

Geriatrics and Rehabilitation Medicine:

Common Interests, Common Goals

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Abstract

Geriatrics and rehabilitation medicine are both fields with roots in antiquity, and they are both objects of renewed interest in modern times. They share a common philosophy: concern for the total needs of the patient. Both fields employ a team approach to patient care. The rehabilitation medicine physician (physiatrist) has an important role in the care of the elderly. Geriatricians and physiatrists should work together for research purposes and to improve the prevention and treatment of illness and disability in the aging population. **Key Words:** Geriatrics, rehabilitation, exercise.

History

THERE ARE HISTORICAL PARALLELS in the development of the fields of geriatrics and physical medicine and rehabilitation (PM&R). Both specialties can trace their roots to antiquity. Both areas deal with populations whose needs have not been met by past models of Western medical care.

References to aging and debility are found in writings from ancient Egypt, India, and China. The Greek physician Hippocrates and the Roman physician Galen made many observations on the process of aging and on the ability of some people to age successfully. Their works were incorporated into European thinking over the centuries (1).

Physical medicine (the use of physical agents as treatment modalities) and therapeutic exercise were discussed by Hippocrates (2). Both subjects developed over the centuries with more or less

increasing scientific interest and acceptance. However, the popular view of the disabled and the perceived need for a field of rehabilitation medicine went through changes similar to that of the popular view of the elderly and the perceived need for a field of geriatrics. Physiatrists and geriatricians function as advocates for their respective patient groups.

Common Philosophy

Geriatrics and rehabilitation medicine share a common philosophy: the consideration of the "total person," i.e., observing the effect of disease or injury on all aspects of a person's life and functioning, and intervening wherever possible. Furthermore, both fields seek to prevent functional deterioration and stress the need for long-term planning and follow-up.

To accomplish these goals, both specialties employ the multidisciplinary or interdisciplinary team approach. The multidisciplinary method involves team members pursuing parallel tracks in patient care, meeting periodically to assess progress and modify goals. The interdisciplinary model sets common goals for the team members, each contributing to the work in progress in an overlapping and complementary fashion.

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The constitution of the team varies with the needs of the patient. It may include doctors, nurses, physical therapists, occupational therapists, social workers, psychologists, and other clinicians whose contributions may be of value.

Geriatrics, Disability, and the Physiatrist

An older patient is more likely to become deconditioned during a shorter period of time in bed than a younger person. When one considers the effects of prolonged bed rest on the elderly (especially the decline in exercise tolerance) (3) and the paucity of objective signs on examination or of complaints of distress by the patient (4), it becomes clear that the elderly are particularly prone to the complications of immobility. A higher index of suspicion is necessary, coupled with the need to anticipate potential problems earlier. Rehabilitation is an important part of both the assessment and treatment of these patients.

Physiatrists can bring many strengths and abilities to the aid of the elderly:

- Physiatrists can function as educators. In an academic setting, they give lectures to students, house staff, attending physicians, therapists, nurses, and other hospital personnel. In the clinical setting, they may give talks on subjects such as body mechanics, exercise, footwear, common types of injuries, and specific diseases to members of the community, patient support groups, and the press.
- Physiatrists are consultants. They are called in by physicians in other specialties to examine patients and render opinions regarding future outcomes, prevention of further disability, care of current impairments, potential admission to an inpatient rehabilitation unit, equipment needs, or possible post-acute care needs.
- Physiatrists are patient advocates. Due to their “global” focus, they may identify other aspects of the patient’s care which need to be addressed. They bring these other issues to the attention of the primary care physician, educate patients and their families as to the nature of the condition, and reinforce their right to seek treatment—even by alternative or complementary methods. They communicate with social workers, insurance companies, and managed care agencies to arrange cost-effective care. They encourage creative thinking, to make the system work on behalf of the patients.
- Physiatrists can be team leaders. Some clinicians think of physiatrists’ role in the interdisciplinary team as coordinators of care, like case managers. For many patients, the responsibility for much of what happens in the course of patient treatment rests with the physiatrists. They function in the coordination role and in the leadership role by encouraging communication among care givers, helping focus the care, solving problems, and monitoring outcomes and cost-effectiveness.
- Physiatrists are also researchers. Clinicians may write case studies or formulate trends, based upon empirical data collected on patients in their practices. Academicians may engage in benchwork hypothesis testing while experimenting in a lab or may pursue research on the wards, collecting data on a series of patients arranged for intervention in a randomized, double-blinded fashion.
- Physiatrists can relieve pain. They use oral medications, injections, exercises, problem solving, meditation, breathing and relaxation methods, supports such as canes, walkers and orthoses, acupuncture, and physical agents as mentioned earlier.
- Physiatrists give hope. They are in the business of optimism. This is not to say that they are unrealistic. They believe in accurate assessment of the patient’s current status and emphasize what can be accomplished with training. In general, they do not believe in withholding resources because of doubts as to future potential. This fits in with their role as patient advocates.

