

Writing SMART rehabilitation goals and achieving goal attainment scaling: a practical guide

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Objective: To describe a practical method of setting personalized but specific goals in rehabilitation that also facilitates the use of goal attainment scaling.

Background: Rehabilitation is a complex intervention requiring coordinated actions by a team, a process that depends upon setting interdisciplinary goals that are specific, clear and personal to the patient. Goal setting can take much time and still be vague. A practical and standardized method is needed for being specific.

Method: A novel approach to writing specific, measurable, achievable, realistic/relevant and timed (SMART) goals is developed here. Each goal can be built up by using up to four parts: the target activity, the support needed, quantification of performance and the time period to achieve the desired state. This method can be employed as part of goal attainment scaling and the other levels can be easily and quickly formulated by adding, deleting and/or changing one or more of the (sub)parts.

Discussion: The success of goal setting and goal attainment scaling depends on the formulation of the goals. The method described here is a useful tool to standardize the writing of goals in rehabilitation. It saves time and simplifies the construction of goals that are sufficiently specific to be measurable.

Introduction

Many patients attending rehabilitation services have multifactorial, complex problems that often require several or many different interventions to be given by different people, frequently in a specific sequence. Rehabilitation is the archetypical 'complex intervention', comprising a multitude of complicated activities and actions. It is a problem-solving process delivered by a multiprofessional

team where standard, single-treatment packages are rarely, if ever, appropriate.¹ In this context a goal-planning process should be used to ensure that all the people involved, especially the patient, agree on the goals of rehabilitation, on the methods to be used to achieve these goals, and on each person's role in this process.²

It is also well recognized that goal setting is an effective way of achieving behavioural change in people.^{3,4} Some of the characteristics of goals that effectively alter behaviour are that the goals: should be relevant to the person concerned, should be challenging but realistic and achievable, and should be specific (in order to measure them).⁵

There is some evidence concerning the benefits of

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goal setting in rehabilitation, particularly around the use of goal attainment scaling as an outcome measure.⁶

Thus goal setting is an essential part, and indeed the central part of the interdisciplinary rehabilitation process.

Nonetheless, there is relatively little research on the best way of setting goals in rehabilitation and many questions on the best method still remain. For example, does the patient (and family) need to be present at the goal setting meeting, or is it sufficient to establish their wishes and expectations beforehand and to check afterwards that the goals set are acceptable? What is an appropriate number of goals? What is an appropriate time frame?

One particular question is 'how should one write (specify) a goal?'. It is generally agreed that a good goal is specific, measurable, achievable, realistic/relevant and timed (SMART)⁷ but defining the characteristics of a SMART goal is less easy. Moreover writing SMART goals in rehabilitation is often perceived as time-consuming and difficult.

Well-defined goals are particularly needed for goal attainment scaling which is sometimes used in rehabilitation as way of measuring success. Goal attainment scaling is a method for evaluating the attainment of goals. Originally goal attainment scaling was developed simply as an outcome measure but the process may also be in itself a therapeutic intervention and a useful tool in case management.⁸

Goal attainment scaling is particularly dependent on defining goals that are measurable,⁷ which is not always easy because each goal requires several different levels to be defined. Yip and colleagues⁸ developed standardized goal attainment scaling menus to address the difficulties associated with writing multiple goals. However, these menus may be at the cost of some of the advantages of goal attainment scaling, such as its client centred and individual approach.

Locally the rehabilitation service has developed and undertaken goal planning for many years but there has been a long-standing unease within the local service about the lack of specificity in some goals set. A current randomized trial of a rehabilitation intervention (motor imagery) needed to use individualized specific goals as an outcome measure. Finally, and at the same time, the clinical

service is increasingly expected to show that treatments are having the desired effect.

Thus the researcher (TB) and the clinical service (RB) set out to achieve a process that sets goals that:

- are individualized to a particular patient;
- can be written without too much effort, time or specific training;
- allow accurate, unambiguous determination of goal achievement;
- are flexible enough to cover most situations.

This novel method for writing SMART goals can be used as a method simply to write better goals, but it can be expanded to allow the goal attainment scaling method to be used at little extra cost.

