# Manual Osteopathy for Management of Falls and Improvement of Movement Disorders in the Elderly

## Final Thesis Assignment

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# CONTENT

## INTRODUCTION

Many are the subjects to talk about when discussing on prevention of being bedridden and its complications, keeping or improving autonomy and quality of life in elder people. A recurrent one is the management of risks and prevention of falls.

Current data, published by the non-governmental organization Parachute Canada, refers that falls cost Canadians more than any other type of injury, with the total economic burden estimated as $6 Billion.

- It is estimated that one in three persons over the age of 65 is likely to fall at least once each year. In Canada, this translated into over 1.6 million seniors who fell at least once in 2011.
- With the number of older persons in Canada projected to increase from 4.2 million to 9.8 million between 2005 and 2036, the estimated number of older persons who will fall at least once in 2036 will increase to 3.3 million.
- In 2004, adults aged 65 years and older accounted for about 13% of our population and direct health care costs for fall-related injuries were $2.0 billion. By 2031, it is projected that older adults will make up 24% of Canada's entire population and approximately $4.4 billion will be spent on direct health care costs for fall-related injuries among this age population.

Meanwhile, the Public Health Agency of Canada, on its 2014 publication, reports that results from the data analysis indicated that self-reported injuries due to falls increased by 43% between 2003 and 2009/2010. The majority of falls resulted in broken or fractured bones, and over one third of fall-related hospitalizations among seniors were associated with a hip fracture. Fracture-induced physical limitations augment the need for support on the part of older adults themselves and their caregivers, and increases pressure on Canadian health care systems, meaning a raise of needs on human resources, material, equipment and, of course, budget burden.

Therefore, it becomes more and more important and pertinent to look for strategies of prevention as well as techniques of management including but not limited to education, training, mobilization improvement, risk awareness and recognition of other factors that could influence the daily life of people at risk.

Manual Osteopathy can effectively provide support and an important and valuable help on movement coordination, improvement of muscle-skeletal conditions, diminution of pain, use of orthoses and other support devises and a greater feeling of wellbeing in the own body.

## DEFINITION

A fall is defined as a person coming to rest on the ground or another lower level; sometimes a body part strikes against an object that breaks the fall.

## FACTORS INVOLVED IN FALL ORIGIN

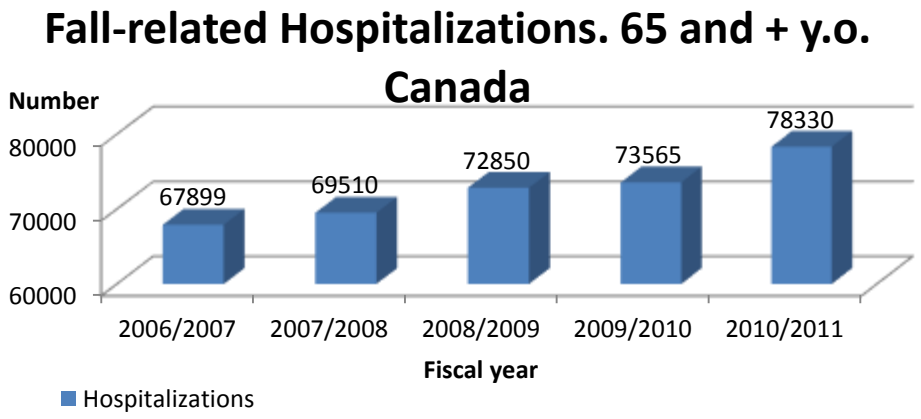
We can classify different elements depending on the individual characteristics, the surroundings and others:

1. Personal factors: related to every individual, as previous health status, illness history, current affection, acute conditions, medication, adverse drug effects, habits or daily activity, range of motion, motion instability, gait disturbance, age-related decline in function as low vision, cognitive impairment, functional disorders and others.
2. Environmental factors: design of a building, entrances and outdoor spaces, place large enough to allow mobilization, floor surface, bulky furniture, changing the usual environment as when moving out to an elder care centre or hospital, replacing furniture, make renovations in the room/house, etc.
3. Others: use (or bad use) of supports as walkers or canes, appropriate shoes (anti slip soles), other helping equipment, situational factors related to the activity being done (e.g., rushing to the bathroom)

