Graded Activity: Legacy of the Sanatorium

Cynthia Creighton

Key Words: history • tuberculosis

Graded activity is a technique in occupational therapy intervention that has two essential characteristics: (a) tasks are classified by degree of difficulty (Reed & Sanderson, 1980) and (b) patients begin working at a level appropriate for their current abilities and move to other levels as function changes (Trombly, 1989). Depending on the focus of therapy, activities may be graded along a variety of dimensions (e.g., by the amount of muscle strength, problem solving, or social interaction required). By pacing and modifying a task to demand the most of which a patient is capable at each stage of recovery or development, the occupational therapist helps the patient progress toward goals (Pedretti, 1985). It has been argued that activities must be gradable if they are to be used therapeutically (Christiansen & Baum, 1991). Skillful analysis of and modification of task demands “becomes the cornerstone of practice” (Allen, 1985, p. 100).

Although other health professionals use the term graded exercise in specialty fields such as cardiac rehabilitation and sports medicine, occupational therapists have made grading a central principle of treatment in all areas of practice since the early 1900s. In fact, this concept has been basic to the profession for so long that there is no clear record of its origin. I propose that occupational therapists began grading activity to improve function as a result of their contact with a method of treating tuberculosis that became popular in the United States during the early years of the profession’s development.

Exercise in the Tuberculosis Sanatorium

Tuberculosis (TB) was a major killer in 18th and 19th century Europe and America. More people died each year in Britain from TB than from smallpox, scarlet fever, measles, whooping cough, and typhus combined (Swan, 1985). TB was probably the leading cause of adult mortality in the American colonies (Holmberg, 1990), and it continued to be the most common killer in many areas of the country until World War I (Wright, 1988). Although the tubercle bacillus was discovered in 1882, effective chemotherapy to combat it was not developed until 60 years later (Swan, 1985). The traditional treatment prescribed for patients with the disease was rest, fresh air, sunshine, and good nutrition. Wealthy people went to resort hotels or abroad to follow a treatment regimen, but this was not possible for the majority of persons infected.

In 1859, the first special hospital for working class and poor TB patients was established by Herrmann Brehmer at Gärbersdorff, in Germany (Bignall, 1982). The hospital, called a sanatorium, from the Latin word for health, was located in the mountains because Brehmer believed that breathing the thin, dust-free air of high altitudes would arrest the disease process in the lungs (Brehmer, 1887). An important part of Brehmer’s treat-
ment program was exercise to strengthen the cardiorespiratory system. The exercise Brehmer prescribed was *Steigungsverhältnisse* (grades or degrees of slope) (Brehmer, 1887). Brehmer apparently did not progress patients systematically from shorter to longer walks or from gentler to steeper slopes. He stated that because the patient's condition changed from day to day, no general rule could be made about the prescription of exercise. Instead, he trained patients to monitor their own levels of fatigue and to rest as necessary.

By the turn of the century, sanatoria had been built in several countries in Europe and in the eastern United States, and Brehmer was acknowledged as a pioneer in TB treatment (Bignall, 1982). Among the physicians Brehmer influenced was Otto Walther, who developed a strictly regulated exercise program based on walking uphill, at the Nordrach Colony Sanatorium in the Black Forest (“Nordrach Colone,” 1905). Special zigzag paths up to 8 miles long with gradual ascents of about 1,000 ft were cut into the sides of the mountains around the sanatorium. Each patient was examined three times a day, and on the basis of temperature and other symptoms was assigned an appropriate path to walk.

Early in 1905, a correspondent from the British medical journal *Lancet* visited Nordrach Colony and published a favorable report about it. Marcus Paterson, an English physician newly appointed as the superintendent of the Brompton Hospital Sanatorium at Frimley, decided to adapt Walther's concept (which he called *graduated walking*) for the treatment protocol at Frimley (Paterson, 1911). There were no mountains near the Brompton Hospital Sanatorium, and Paterson chose to prescribe manual work, instead of climbing, as exercise. He believed that work would both improve patients' physical condition and make it easier for them to return to their normal occupations after discharge (Paterson, 1911). Paterson developed a 15-week *graduated labour* program that included a preliminary walking phase and six steps or grades of work, with different parameters for men and women. All patients began with walking, building from half a mile each day to 6 miles. When they were able to complete the 6-mile walk without undue fatigue or increased temperature or sputum production, they advanced to the first grade of work, called *small baskets.* Men carried baskets of mulch weighing 10 lb back and forth from the lawns, or weeded and watered gardens, for 2 hr in the morning and 2 hr in the afternoon. A rest in bed was required during the noon hour. Patients in Grade 2 carried 18-lb baskets or watered with larger cans. Grades 3 through 5 incorporated heavier jobs, such as chopping firewood, scrubbing chicken houses, and hauling stones. In Grade 6, the work periods were longer, and the rest at noon was omitted.