Background assumptions

This article is based on four assumptions. First, it will consider rehabilitation as taking place within the pre-eminent (biopsychosocial) model of illness used in rehabilitation, namely an expanded version of the World Health Organization's International Classification of Functioning, Disability and Health (ICF) model.⁹

Consequently, it then assumes that rehabilitation goals will usually be set around observed behaviours at the WHO ICF levels of activities and participation. This does not deny the importance of other goals concerning the patient's personal experiences or the patient's context (personal, physical or social). Indeed it should be possible to use or adapt this method for goals in those realms. However, the method described here focuses on activities because they are most easily defined, and they probably are of most concern both to the patient and to those who pay for health care.

Third, the description assumes that preliminary work with the patient (and relevant other parties) has already established necessary background information: the patient's wishes and expectations, and all the additional information needed. Goals must always be set in realms that are of interest to the patient. Additionally it may be important to investigate the wishes and expectations of other

parties such as family members, friends and work colleagues, whoever is paying for the service, and (occasionally) team members. It is also important to know sufficient other information to ensure that the goal is potentially achievable, and to identify the actions needed to achieve the goal. In other words, this method is only a part of the complete goal-setting process.

Thus, finally, this method assumes that the team will only set goals that are attainable and realistic for the patient to achieve.

Goal attainment scaling – introduction

Goal attainment scaling is the term used to describe a simple method of scoring (quantifying) the achievement of goals. Rather than simply stating that a goal has or has not been achieved, attainment scaling recognizes that sometimes achievement exceeds expectation, whereas at other times achievement is less than expected but nonetheless there is some progress towards the goal, and (rarely) there may be no progress towards goals set, or even deterioration.

Goal attainment scaling is a structured approach to recording goal achievement and was first introduced in the 1960s by Kiresuk and Sherman¹⁰ within a mental health service. The approach is based on predicting the expected goal to be achieved, accompanied by two states above the expected outcome and two states below, one of which is usually (but not inevitably) the current (or ‘baseline’) state.

The process of goal attainment scaling was chosen by us because it is already reasonably well researched with evidence that it is at least as sensitive as a measure of change as other standardized scales,⁶ and moreover it may in itself improve outcome. Furthermore the scoring system can be adapted to take into account variables such as the difficulty of achieving a goal and the patient’s priority, and the scoring system can encompass more than one goal but still give a single outcome value.

It is not necessarily easy to write a goal specifically, but the additional challenge when using goal attainment scaling in particular is to write a series of five well-defined potential states for each goal, and to do so quickly and easily.

The process of goal attainment scaling includes five steps¹¹ and our method will focus on steps 1–3, illustrated in Figure 1. It must be emphasized again that before starting step 1 it is essential to know what the patient’s wishes and expectations and goals are and to know enough about the patient’s situation (disease, impairments, context, etc.) to allow the team to set valued and achievable goals.

Step 1: Defining the expected goals

The key innovation described in this article is a structured approach to specifying a goal, and this is the important first step in goal attainment scaling. Even if goal attainment scaling is not used, this method allows one to write a SMART goal. The method involves ‘building up’ an expected goal using four parts:

- specifying the target activity (a behaviour);
- specifying the support needed;
- quantifying the performance; and
- specifying the time period to achieve the desired state.

Part I. Specify the target activity

Rehabilitation is, ultimately, concerned with altering behaviour whether that behaviour is (a) observed activities or participation in social activities, such as dressing or working, (b) the reporting by a person of their internal experiences (such as pain), or (c) the report of a person about their interpretation of activities and experiences (such as their own assessment of quality of life, or satisfaction, or social role performance).

In the context of setting specific and measurable goals it is easiest to focus upon target behaviours concerned with activity and participation. Common examples include mobility and the many activities of daily living (personal, domestic, community, vocational, etc.). The method described here can extend to the reporting of experience and perception, but this article will not consider these aspects in any detail; there is some discussion later.