## THE ACTUAL PROBLEM IN CANADA

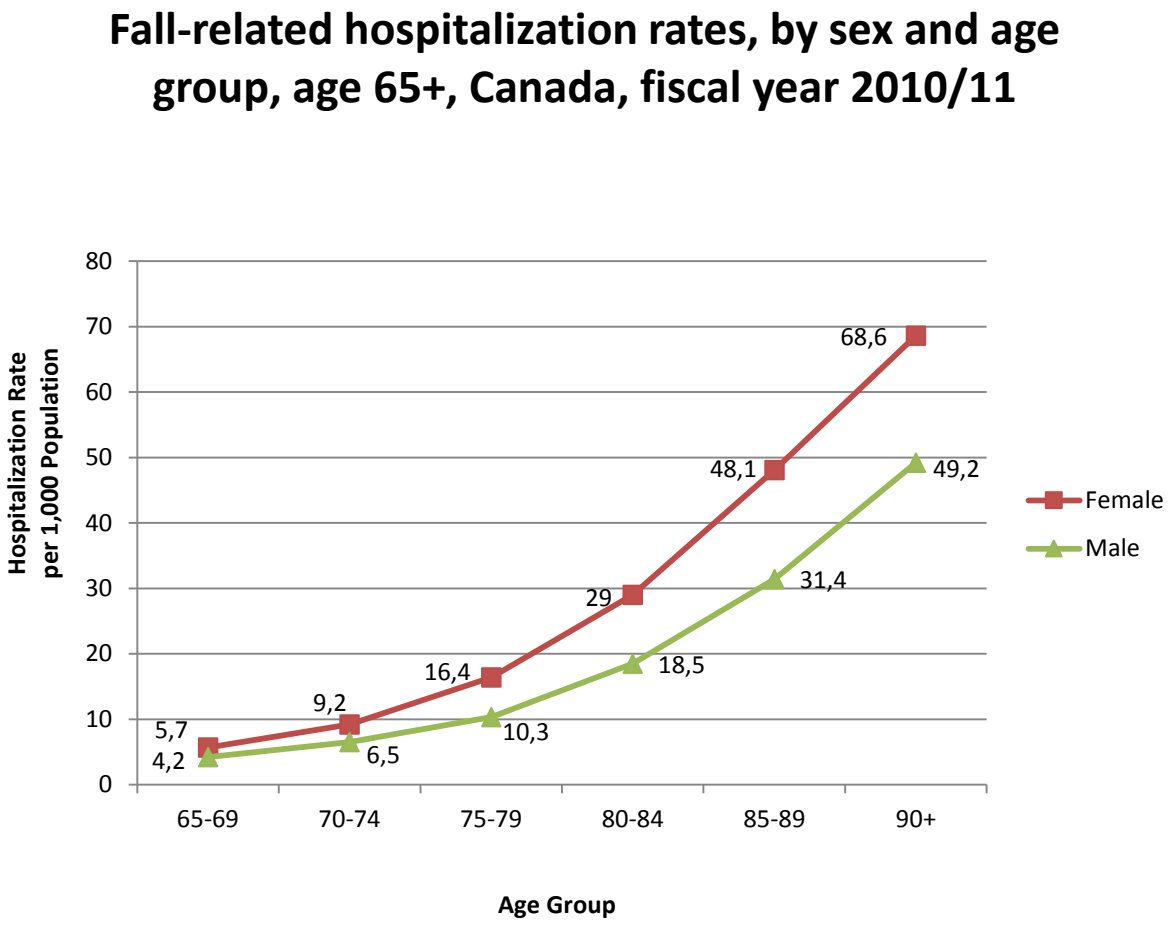
The trend in fall-related hospital cases for those aged 65 and over in Canada during 2006/2007 through 2010/2011 is shown in the next graphic. Overall, the total number of fall-related hospitalizations increased from 67,899 in 2006/2007 to 78,330 in 2010/2011. This represents a 15% increase in the number of individuals who were hospitalized as a result of falls during that period.