One combination of the clinical and the patient advocate role is their involvement in palliative care for the frail elderly person, or the demented person, or the patient with a terminal illness. Physiatrists use their creativity to muster the resources needed for comfort and prevention of side effects and complications. They occasionally become involved in ethics and quality-of-life discussions.

A physiatrist needs to think “outside the box.” Certainly, creativity and the ability to think of innovative ways to treat patients and help them attain benefits are qualities that are not limited to physiatrists. However, those who do possess these qualities tend to achieve better results for their patients and tend to foster creativity in other members of the team.

Rehabilitation Medicine and the Geriatric Patient

Inpatient Needs

The physiatrist has had a long-established role in the care of the hospitalized patient. Whether in the acute care or subacute care settings, the physiatrist establishes diagnoses, assesses pre-admission functional status, estimates post-discharge needs, and coordinates education, remobilization, and functional interventions during and after discharge. In the long-term care setting, the physiatrist monitors patients periodically for potential decline in function, to provide intervention as early and as rapidly as possible.

Outpatient Needs

The involvement of physiatrists in the care of the patient outside the hospital setting has been a fairly recent development. In the ambulatory care setting, the physiatrist may continue the broad approach to the comprehensive functional needs of patients. However, there is an increasing need for rehabilitation physicians to provide a narrow focus for a particular complaint, especially in the area of sports medicine. Their more vigorous elderly patients also require this approach.

As part of the elderly population becomes less mobile and less able to seek help outside the home, there seems to be a resurgence of interest in "house calls." Home care agencies provide patient care based upon a doctor's prescription. The physiatrist has several roles in this system. They include visiting the homebound patient, prescribing and coordinating care, and fostering communication among health care providers, patients, and relatives.

Thus, physiatrists can and should play an important role in patient care throughout the post-hospitalization period. They can not only develop clinical pathways for patient management in the post-acute setting, but can also function as "gatekeepers" for delivery of care (5).

The Need for Closer Interaction

With so many changes happening in the modern health care system and with resources being apportioned with increasing parsimony, it is important to note that much research in areas common to both geriatrics and PM&R occurs on parallel tracks.

Perusal of the geriatric and PM&R literature confirms this tendency. For example, osteoporosis

and the effects of exercise have been studied by physiatrists (6, 7) as well as by geriatricians (8, 9). Management of elderly patients who have had hip fractures is another area of interest common to both geriatrics (10, 11) and PM&R (12, 13). Assessment of balance and prevention of falls is a third area in which investigators in both PM&R (14–17) and geriatrics (18–21) have taken active roles.

Need for Common Terminology

There are a few research areas in which not only is effort duplicated, but also terminology differs to the extent that it is sometimes difficult to compare results. One example is the "sit-to-stand" test (STS), also known as the "chair-rise" test in much of the geriatric literature.

The ability and/or speed required to rise unaided from a chair has been incorporated into several testing batteries, and the results extrapolated to leg function, walking ability, and self-care ability (22, 23). However, the experimental setting (especially the design specifications of the test chair [24, 25]), the acquisition of data, and the analysis of results are highly variable. Data are cited to prove that the strongest predictor of successful chair rise is lower extremity strength (26). Other studies cite the starting position of various joints (27), the motions of the joints (28), or the ability to coordinate the actions of various muscles during phases of the test (29). Comparison of these studies reveals similar graphs with similar results, but different labels and phases.

A common terminology would help decrease confusion when readers attempt to derive conclusions from testing and treatment protocols. Interdisciplinary research protocols would be simplified.