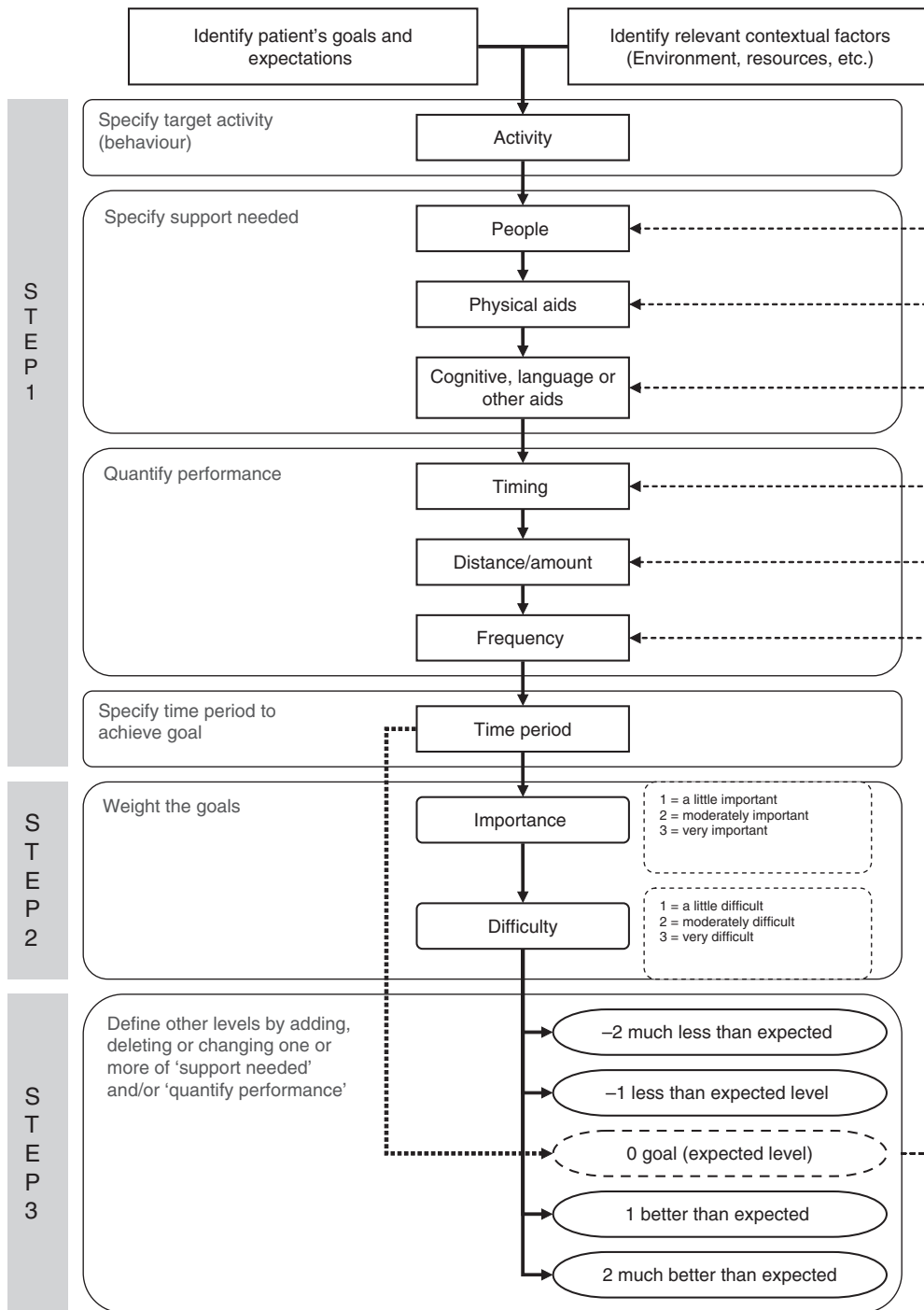


Figure 1 Flowchart for writing goals in goal attainment scaling.

This first part has the largest number of possibilities and identifies the functional purpose of the goal.

The behaviour should be specified as clearly and explicitly as possible: 'walking indoors' rather than 'mobilizing', and 'cooking a three-course meal' rather than 'preparing food'. Phrases such as 'using left hand in functional tasks' are too vague and need more detail such as 'brushing teeth using left hand'.

In rehabilitation some activities are commonly targeted, and one might use a list such as the Rehabilitation Activities Profile¹² or the ICF core sets for stroke¹³ as a checklist both to ensure that all relevant activities have been considered when setting goals and to standardize the behavioural descriptions used, to an extent.

Part II. Specify specific support

Behaviour is a (goal-directed) interaction with the environment, whether objects or other people. In rehabilitation it is often necessary to modify or provide additional environmental factors for the behaviour to succeed. There are several environmental supports to consider, and thus this part is divided into three subparts.

The first subpart concerns support given by people in the environment:

- hands-on, practical or physical assistance (such as assisting in a transfer, cutting food, doing up shoe laces); or
- emotional and stand-by support to increase self-confidence; or
- cognitive, structural support such as prompting and reminding.