At first Paterson had some difficulty involving patients in the innovative program. Most of them had been clerical or shop workers, rather than manual laborers (Bignall, 1977), and he admitted that the patients did not take kindly to the work, it being absolutely contrary to their preconceived views of the kind of treatment suitable to their condition. Some of them imagined for a time that it was not designed for their benefit, but purely for the advantage of the institution, and they regarded it rather as a labor master trying to get so much work out of them than as a medical man who was endeavouring to cure their disease. (Paterson, 1911, p. 13)

By the end of the first 6 months, however, graduated work was accepted at Frimley, and Paterson reported, “patients were feeling so well it became necessary to restrain them from doing too much” (1911, p. 15). He believed that the technique resulted in psychological as well as physical improvement: “To the patient who wishes to regain his health and return home, the grades are definite steps in his recovery which he is slowly but surely mounting ... all trace of gloom and depression vanishes” (1911, p. 59).

Paterson published a book about his graduated labor program in 1911, and the idea was adopted worldwide. Among the American facilities that established programs based on Paterson's principles in the second decade of this century were the Loomis Sanatorium in New York, the Cook County Tuberculosis Hospital in Illinois, and Eudowood Sanatorium in Maryland (McLaren, 1919; Sloan, 1922).

**NSPOT and Graduated Work**

In 1917, when a small group of people interested in the therapeutic use of occupation met in New York to found the National Society for the Promotion of Occupational Therapy (NSPOT), Paterson was elected to honorary membership (NSPOT, 1918). The 40 active members of the new organization included representatives from four sanatoria, including Loomis. George Barton, host of the meeting and first president of NSPOT, had himself been a tuberculosis patient for more than a year, in the Clifton Springs Sanatorium (alternate spellings of the word “sanatorium” were sometimes used in the United States [Barton, 1968]). After his discharge, he had purchased a neglected house and land in Clifton Springs, New York, and renovated them, as an experiment in the application of graded work (Barton, 1919). Barton wrote later that after a year (the author's) schedule resolved itself into ... (1919, pp. 52-53).

NSPOT's earliest members also included at least two health care professionals who had used graded activity with diagnoses other than tuberculosis. One of these was
Susan Tracy, a nurse who published the first occupational therapy textbook in 1910. Although Tracy did not use the terms graduated or graded, she recommended gradually and systematically modifying therapeutic activities as patients progressed. For example, in her discussion about treatment for blindness, she wrote:

In the beginning of any sense training, the element of size is important. Whatever work is placed in the hands of such a patient should be large enough to be free from fussy details. Do not at first set such a patient to stringing small beads or counting small spaces. (1910, p. 140)

About depression, Tracy wrote that “as the patient becomes capable of longer continued attention and occupation, increasingly complicated and finer work and games may be taken up” (1910, p. 161).

Perhaps even more influential among the NSPOT members was physician Herbert Hall. In a paper published in 1905, Hall had argued that rest was an ineffective method of treatment for neurasthenia (depression), and that attempts to use walking or work instead usually failed because the effort required was too extreme and patients quickly became tired and discouraged. He proposed that “The great need seems to be to lift the neurasthenic out of his tangle of nervous symptoms . . . by bringing about a gradual process the conditions of a normal life., a life of pleasant and progressive occupation” (1905, p. 6). Hall did not use the words graduated or graded in this early paper, and his method of progressing the psychiatric patients in his crafts workshop was at first very basic. Patients were simply asked to “do something” for longer periods of time each day (1905, p. 9). By 1910, however, Hall was using the phrase “progressive and graded manual occupation” in his writing (p. 13). In a presentation given at the annual meeting of NSPOT 2 years after its formation, Hall said that his ideas about graded activity had developed over the years, and that he now saw it as “a principle—a principle which I think we shall be able to put into application in almost any branch of occupational therapy” (NSPOT, 1919, p. 45). He went on to describe his own program at Devereux Mansion, which had become much more sophisticated. Hall reported that the crafts in his workshop were classified into three grades, and that patients were progressed from level to level as their attention span, coordination, and quality of work improved—or were sent back to lower levels if they could not succeed. The first grade of work was making a cement pot from a mold; this was a simple operation that produced quick results. The second grade was building toys in a woodshop, which required more sustained effort and skill. Hand weaving was the most advanced grade of activity, because of the physical coordination and concentration required.