Suggested Focus Areas for Investigation

Disability with Aging and Aging with a Disability

Further work is needed on the quality of life of the increasing numbers of patients with orthopedic and neurologic impairments who are surviving into old age. Another area of concern is the development of musculoskeletal complications which arise from disorders acquired during youth, such as shoulder degeneration in persons with paraplegia.

There are also some conditions which may continue to evolve over time, such as recovery

from stroke. As patients may show gradual improvement over a long interval, it is important to prevent complications during this time, to detect the improvements in a timely manner, and to use these changes to increase function. Patients so affected require periodic monitoring and occasional intervention. The notion of the "plateau" should be re-evaluated, especially in light of the theories of brain plasticity. Furthermore, there is very little information available regarding management of patients 10 to 20 years after an adult-onset event.

Fitness

In recent times, there have been increased efforts to promote fitness and strength training in the aging population—at home, in the gym, and in health care facilities. Biochemical and histological studies of older participants have shown that their skeletal muscles will respond to exercise (8, 30, 31). However, improving fitness does not necessarily lead to functional improvements. The best way to improve gait or self-care is by training specifically for that function (32).

Changes with Aging—Are They Reversible?

Gerontologists have long sought a biomarker of the aging process. However, many body systems that are affected by disease or disuse are not considered useful for this purpose. One group of researchers has reported that the decline in Maximum Oxygen Consumption (VO_{2max}) with aging seems to reflect changes due solely to the aging process. They concluded not only that exercise performance correlates well with measurement of VO_{2max} , but that VO_{2max} is a reliable marker of "successful" aging (33).

Other studies have shown that normal aging causes a gradual reduction in activity and function. The observed reduction in exercise tolerance is more often related to changes in body composition, rather than to deterioration in cardiac function. Aging muscle uses oxygen less efficiently, which in part has been attributed to mitochondrial dysfunction. This metabolic change responds favorably to training, just as it does for the younger population (34–36).

After conducting a meta-analysis of 29 studies of the effects of endurance training on functional capacity in the elderly, one group of authors concluded that there is a significant benefit. Increases in functional capacity are related inversely to subject age and directly to duration of

exercise bouts, length of the training regimen, and pre-training VO_{2max} (37).

In 1993, Drs. Mary Fiatarone and William Evans published an article advocating resistance training and nutritional supplementation to reverse dysfunction in aging muscle (35). They followed this report with a 1994 study which showed that elderly exercisers who received nutritional supplementation responded the best, followed by exercisers who did not receive nutritional supplements. Those who received nutritional supplements but did not exercise did not improve in physiological or functional parameters (38).

The effects of long-term exercise are being studied (8, 39). Another important research question is the relationship between strengthening anti-gravity muscles and preventing falls (40). Various authors have achieved postural influences by shoulder girdle strengthening, by lower extremity strengthening, and by water exercises (41).

The *Archives of Physical Medicine and Rehabilitation* has published numerous studies over the years concerning exercise and the elderly (6, 15). Beneficial effects include increased gait velocity (42), sustained favorable lifestyle modification (43), decreased sway, and shorter reaction times (44, 45), in addition to the expected increases in strength.

Falls, Balance, and Posture

A joint initiative between geriatrics and PM&R is also needed to study falls and injury prevention.

There are many patient (intrinsic) and environmental (extrinsic) factors that contribute to falls and injury (46, 47). Analysis of this problem usually begins with the patient, often after multiple falls and injuries have occurred.

As regards intrinsic factors, published reports have cited static balance, lower extremity strength, ankle and hip flexibility, joint position sense, and cerebellar function. Thus, both peripheral and central mechanisms are involved. Postural disturbances, reduced muscle strength, slower reaction times, stiffer connective tissue, and less dense bones also contribute to falls and injury.

The second main area of concern in preventing falls and injury is systematic environmental assessment. Much can be done to maximize safety and independence, whether clients reside in nursing homes, chronic care facilities, or private homes. This includes the presence of alarms,

adequate lighting, and adaptive equipment (e.g., grab bars, bath equipment). Special attention should be paid to coordination of furniture dimensions and functions. Rugs and room thresholds are potential hazards for ambulatory patients. The environmental assessment should be incorporated into the home visit protocol.