The second subpart concerns specific objects in the environment – extra aids, or particular adaptations to objects – that need to be present. It covers the field of physical equipment, for example:

- specific items that can be moved around (such as a walking stick, wheelchair, or hoist); or
- adaptation to personal items (such as clothing or cutlery); or
- an adapted fixed environment (such as a ramp, or a stair rail).

The third subpart of support concerns the way that items in the environment can be set up to provide informational support encoded or present within the environment; it is the *meaning* or *involuntary consequence* associated with the object that is important. Examples include lists to prompt the person to sequence actions, sign posting for orientation, and barriers that remind the person not to go somewhere.

Part III. Quantify performance

Activities can be described both qualitatively, using judgement, and quantitatively in terms of some measurable aspect of the behaviour. The patient's perception of quality (and, to a lesser extent, the judgement of other people) is of importance but it is not easily standardized. Thus qualitative descriptions have been left out in this method although an assessment of quality could be used as an option if quantification is not possible.

Performance can be quantified in three ways:

- by the time taken to achieve a set quantity of the activity, and/or
- by the quantity of a continuous activity performed (e.g. distance) in a set time, and/or
- by the quantity of a discrete activity occurring in a period of time (e.g. its frequency).

Any activity that has a reasonably clear start and finish can be timed, and timing allows a reasonably accurate and sensitive (to change) method of quantification that, incidentally, will often also be associated with the quality of performance. Timing should be widely used. Examples include time to walk to the post office, time taken to get up and dressed, and time to complete a shopping trip successfully. Generally (but not inevitably) time will be shortened as performance improves.

Distance or amount is commonly used to quantify activities, for example the distance walked in 2 minutes, or the number of words typed in 5 minutes. It could also be the distance walked before being stopped by pain, or the amount of time elapsing before fatigue supervenes.

Any activity that occurs repeatedly can also be counted. If the activity is a desired activity then an

increase will usually be specified (e.g. number of letters filed successfully) but counting can also apply to unwanted activities (such as falling, swearing, forgetting, needing prompts or dropping objects) when a decrease will usually be the desired change.

Part IV. Specify time period to achieve the desired state

The last step is to specify the time period over which (or date when) the target state is to be achieved. In practice many services review progress at set intervals varying from weekly, through every 4–6 weeks, up to every 3–6 months. This time will vary depending on the rehabilitation setting (post-acute or longer term) and the goal set (most commonly short- or medium-term goals).

It is important to remember that rehabilitation concerns changing behaviours, which depends upon learning by the person or people concerned. Behavioural change takes time. Consequently, in complex cases it is rarely appropriate to set a review point at less than four weeks away. Moreover, the process described here is probably too 'expensive' in terms of staff time to warrant its use for shorter term goals. The principles may be used by individual therapists, but setting complex multiprofessional team goals simply for one or two weeks may best be done less formally.

Step 2: Weighting the goal

Traditionally in goal attainment scaling, each goal is weighted for importance and difficulty. However, it is possible not to score importance and difficulty and simply assign a weight of 1 to the goal. If wanted, each goal can be weighted for importance and/or difficulty. The importance is determined by the patient, and the difficulty by the clinician. Both importance and difficulty are ranked on a 3-point scale, ranging from 1 (a little importance/difficult) to 3 (very important/difficult). If weighting is used, it needs to be used consistently and uniformly for all goals and in all patients if any comparison is being undertaken.

Step 3: Scaling the goal

In the goal attainment scaling process, once the initial goal has been set in terms of the performance level expected at a specified time (which is defined as the level scoring '0'), four more performance levels need to be specified: two that are better than and two that are worse than the goal.

The particular advantage of the structured approach to defining a goal outlined above (step 1) is that it allows easy definition of better than expected and worse than expected states. These states are achieved by adding, deleting and/or varying one or more of the parts or subparts from step 1.

Thus, states that indicate exceeding the goal will involve one or more of:

- succeeding with less support from people;
- succeeding with a less supportive physical environment;
- succeeding with a less supportive 'cognitive' environment;
- being faster (usually);
- an increase in quantity (e.g. distance); and/or
- doing the activity more or less frequently.

States that indicate underachievement will be the reverse.

The goal that was set in step 1 is level '0'; it is the level that the team believes can be achieved by the specified time. Two states that reflect a better outcome than expected (+1, +2) and two states that reflect a worse outcome than expected (−1, −2) need to be specified. Level −1 is somewhat less than the expected level and level −2 is much less than the expected level. Levels +1 and +2 are when the patient performs somewhat better than expected and much better than expected, respectively.

