Influence of goal attainment scaling on cognitive behavioral based physical therapy outcomes after lumbar spine surgery

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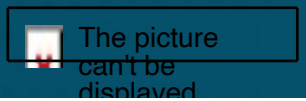
FDA Device/Drug Status:
This abstract does not discuss or include any applicable devices or drugs.



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Background

- Patient-centered goal setting is considered an important component of behavioral interventions for chronic pain
  - Encourages patient to become active participant in recovery process
  - Utilizes S-M-A-R-T framework
  - Considers patient's confidence in attaining goals
- Goal achievement can be measured using goal attainment scaling
- Limited data exist on the relationship between goal attainment and spine surgery outcomes

Changing Behavior through Physical Therapy (CBPT)

- Telephone-based program delivered by a physical therapist
- Utilizes cognitive behavioral strategies including *patient-centered goal setting* for improving postoperative spine surgery outcomes

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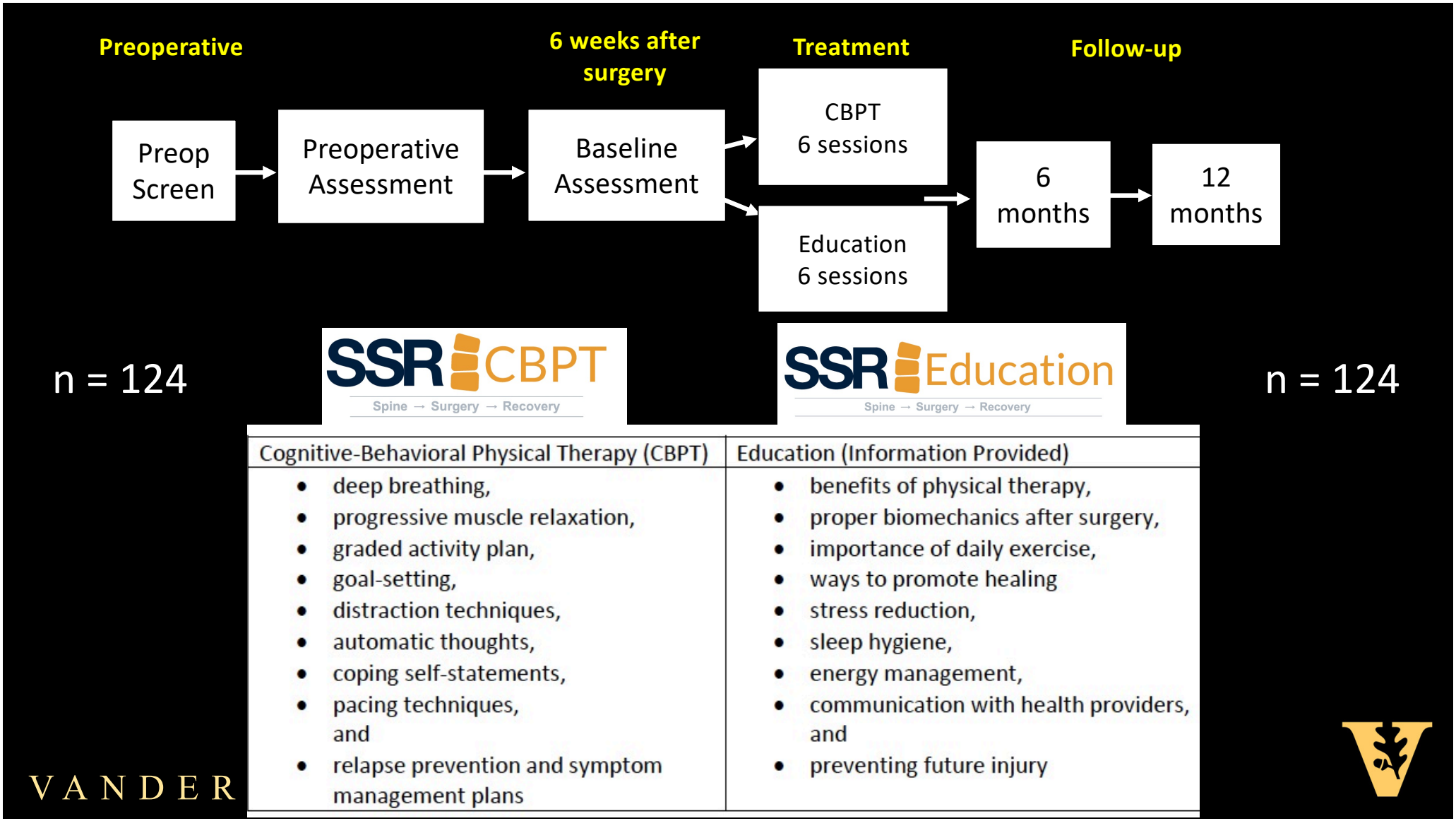
Preoperative
6 weeks after surgery
Treatment
Follow-up
Preop Screen
Preoperative Assessment
Baseline Assessment
CBPT 6 sessions
Education 6 sessions
6 months
12 months
n = 124
SSR CBPT
Spine → Surgery → Recovery
SSR Education
Spine → Surgery → Recovery
n = 124
Cognitive-Behavioral Physical Therapy (CBPT)
deep breathing,
progressive muscle relaxation,
graded activity plan,
goal-setting,
distraction techniques,
automatic thoughts,
coping self-statements,
pacing techniques, and
relapse prevention and symptom management plans
Education (Information Provided)
benefits of physical therapy,
proper biomechanics after surgery,
importance of daily exercise,
ways to promote healing
stress reduction,
sleep hygiene,
energy management,
communication with health providers, and
preventing future injury
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Objective and Rationale