Thirdly, dependence in activities of daily living is associated with increased falls risk. For example, transfer activities are essential for safe mobility of the dependent, nonambulatory patient. Particular attention must be directed toward furniture positioning, appropriate footwear, clear instructions to the patient, and good body mechanics on the part of the care giver. Transfer activities must be modified after lower extremity surgery, especially to avoid dislocation of a hip arthroplasty.

One of the best-known researchers in the geriatric and internal medicine literature in the field of prevention of injurious falls is Dr. Mary E. Tinetti. She has criticized the disease-oriented approach to assessment of mobility problems (46). Tinetti prefers the performance-oriented approach, asserting that "falling is an entity in its own right, most commonly due to the accumulated effect of multiple chronic disabilities, and that it may be preventable if the causative factors are recognized in individual patients." (48).

Tinetti has also sought to improve upon laboratory gait analysis, which does not give a true picture of mobility in one's usual environment (46). She has been able to prove that her analysis method, combined with appropriate intervention, has a beneficial effect (49).

One cannot leave the areas of exercise, balance, and falls without a brief consideration of the "Frailty and Injuries: Cooperative Studies of Intervention Techniques" (FICSIT) trials (50). It involved more than 2,400 volunteers participating in various interventions. A group of eight centers around the country pursued different clinical trials, using similar data-collection methods.

A meta-analysis attempted to account for all seven independent, randomized, controlled trials—two in nursing homes and five community-based. Each facility included some form of exercise in its interventions, but this varied in duration, frequency, and intensity. The main conclusion was that the adjusted fall incidence ratio was slightly lower for the programs that included balance training (0.83) than for those that included exercise training (0.90). Further analysis suggested that a program that includes t'ai chi is of particular benefit in lowering risk. Many other variables existed, since the programs were not uniform in their composition (51).

Exploration of Complementary Medicine

Another area which PM&R and geriatrics researchers should explore jointly is the benefits and applications of complementary medicine. Patients are gathering information from the media (especially via the Internet) and from the community at large regarding herbal treatments, physical agents (such as magnets), and various movement techniques. These areas should be studied and the scientifically validated therapies should be incorporated into evaluations and treatments.

One example of such a therapy is t'ai chi chuan. This is a Chinese "soft," or internal, martial art. This means that t'ai chi uses soft, slow, flowing motions that develop awareness, coordination and inner harmony. Since it also fosters relaxation, it has been used as a means of dealing with stress and tension.

T'ai chi has been reported to have many benefits, including increasing joint mobility, improving circulation, lowering blood pressure, reducing back pain, bolstering the immune system, improving athletic performance, and aiding weight reduction. It has been previously noted that t'ai chi has a beneficial effect on the responses of the cardiovascular and pulmonary systems to exercise (52), and that its practitioners perform better on tests of balance than do non-practitioners (53).

As a result of the FICSIT trials, interest has increased in the use of t'ai chi for reduction of falls (51). Two of the centers which used t'ai chi during FICSIT have published their results separately, so one can analyze their interventions in greater detail (54–57).

Functional Outcome Measurement

The latest area to be explored in geriatric rehabilitation is outcome measurement. Traditional rehabilitation models of assessment (58) and public health models (59, 60) are being applied. Clinical practice guidelines are being developed (61), in the hope that greater efficacy can be combined with cost-effectiveness in the delivery of care. These new initiatives require the combined input of both geriatricians and PM&R physicians.

Conclusions

Articles summarizing the philosophies, approaches, and delivery models of geriatric rehabilitation have been published in several journals (62–65). Several textbook chapters explore this material in varying amounts of detail (66–68).

One particular example of collaboration between clinicians and researchers in geriatrics and rehabilitation medicine is an entire textbook devoted to the subject, published in 1994 (69). The interested reader is referred to these sources for more information.

As more people age and enter the pool of the potentially disabled, the importance of both geriatrics and PM&R increases. Both fields are experiencing growth. However, they must work together to define their roles more clearly, apply similar terminology for clarity of communication, conduct joint research projects to validate their efficacy with similar methods, hold joint grand rounds in topics of mutual interest, and in general share their common vision for the best possible care of the aging population.

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