It is possible for one of these levels to be the current level of performance (see discussion later), but it will still need accurate specification using this system.

Step 4: Evaluating goal achievement

At the appointed review date the level achieved is determined by the patient and the team.

Step 5: Scoring goal achievement

The score is calculated by applying the formula^{14, 15}:

$$GAS = 50 + \frac{10\sum(W_i X_i)}{\sqrt{((1 - \rho)\sum W_i^2 + \rho(\sum W_i^2))}}$$

where W_i is the weight (importance \times difficulty) assigned to the i -th goal; X_i is the numerical value achieved for the i -th goal; and ρ is the expected correlation of the goal scales (normally 0.3).

Calculating the score is discussed in more detail elsewhere.¹¹

Example 1. An illustration employing steps 1–3

Mr R, 73 years old, had a stroke two months ago. He used to live independently in an apartment with an adapted shower. The stroke has left him with slightly reduced balance and some apraxia. He has expressed the desire to be able to wash himself in the shower on his own. It is anticipated that at the time of discharge Mr R will need a small care package to provide some help at home. The interdisciplinary team will need to write a SMART goal for Mr R to work towards washing himself in the shower on his own.

Step 1: Defining the goal

By selecting possibilities from each (sub)-part a SMART goal is created. The occupational therapist suggests that Mr R needs verbal prompting (support by people) to perform this activity and would be safe doing this if he had a long-handled sponge (support by objects). The psychologist suggests using a checklist (cognitive, structural, communication support) to increase his independence. He should be able to do it within 15 minutes (quantifying by timing) on a daily basis (quantifying by frequency) within four weeks (time period to achieve state). So the result is the SMART goal: To wash in the shower with verbal prompting using a long-handled sponge in 15 minutes on a daily basis using a checklist within four weeks.

This goal is clear for Mr R as well as for the interdisciplinary team. The psychologist will have to teach him the strategy of checklists. The occupational therapist will have to practise the activity

with Mr R and will have to supply the long-handled sponge. The physiotherapist will have to practise activity-related balance and the nursing staff will have to implement the techniques in his daily routine.

Step 2: Weighting the goals

A weight for importance and difficulty is assigned to the goal. For Mr R the goal is very important (score 3) and it is moderately difficult (score 2). The weight for this goal is importance \times difficulty; $3 \times 2 = 6$.

Step 3: Defining other levels

The goal is: To wash in the shower with verbal prompting using a long-handled sponge in 15 minutes on a daily basis using a checklist within four weeks (level 0). The other levels are defined by adding, removing or changing one or more of the (sub)-part (from II and III) that are specific for Mr R.

- Level –1 is the current level: To wash in the shower with physical assistance of one person on a shower chair within four weeks.
- Level –2 is less than current: To wash in the shower with physical assistance of one person on a shower wheelchair within four weeks.
- Level 1 is somewhat better than expected: To wash in the shower with a long-handled sponge in 15 minutes on a daily basis within four weeks.
- Level 2 is much better than expected: To independently wash in the shower in 15 minutes on a daily basis within four weeks.

Practical application – some points

We have learned four lessons from our experience with goal setting in rehabilitation in general and with the method described here:

- *Getting the team to work together as a team.* When setting goals, aim for them to be interdisciplinary (i.e. to require collaborative

working by two or more team members). Interdisciplinary rehabilitation is effective,¹⁶ and creating interdisciplinary goals improves the collaboration of the various disciplines and creates clear aims for the patient and the disciplines (see example 2).

- *Making goals relevant and important.* This should follow on from discussions with the patient, but we find it is much more likely if goals are based on activities (or social participation) (see example 2).
- *Scoring goal attainment (a).* When scoring goal attainment (step 4), it is possible that none of the predefined levels precisely represents the patient's level. However, it is our experience that the team can score the appropriate level without significant difficulty. In example 1, the attainment of the patient after four weeks is actually: able to wash in the shower with verbal prompts in 10 minutes on a daily basis using a checklist. This level is not one of the predefined levels. However, it is fairly obvious that the appropriate level is level 0. We suggest that this difference is noted on the score sheet.
- *Scoring goal attainment (b).* When scoring goal attainment (step 4), occasionally the level achieved is in between two predefined levels. We suggest always choosing the lower (less good) level in this case and making a note of the actual level on the score sheet.

