcomes for patients who did and did not attain their goals. The authors suggested that goal attainment might not be a valid measure of outcome, disregarding the possibility that the goal priorities and degree of achievement could have detected important changes from the patients' perspectives.

Two studies investigated the measurement properties of patient-nominated goal attainment in the area of pain management programs, and found preliminary evidence for validity and reliability. (29, 30) Similarly, Gordon, et al. (27) found weak correlations between goal attainment and traditional measures of health status among geriatric patients with dementia. However, effect size analysis revealed that goal attainment scaling was the more sensitive measure of change among these patients. All three studies concluded that goal attainment scaling provides different and critical information about the value of treatment in these populations. It should be noted that Gordon, et al. used provider-nominated goals due to the challenge of patient-nominated goal-setting in the presence of dementia. Our study results are consistent with Oldridge and Gordon's work in that traditional clinical outcome measures (pre-FRP to end of FRP changes demonstrated very low correlation with satisfaction and goal achievement. measured at least 1 year after FRP completion.

These prior studies provided insight into the relationship between goal attainment and traditional health measures, but they did not examine the relationship between goal attainment and patient satisfaction with outcome. Elkadry, et al. assessed the relationship between patient-nominated goals and satisfaction for patients undergoing surgery for pelvic reconstructive surgery.(31) They reported that although goal achievement strongly correlated with satisfaction ($r=0.57$, $p<0.001$), objective clinical and urodynamic outcomes did not. Their findings are consistent with those of our study, however, interpretation of this study is limited by the use of "overall satisfaction." Although satisfaction is relatively new to the health care outcome measurement arena, it is already very clear that satisfaction is a multi-dimensional construct.(32–35) It is likely that overall satisfaction questions measure many dimensions of care such as the patient-provider interaction.(32) We focused on "satisfaction with progress you have made with your pain problem" in order to avoid measuring satisfaction with care received. The follow-up survey contained 3 satisfaction questions regarding: 1) progress with your pain problem; 2) care received in the FRP; and 3) living the rest of your life with your current symptoms. Scores for questions 1 and 3 were highly correlated, and combined responses to questions 1 and 3 were highly consistent with responses to question 1 alone, so question 3 responses were eliminated in our final analysis.

In this study final pain, physical function and GAS together explained 43.5% of the variance in satisfaction with progress. The unique contribution of goal achievement was approximately twice that of either pain or function, indicating that goal achievement adds information beyond the more traditional measures of outcome and deserves further study.

Limitations and Future Research

Although many of the components of our follow-up survey have been studied, the entire survey has not been validated in its current form. Future work will include refinement and validation. We are particularly interested in comparing the impact on satisfaction from symptom vs. functional goal achievement.

This study design did not allow assessment of changes of goal content or importance over time. Future research will provide for on-going monitoring of these changes.

As illustrated in Figure 1, a little more than half of the variance in patient satisfaction remains unexplained even after combining the traditional measures and the GAS. From our

discussions with hundreds of CDS patients in the FRP, it is clear that they vary widely in prioritizing symptom and functional outcomes. Clarifying pre-treatment goals in both symptom and functional domains and assessing goal achievement outcomes accordingly may provide a new model for guiding treatment choices and assessing patient-centered outcomes. This approach would give patients and their health care providers a powerful tool in finding the “right treatment for the right patient” and assessing how well the treatment really worked *for that patient*. For example, a patient who rates pain relief as very important and functional goal achievement as not important may be more satisfied with treatment aimed at pain relief (medication, modalities, etc.). A patient who values functional recovery over pain relief may be more satisfied with outcomes from intensive rehabilitation.

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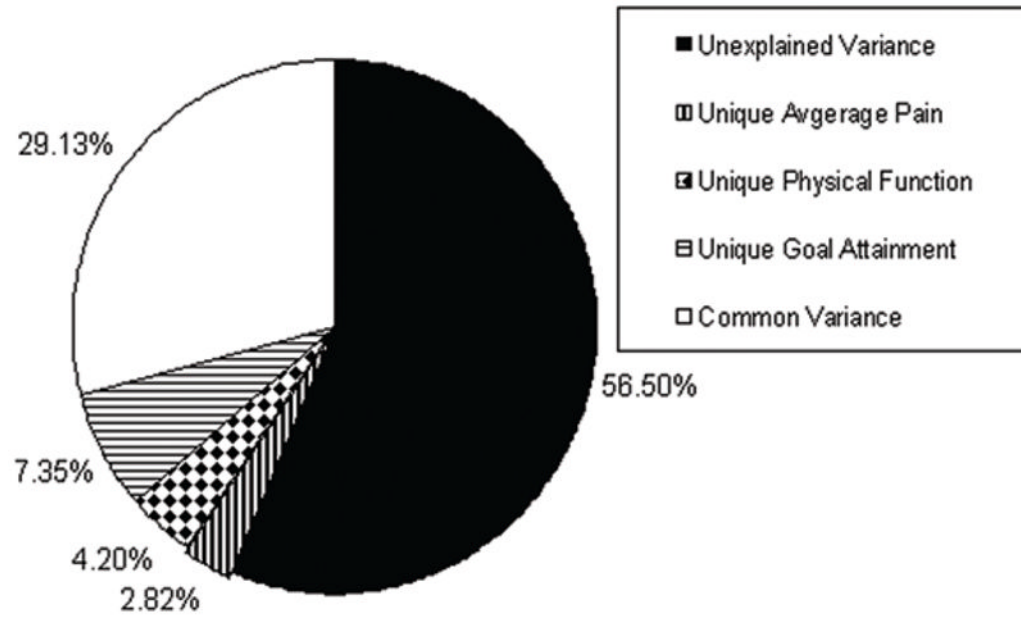


Figure 1. Variance explained in 1-year satisfaction by Average Pain, Physical Function, and GAS at 1 year (n=86).