World War I and the 1920s

A few months after NSPOT was founded, the United States entered World War I, and occupational therapy was included in new rehabilitation programs for wounded soldiers. The idea of organizing therapeutic activities into classes and graduating patients from level to level fit well with the philosophy of re-education adopted by many of the leaders of the military rehabilitation system (Salmon, 1917). The original use of graded activity to build general endurance and productivity in patients with chronic conditions was modified, however, as practitioners began treating the acute conditions and traumatic injuries of the war years. The development of new techniques for measuring improvement in functions, such as range of motion at a particular joint or strength in an isolated muscle group, also contributed to a growing specificity in graded activity programs during this period in history.

One of the earliest and most sophisticated uses of graded activity in the military was at Walter Reed Army Hospital, Washington, DC. Bird Baldwin, first director of the occupational therapy department there, wrote in 1919 that “our curative shops are now being organized, and graduated on the principle which will enable us ultimately to isolate, classify, repeat and to a limited degree, standardize and control the type of movements involved in the particular occupational and recreational operations” (p. 5). Three years later, a representative of the department reported that

- all shops are equipped with apparatus to meet the needs of type cases, such as adjustable seats, and especially adapted handles and treadles... As the patient works his back to strength, this mechanical help is gradually withdrawn, in proportion to the restoration of function, until he is using tools requiring normal range of motion.... A weekly report of the patient’s gain or loss is made to the head nurse who, in unusual cases, of either gain or loss, makes a report to the ward surgeon. When there is a continued loss... the period of work is lessened, or the character of work changed, with the consent of the ward surgeon. (Green, 1922, p. 172)

Conclusion

By 1921, when NSPOT became the American Occupational Therapy Association (AOTA) and Herbert Hall was elected president, occupational therapists had taken graded activity far beyond its origins in the tuberculosis sanatorium. The papers presented at the organization’s meeting that year included descriptions of cases in which graded activity was used to treat burns, fractures, peripheral nerve injuries, heart disease, industrial injuries, and homebound children (Brush, 1922; Collins, 1922; Goodman, 1922; Green, 1922).

Evelyn Collins’ description of her intervention with a boy who had a progressive muscular disease indicates that activities were graded to build emotional and cognitive, as well as physical skills:

- Everything he attempted to do his hands just dropped, seemed to lose all power whatsoever and the case seemed very baffling. Then one day we found a point of contact in string work and tried that. With the first effort he could make just a tiny chain, single
catch, with his fingers, and it was the most irregular piece of work that could possibly be described. . . . From that we went on, we used a little longer string, and his chain was a little longer; his interest began to waken, his will began to be assuaged. By and by, because of the great pride of his family and much praise and encouragement, we got very successful accomplishment in small things, and we graded him up with longer and longer strings and larger and more difficult work until from just being able to use his fingers very little we find him working with a short pull and then a long pull, and a real grip and holding his attention for an hour instead of a few minutes as at first. (1922, pp. 38-39).

Although in 1921, crafts such as woodworking and weaving were most commonly graded, some practitioners were applying the technique to assembly work, sports, games, and musical activities. And instead of providing a standard regimen of graduated work for all patients, occupational therapists were individualizing graded activity programs, taking into consideration each patient's history, interests, and vocational goals.

When AOTA published a bulletin on the principles of occupational therapy in the mid-1920s, graded activity was officially established as a core concept of the discipline. Principles 7 and 8 (of the list of 15) would not be out of place in an introductory textbook today: "The occupation selected should be within the patient's estimated strength and capability. As the patient's strength and capability increase, the type and extent of occupation should be regulated and graded accordingly" (AOTA, 1925, p. 1). ▲

Acknowledgment
I gratefully acknowledge the work of Iris Hagemauer in translating from the German text.

References
Goodman, H. B. (1922). The industrial case from the accident back to the job. Archives of Occupational Therapy, 1, 193-203.
Green, N. (1922). Occupational therapy for orthopedic cases. Occupational Therapy and Rehabilitation, 1, 269-278.
Sloan, M. F. (1922). Occupational therapy as applied at Eudowood Sanatorium. Archives of Occupational Therapy, 1, 121-129.