Example 2. Illustration of an interdisciplinary goal at the activity level

The physiotherapist has identified weak hip extensor power and poor stability around the hips. An obvious goal for the physiotherapist would be: To bridge with verbal prompting to clear the bed by 10cm and hold for 5 seconds within four weeks. This goal complies reasonably well with the SMART criteria: specific, measurable, achievable, relevant and timed. However, a better goal that would be interdisciplinary, probably more relevant and at the activity level, would be: To pull up the trousers independently, using bridging, within four weeks.

Discussion

We describe a new, structured method for writing goals that are specific and measurable without too much effort. Goal attainment scaling is a technique that is increasingly used in rehabilitation, but its success depends upon formulating unambiguous goals and the method described here is a useful tool to achieve this: it is flexible enough to cover most situations; it is patient-specific; it saves time and effort; and it can easily be taught and used by the whole team. In this article we have focused on the construction of the target goals and levels of achievement (steps 1–3). More detailed information on goal attainment scaling in general is available elsewhere.^{6,10,14,17} Some particular additional points that we have considered are discussed here.

Weighting the importance and difficulty of goals seems intuitively good, and different methods for weighting are available. In the accompanying article by Turner-Stokes¹¹ a 4-point (0–3) weighting scale is suggested. However, this means that items rated '0' score '0'. This may be appropriate in that unimportant goals or goals that can easily be achieved should not be set and should not score at all. However in our view, it is inappropriate to waste time setting goals that are of no importance and/or are very easily achieved. Consequently we have restricted the scale to 1, 2 or 3 (see Figure 1).

Furthermore, the additional value (information content) of weighting goals is unknown, and it is quite possible that it is an unnecessary complication. Whether importance and/or difficulty are scored or whether goals are always assigned a weight of 1, it is vital that a consistent approach is used for all goals given to an individual patient and for all patients where aggregation of data is contemplated. Comparing patients where importance *and* difficulty are scored with patients where only importance is scored or without any weighting at all is completely invalid.

The score attributed to the current state when goals are set is also subject to debate. Some authors set '-2' as the current state, but this approach risks missing a deterioration in the patient's state¹⁵ (i.e. there would be a floor effect). One suggested remedy is to add a further level, '-3,' to indicate deterioration from the

current level (set as '-2').¹⁸ Another suggested remedy is to set the current state as '-1,' but although this allows for deterioration it reduces sensitivity to improvement by removing the option of 'has made some progress, but not as much as expected'.

Our suggestion is to set the current state at the extreme ('-2'), and to score (record) any deterioration as '-3' in the patient's record but to score it as '-2' when scoring, acknowledging that this overestimates their state. Unexpected deterioration is sufficiently rare to make this a minor problem.

Goal setting in general, and goal attainment scaling in particular, has generally been applied when improvement (recovery) is the expected direction of change. However, goals can also be set in situations where deterioration is the expectation (e.g. in motor neurone disease); under these circumstances the goal of treatment is to reduce the extent or consequences of disease progression. The same general approach to scoring should be used here: '+2' would represent an outcome state much better than expected and '-2' a state much worse than expected. As above, it is probably best to set the current state as '+2', with '+3' being used to record (but not score) a completely unexpected improvement. In patients who deteriorate, the level '0' ('expected state') is the state anticipated as a result of the intervention with '-1' and '-2' being worse states.

The approach we have put forward depends upon defining different states at a fixed time. In principle it would be possible to fix a state and to vary the time taken to reach that state as an alternative means of scoring. For example the state might be 'washing up breakfast dishes without being reminded and without breakage' and one could aim to achieve this by six weeks, with achievement by five weeks being level '+1,' four weeks '+2,' and seven weeks '-1' and not achieving it by 10 weeks being '-2'. We are unaware of this method being used for goal attainment scaling, but recording the time to achieve a state (such as recurrence of a cancer) is a common analytic technique.

The method has been described here primarily in relation to activities. These are most easily described. The technique should, however, be applicable to most outcomes, including subjective

state such as pain, mood and quality of life because behavioural correlates usually exist. For example a patient's self-report is in fact a behaviour and, more importantly, these subjective states usually have externally observed behavioural sequelae such as taking symptomatic treatments (e.g. analgesic drugs), reducing or altering other activities (e.g. sleeping less long, not going to work).