Table 1

Patient demographics and pre/post FRP changes in clinical measures.

Variable/Statistic	Responders		Non-Responders		p <
	N	Statistic	N	Statistic	
Age: mean (sd)	89	42.2 (9.15)	17	37.3 (8.64)	0.048
Gender: Females %	89	49.40%	17	47.10%	0.86
Program Change in:					
Pain mean (sd)	88	0.50 (2.46)	17	0.96 (3.17)	0.51
BP mean (sd)	88	4.27(6.81)	17	4.69(7.06)	0.82
ROM mean (sd)	79	26.8(17.7)	16	26.2(22.9)	0.91
PILE mean (sd)	88	30.3(16.0)	17	34.1(19.0)	0.40
MET mean (sd)	88	2.31(2.43)	17	3.18(2.48)	0.19
ODI mean (sd)	88	12.7(11.4)	17	12.7(14.6)	0.99
FABQ mean (sd)	88	9.95(12.5)	17	11.35(8.77)	0.67

All program change scores were scaled so that positive values indicated improvement

Table 2

Personal and Health Demographics for the 1-Year Post FRP Cohort

Variable	Levels	N	Pct	χ^2	df	p <
Age Groups	18-35	18	20.9	31.14	2	.0001
	36-50	53	61.6			
	51-62	15	17.4			
Gender	Female	43	50.0	0	1	-
	Male	43	50.0			
Surgery Following FRP	No	76	89.4	52.8	1	.0001
	Yes 1	6	7.1			
	Yes 2	2	2.4			
	Yes 3	1	1.2			
	Missing*	1				
Medical Visits since FRP	No	24	27.9	12.37	4	.015
	Yes (1-5)	26	30.2			
	Yes (6-10)	12	13.9			
	Yes (11-20)	10	11.6			
	Yes (21+)	14	16.3			
New Health Problems since FRP	Yes	20	23.8	23.05	1	.0001
	No	64	76.2			
	Missing*	2				

* missing not including in the computation of the chi-square statistic reported

Table 3

Work and Compensation Variables for the FRP Cohort

Variable	Levels	N	Pct	χ^2	df	p <
Work Status**	Not Working	35	40.7	2.98	1	.085
	Disabled	11	12.8			
	Retired	5	5.8			
	Student	1	1.2			
	Not Looking	5	5.8			
	Looking for	13	15.1			
	Full time	3	3.5			
	Part time	1	1.2			
	Anything	9	10.5			
	Working	51	59.3			
	Part Time	13	15.1			
	Severity Modified	1	1.2			
	Moderately Modified	5	5.8			
	Slightly Modified	4	4.7			
Worker's Compensation Status***	Full duty	3	3.5	3.28	1	.07
	Full Time	38	44.2			
	Moderately Modified	2	2.3			
	Slightly Modified	9	10.5			
	Full Duty	27	31.4			
	Eligible	31	39.7			
Social Security Disability***	Received	25	32.1	4.38	1	.037
	Awaiting result	6	7.7			
	Denied	0	0.0			
	Not Eligible	47	60.3			
	Missing*	8				

Variable	Levels	N	Pct	χ^2	df	p <
	Received	14	18.9			
	Awaiting result	4	5.4			
	Plan to apply	2	2.7			
	Denied	8	10.8			
	Not Eligible	46	62.2			
	Missing*	12				

* Missing responds are not included in the computation of the chi-square statistic reported

** For this variable, the Chi-square test is comparing Working vs. Non-working only

*** For these variables, the Chi-square test is comparing Eligible vs. Not Eligible

Table 4
 Satisfaction, Average Pain, Physical Function and Goal Achievements at least 1 year after completing the FRP

Variable	Scale and Interpretation	N	Mean	SD	Min	Max
Satisfaction	(1–6) Higher Values Greater Satisfaction	86	4.1	1.72	1	6
Average Pain	(0–12) Higher Values Greater Pain	86	5.5	2.50	0	11
Physical Function (PF)	Standardized to Mean 50 and SD 10, Higher Values Greater Function	86	42.2	12.03	14.9	57.0
Goal Attainment: Work	(0–100) Higher Values Greater Attainment	84	58.0	36.73	0	100
Goal Attainment: Recreation		77	54.9	33.00	0	100
Goal Attainment Home		72	67.3	29.41	0	100
Goal Attainment: Composite		86	59.7	28.41	0	100

Table 5

Intercorrelations and variance explained (R^2) for Satisfaction, and Patient's reported Average pain, Physical function and Goal Achievement at least 1 year after completing the FRP

	Satisfaction N = 86	Avg. Pain N = 86	PF N = 86	Goal Achievement			
				Work N = 84	Recreation N = 77	Home N = 72	Composite N = 86
Satisfaction	1.00	-0.530	0.547	0.364	0.509	0.554	0.542
Average Pain	0.281	1.00	-0.607	-0.432	-0.411	-0.408	-0.460
PF	0.299		1.00	0.279	0.512	0.525	0.406
GA: Work	0.132			1.00	0.552	0.372	0.824
GA: Recreation	0.259				1.00	0.690	0.885
GA: Home	0.307					1.00	0.807
GA: Composite	0.293	0.299	0.132	0.259	0.307	0.294	1.00

Pearson Correlations between variables are above the diagonal.

All correlations in the table were statistically significant at $p < .05$

Bolded scores in the Satisfaction column are the simple regression R^2 values