**Graphic 1: Fall-related Hospitalizations. 65 and + y.o. in Canada**



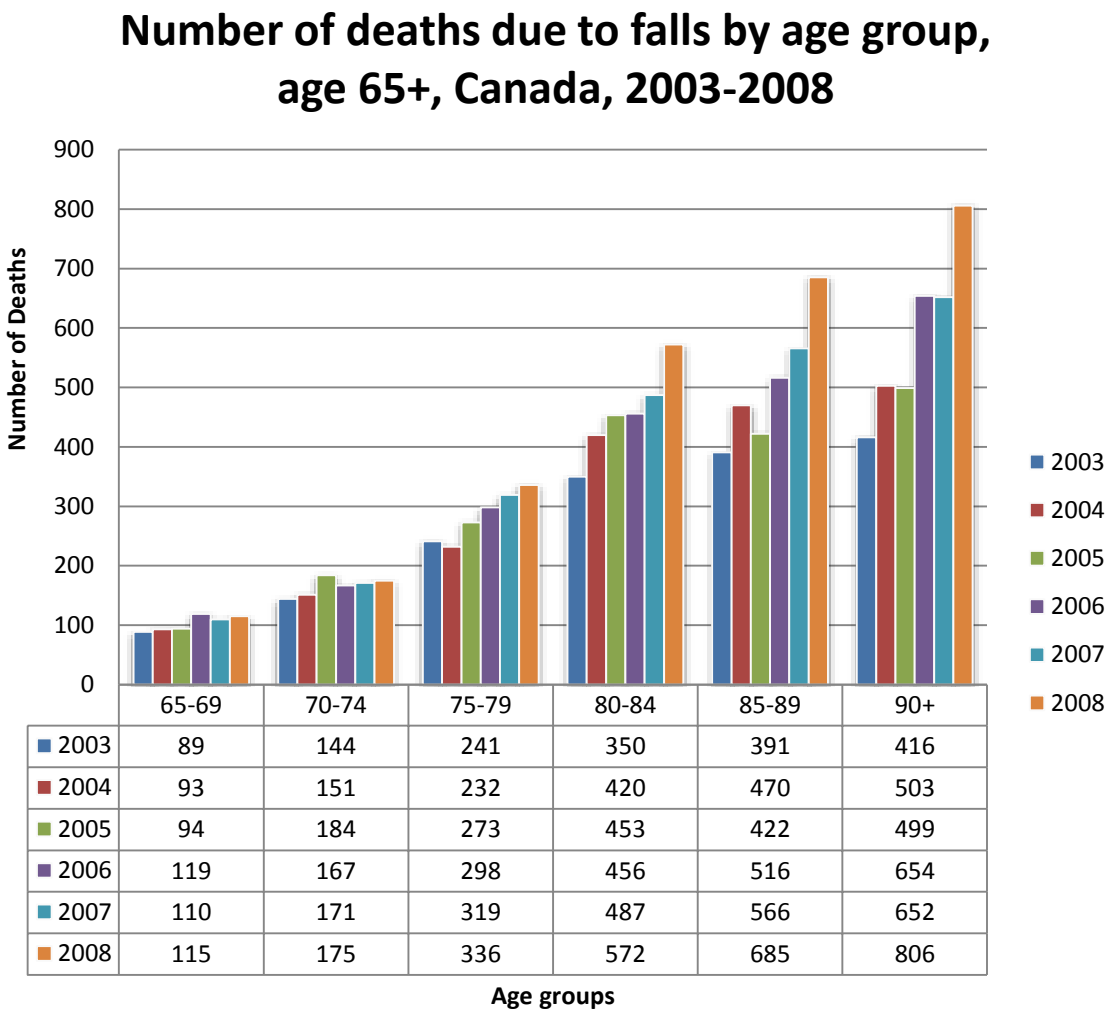
Men and women both had increasing rates of fall-related hospitalization with age but females appeared to have an increased rate of falls relative to males as age increases. As it is already known, females are at greater risk of osteoporosis, which partly accounts for the increase in the risk of fracture as a consequence of a fall and therefore the impact on hospitalizations.

**Graphic 2: Fall-related hospitalization rates, by sex and age group, age 65+, Canada, fiscal year 2010/11**




In addition to such burden of falls, the problem is not only hospitalizations, but deaths as an aftermath of those falls, which are increasing year after year, almost duplicating in numbers by the age of 90 and over, between 2003 and 2008.