- *Objective: to examine the relationship between goal attainment during CBPT and 6 and 12-month physical function and pain after spine surgery*
- In intent-to-treat analyses, there were small and non-significant group differences at 6 and 12 months
- Evidence suggested that patients who completed CBPT had better outcomes than controls

Study Design

- Secondary analysis of prospective data from a multisite randomized trials
- Subset of data from trial -> 112 participants receiving a CBPT intervention who attended 2 or more sessions and had goal attainment data
- Outcome data from 6 weeks (baseline), 6 and 12 months after spine surgery

Participants

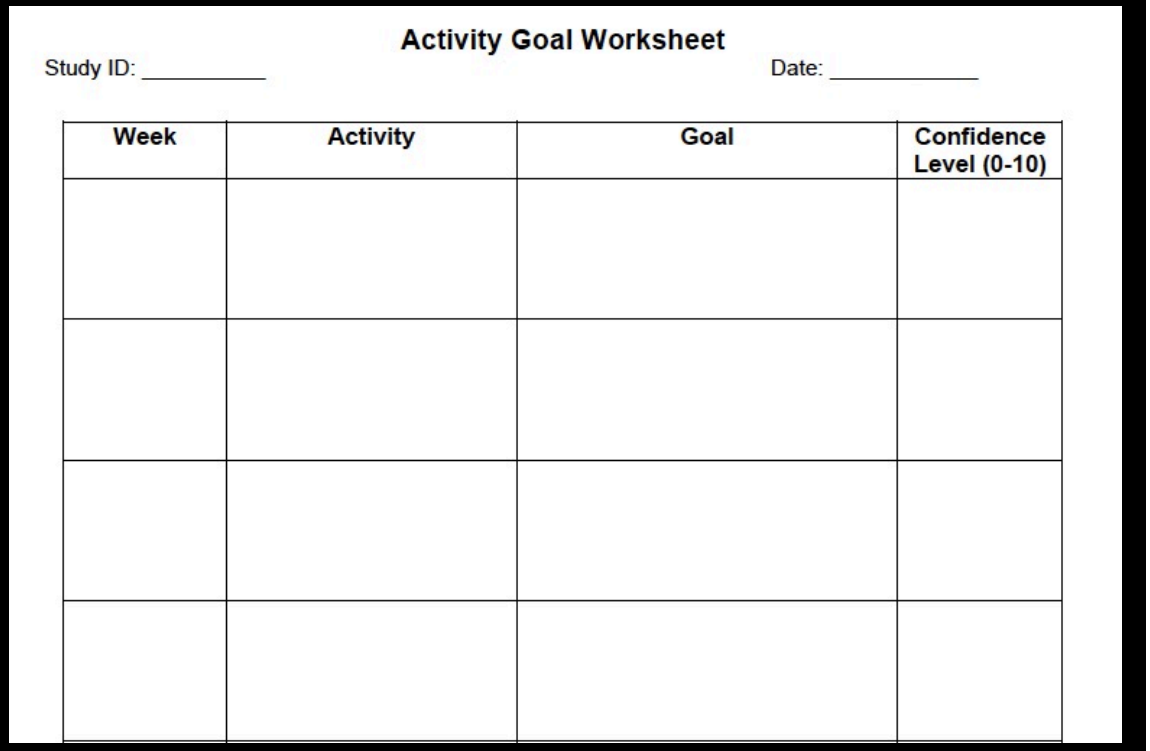
Inclusion Criteria

- English speaking adults (age > 21 years)
- Lumbar degenerative condition including spinal stenosis, spondylosis with or without myelopathy, degenerative spondylolisthesis
- Surgical treatment: laminectomy with or without fusion

Exclusions: Microsurgical techniques; surgery for spinal deformity, trauma, tumor, infection

Goal Attainment Scaling

- Patients set specific activity goals at each session for the coming week
- Progress from least -> more difficult
- *On a scale of 0 to 10, where 0 is not confident at all and 10 is completely confident, how confident are you that you can _____?*
  - Scores < 8 – modify goal



Activity Goal Worksheet

Study ID: _____ Date: _____

Week	Activity	Goal	Confidence Level (0-10)

Goal Attainment Scaling

- CBPT therapist rated whether patients met prior week's goals as expected, more than expected, or less than expected
- Goal attainment scores were obtained for each goal set throughout CBPT intervention

Goal Attainment Scale

-2 (Much less than expected)	-1 (Somewhat less than expected)	0 (as expected)	+1 (Somewhat more than expected)	+2 (Much more than expected)