Two final points must be emphasized. The method described here has not itself been evaluated against other techniques for defining different outcome states (such as using a predefined menu). However, it is currently being used in clinical practice and as an outcome measure in a randomized controlled trial, and it is proving to be a user friendly, practical and quick tool in both clinical and research practice, without compromising the patient-centred and individualized approach.

Second, in this discussion we have outlined several variations on the theme of scoring the achievement of outcome (concerning weighting, score attributed to the current state, handling unexpected change, etc.). A clinical team or researcher may choose whichever approach seems most appropriate in their circumstances, but it is imperative that only one method is used with all patients to be analysed in a group, and that the exact methods used in any report or analysis are specified.

Clinical messages

- Goals in rehabilitation can be constructed using four parts: the target activity, the support needed, quantification of performance and the time for achievement.
- This method can scale outcome by changing (sub)parts to give five levels.
- The method is easy and quick, patient-specific, and applies to most situations.

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References

- 1 Shiell A, Hawe P, Gold L. Complex interventions or complex systems? Implications for health economic evaluation. *Br Med J (Clin Res Ed)* 2008; **336**: 1281–83.
- 2 Wade DT. Goal planning in stroke rehabilitation: How? *Topics Stroke Rehabil* 1999; **6**: 16–36.
- 3 Locke EA, Bryan JF. The effects of goal-setting, rule-learning, and knowledge of score on performance. *Am J Psychol* 1966; **79**: 451–57.
- 4 Locke EA, Latham GP. Building a practically useful theory of goal setting and task motivation. A 35-year odyssey. *Am Psychol* 2002; **57**: 705–17.
- 5 Schmidt RA, Wrisberg WA. *Motor learning and performance: a situation-based learning approach*, fourth edition. Human Kinetics, 2007.
- 6 Hurn J, Kneebone I, Cropley M. Goal setting as an outcome measure: a systematic review. *Clin Rehabil* 2006; **20**: 756–72.
- 7 Schut HA, Stam HJ. Goals in rehabilitation teamwork. *Disabil Rehabil* 1994; **16**: 223–26.
- 8 Yip AM, Gorman MC, Stadnyk K, Mills WG, MacPherson KM, Rockwood K. A standardized menu for Goal Attainment Scaling in the care of frail elders. *The Gerontologist* 1998; **38**: 735–42.
- 9 World Health Organization. *International classification of functioning, disability and health*. Accessed 23 September 2008, from: www.who.int/classifications/icf/en/
- 10 Kiresuk TJ, Sherman RE. Goal attainment scaling: a general method for evaluating comprehensive community mental health programs. *Community Ment Health J* 1968; **4**: 443–53.
- 11 Turner-Stokes L. Goal attainment scaling (GAS) in rehabilitation: a practical guide. *Clin Rehabil* 2009; **23**: 362–70.
- 12 Jelles F, Van Bennekom CA, Lankhorst GJ, Sibbel CJ, Bouter LM. Inter- and intra-rater agreement of the Rehabilitation Activities Profile. *J Clin Epidemiol* 1995; **48**: 407–16.
- 13 Geyh S, Cieza A, Schouten J, Dickson H, Frommelt P, Omar Z *et al*. ICF core sets for stroke. *J Rehabil Med* 2004; **44**(suppl): 135–41.
- 14 Tennant A. Goal attainment scaling: current methodological challenges. *Disabil Rehabil* 2007; **29**: 1583–88.
- 15 Law LSH, Dai MOS, Siu A. Applicability of goal attainment scaling in the evaluation of gross motor changes in children with cerebral palsy. *Hong Kong Physiother J* 2004; **22**: 22–28.
- 16 How do stroke units improve patient outcomes? A collaborative systematic review of the randomized trials. Stroke Unit Trialists Collaboration. *Stroke* 1997; **28**(11): 2139–44.
- 17 Rockwood K, Howlett S, Stadnyk K, Carver D, Powell C, Stolee P. Responsiveness of goal attainment scaling in a randomized controlled trial of comprehensive geriatric assessment. *J Clin Epidemiol* 2003; **56**: 736–43.
- 18 Steenbeek D, Meester-Delver A, Becher JG, Lankhorst GJ. The effect of botulinum toxin type A treatment of the lower extremity on the level of functional abilities in children with cerebral palsy: evaluation with goal attainment scaling. *Clin Rehabil* 2005; **19**: 274–82.