**Graphic 3: Number of deaths due to falls by age group, age 65+, Canada, 2003-2008**




| | 65-69 | 70-74 | 75-79 | 80-84 | 85-89 | 90+ |
|---|---|---|---|---|---|---|
| 2003 | 89 | 144 | 241 | 350 | 391 | 416 |
| 2004 | 93 | 151 | 232 | 420 | 470 | 503 |
| 2005 | 94 | 184 | 273 | 453 | 422 | 499 |
| 2006 | 119 | 167 | 298 | 456 | 516 | 654 |
| 2007 | 110 | 171 | 319 | 487 | 566 | 652 |
| 2008 | 115 | 175 | 336 | 572 | 685 | 806 |

## PREVENTION MEASURES

Looking to prevent the occurrence of falls, multiple approaches have to be considered, given the different factors involved.

The World Health Organization recommends the "Three Pillars of the Falls Prevention Model" which includes building awareness, assessment of risk factors and effective interventions.

### Pillar One. Building awareness of the importance of falls prevention

General and specifically targeted populations need to satisfy a maybe largely unknown need of knowledge about not only personal risks and consequences of falls, to be fulfilled by

education of individuals and groups, but also about social and economic burden of the problem. More people are aware, more easily they will implicate and collaborate on applying prevention measures. While talking about groups, they necessarily should be integrated by directed affected people: older persons, family and caregivers, as well as environment and support responsible organisms: community, health sector, government and even media to spread information and consciousness on the matter.

### Pillar Two. Improving the identification and assessment of risk factors and determinants of falls

There are quite a lot of factors to be considered, some of them already known, some others to be assessed because of variability depending on personal and external characteristics. It may be useful to plan and execute an evaluation on personal or individual-level factors as behaviour, social entourage, physical environment conditions, economic circumstances and health status; although a serious assessment of health services availability and accessibility may have a great impact. Health and social services should be structured in such a way as to routinely screen older persons for known risk factors for falls. Health professionals should be trained to use evidence-based protocols and procedures that help to identify those individuals who are at the greatest risk and for the implementation of suitable follow-up programmes when indicated.

### Pillar Three. Identifying and implementing realistic and effective interventions

Once the identification and assessment of all personal and environmental factors involved are completed, it’s time to develop and implement interventions characterized by being effective in reducing falls in older people by simultaneously targeting several intrinsic and extrinsic risk factors or determinants. Numerous studies have shown that successful multifaceted-intervention programmes have included such components as: medical assessment, home safety improvement, monitoring of prescription medications, environmental changes, exercise and physical activity, training in transfer skills and gait, assessment of readiness to change behaviours - with education, feedback and positive reinforcement strategies - and referral of clients to health-care professionals.

## ROLE OF MANUAL OSTEOPATHY IN MANAGEMENT OF FALLS

A review of scientific evidence available about manual osteopathic interventions on management of falls and balance disorders in the elderly leads to those important findings listed below:

- Cavalieri et al were the first researchers to conduct a clinical trial evaluating the impact of OMT (Osteopathic Manipulative Treatment) on fall prevention in elderly adults. The study suggested that if OMT is to have any application for preventing falls in an elderly high-risk population, patients will need to be treated more than once every 6 weeks.
- Elster reported the case of an individual with Parkinson disease who received cervical manipulation. During a period of 3 months, the patient reported subjective improved cervical range of motion, improved sleep, better energy, and decreased body stiffness. For a more objective measure, the author measured the patient's symptom severity at baseline and at week 12 using Unified Parkinson's Disease Rating Scale and found a 43% reduction in severity of Parkinson disease symptoms.
- Wells et al published a randomized controlled clinical trial investigating the effect of a standardized OMT protocol that focused on improving joint range of motion from the cervical spine to the ankle in patients with Parkinson disease. A single OMT session was found to have an immediate beneficial effect on gait measures. The OMT protocol statistically significantly improved stride length, upper limb velocity in the shoulder, and lower hip velocity relative to the two control groups.
- Svircev et al explored the use of neuromuscular therapy (a form of massage therapy) for 32 persons with Parkinson disease in a randomized controlled clinical trial. Participants were randomly assigned to receive twice-weekly treatments for 4 weeks of either neuromuscular therapy or muscle relaxation therapy. At the end of the intervention period, the neuromuscular therapy group had improved Clinical Global Impression scores and Unified Parkinson's Disease Rating Scale Part C scores, but the muscle relaxation group (controls) did not improve. However, the Clinical Global Impression score improvements were not maintained one week after the final treatment.
- Noll reports in a review that the evidence in the literature for using manipulation to manage Parkinson disease consists of a few case observations and a no more abundant small clinical trials, which is not really a conclusive, evidence-based foundation. Clearly, more clinical research is needed to establish the value of using manipulation to treat patients with Parkinson disease.
- Gilliss et al reported the case of a 65-year-old man with gait dysfunction and multiple sclerosis. Muscle energy techniques were used to correct his somatic dysfunction. Detailed gait analysis was recorded by means of a 12-foot mat and videotaping before and after the treatment session. All posttreatment gait mat measurements showed dramatic improvements, including a 58% decrease in the number of steps taken in 12 feet, improved step and stride length, increased velocity, and restored stride-length symmetry. The case report suggests that a Trendelenburg gait pattern, classically thought to be due to a weakness in the proximal hip abductor muscles, may also arise from somatic dysfunction and thus may be corrected by means of OMT.
- Lopez et al evaluated the effects of OMT on balance in healthy elderly adults. The primary areas treated were the head, neck, shoulders, and thoracic spine. Anteroposterior