Goal	Week	Score

Goal Attainment Scaling

- Goal Categories

Goal Category	Examples
Activities of daily living	Cleaning, cooking, vacuuming, hygiene
CBPT strategy	Deep breathing, present-mindedness, imagery
Exercise	Physical therapy, home exercises
Healing	Ice/heat, attend MD appointment or message MD
Lifestyle	Back to school, look for job, shopping, pay bills
Physical/recreational activity	Walking, gardening, outdoor activity, stair climbing
Social	Attend church, Eat out at restaurant, family reunion

Each patient goal set at each session was coded by a single evaluator

Goal Attainment Scaling

- A goal attainment scaling t-score was computed for each participant based on meeting individual goals

$$\text{Overall GAS} = 50 + \frac{10\Sigma(W_i X_i)}{\sqrt{(0.7\Sigma W_i^2 + 0.3(\Sigma W_i^2))}}$$

- Participants with t-scores > 50 (goals met as expected) were grouped as high goal attainment

Kiresuk et al. 1994; Turner-Stokes 2009

Outcomes

- Physical function (PROMIS)
- Pain interference (PROMIS)
- Back and leg pain intensity (Brief Pain Inventory)

Outcomes measured at 6 weeks (baseline), 6 and 12 months after surgery

Data Analysis

- Mixed effects regression
  - Main effect for time (Baseline, 6 months, 12 months)
  - Main effect for group (High vs. Low goal attainment)
  - Interaction of group and time
- Significant interactions examined with linear regression

Goals

- 1395 total goals were set across all CBPT sessions
- Median goals per session = 3 (range: 1 to 6)

Goal Category	Number (Percent) of Total Goals
Physical/recreational activity	504 (36%)
CBPT strategy	390 (28%)
Exercise	157 (11%)
Activities of daily living	156 (11%)
Lifestyle	107 (8%)
Social	50 (4%)
Healing	31 (2%)

Goal Attainment Groups

Characteristic	High Goal Attainment (n = 48)	Low Goal Attainment (n = 64)
Age, mean ± SD in years	64.0 ± 10.1	62.8 ± 12.0
Sex, N (%) females	20 (42%)	37 (58%)
Race, N (%) White	42 (88%)	54 (84%)
Education, N (%) some college or more	40 (83%)	46 (72%)
BMI, mean ± SD kg/cm2	31.2 ± 5.2	32.9 ± 6.6
Pain duration, mean ± SD in months	52.6 ± 116.0	44.9 ± 57.7
Fusion status, N (%) yes	30 (63%)	37 (58%)

Goal Attainment and Outcome

	Physical Function			Pain Interference			Back Pain Intensity			Leg Pain Intensity		
Variable	**β**	**95% CI**	**p**	**β**	**95% CI**	**p**	**β**	**95% CI**	**p**	**β**	**95% CI**	**p**
Fixed Effects												
Group												
High goal attainment	0.6	-2.4 to 3.7	0.68	-2.9	-6.6 to 0.8	0.12	-0.7	-1.6 to 0.2	0.13	-0.9	-1.9 to -0.03	*<0.05*
Time												
6 months	2.6	0.8 to 4.5	*<0.05*	-3.4	-5.5 to -1.3	*<0.05*	-0.3	-0.8 to 0.2	0.26	-0.1	-0.7 to 0.6	0.89
12 months	3.4	1.6 to 5.3	*<0.05*	-4.0	-6.0 to -1.9	*<0.05*	-0.1	-0.6 to 0.5	0.83	0.2	-0.5 to 0.8	0.64
Group*Time												
High goal attainment*6 months	3.7	1.0 to 6.5	*<0.05*	-0.3	-3.5 to 2.9	0.85	-0.2	-1.0 to 0.7	0.72	0.1	-0.9to 1.1	0.85
High goal attainment*12 months	2.8	0.02 to 5.6	*<0.05*	-0.5	-3.7 to 2.7	0.76	-0.5	-1.3 to 0.4	0.28	0.04	-0.9 to 1.0	0.94
Random Effects												
Residual variance (SD)	26.6 (5.2)			34.2 (5.9)			2.3 (1.5)			3.2 (1.8)		
ICC	0.6			0.6			0.6			0.5		

Abbreviations: CI = confidence interval, ICC = intraclass correlation coefficient, SD = standard deviation

In post-hoc regression accounting for baseline score, high goal attainment participants reported higher physical function at 6 months (4.2 points) and 12 months (3.3 points).

Summary

- Patient-centered goal setting is an important component of CBPT after spine surgery
  - Patients set a range of goals with most relating to physical activity, CBPT strategies, exercise, and activities of daily living
  - Patients meeting high goal attainment in CBPT had higher physical function at 6 and 12 months at 12 months

Limitations

- Goal coding strategy was developed for this study and performed by a single evaluator
- Did not explore relationship of goal categories, goal profiles (e.g., patterns of goals set), goal attainment, and outcomes
- Regression models limited in accounting for covariates

Clinical Implications

- Patient-centered goal setting and goal attainment scaling can be used to tailor interventions for improving physical function in patients with chronic pain

- Clinicians working with postoperative spine patients should consider the potential importance of these processes for optimizing recovery

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Thank You

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