sway was reduced to a statistically significant level for the OMT group at the end of 4 weeks. Nevertheless, the clinical efficacy of using OMT in individuals who already have poor balance needs further evaluation.

- Fraix, in a pilot study, explored the efficacy of using OMT for chronic vertigo. The results showed statistically significant improvement in Dizziness Handicap Inventory score relative to the baseline measures.
- Other generally effective options for patients with gait and balance disorders included exercise and physical therapy. Exercise programs may target strength, balance, flexibility, or endurance. A Cochrane review found that programs containing two or more of these components reduce the rate of falls and number of persons falling. Exercising in supervised groups, particularly tai chi, and carrying out individually prescribed exercise programs at home are effective. A variety of exercise interventions, including walking, functional exercises, muscle strengthening, and multiple exercise types, have also been found to significantly improve balance.

All these studies show the advantages of adding osteopathic treatment to the pool of resources implemented for prevention and follow-up of falls in elder people. Though, at the same time, it results notorious that there is a lack of further information and research on the role and function of Manual Osteopathy in the field, not according to the growing elder population and the possibilities of economic, social and personal benefits that can be achieved by applying these practically innocuous and non-drug based techniques.

One constrain may be the misunderstanding about the best frequency of sessions, the determination of the best control strategy and the time needed to maintain the positive outcomes of OMT, as reported by Svircev et al, and thus, the lack on established and normalized protocols of intervention, given the multiplicity of individual and environmental factors involved. Therefore, authors insist on the necessity of additional research, findings and publishing of scientific evidence on this issue.

## CONCLUSION

Falls are an important problem for individuals and society. They involve billions of dollars in health care and insurances expenses all around the world, as well as personal and time investment; they are an identified health, economic and social burden in Canada and, regrettably, a growing cause of illness and death for elder people.

In developed countries, elderly population is increasing and estimations are that, in Canada, as much as one fourth of its population will be formed by third age people in 15 years from now, with the increasing in economic burden that it implies.

Prevention is a key concept to take control on the matter and it has to involve a plural professional team, multifaceted assessment and implementation of measures to identify and to avoid or minimize the odds for subjects who are more likely to be at risk. Few interventions, however, have been shown to reduce falls and injuries. Exercise and physical therapy have a mild benefit and tai chi seems to be most fruitful for otherwise healthy elderly adults. The potential of applying osteopathic techniques to prevent falls and improve gait and balance has not been sufficiently explored.

Therefore, management of falls must take in consideration the uprising costs and morbidity associated with falls, gait disturbances, and balance disorders in third age people; logically, it should be noted that developing a treatment modality intended to improve musculoskeletal function must be done, alongside with more scientific research to support findings and propose upgrades on recommendations. This slight and developing line of study about the potential advantages of manual osteopathic treatment for managing falls, gait disturbances, and balance problems creates expectations. This is a promising progress, because more evidence will be crucial to prove if osteopathic manipulation based treatments can significantly diminish the occurrence of falls, gait disturbances, and balance problems for elder people.

Manual therapists can represent a substantial part in the evaluation and treatment of people with gait and balance impairments. They can help determine the disorders created by a gait anomaly and elaborate personalized programs addressed at identified functional limitations.

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