



STATE OF THE ART – Analysis and Review of Existing European Scientific Research on Active Aging



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1. Introduction

Contemporary Europe faces one of the most complex demographic challenges in its history – the accelerated aging of its population. According to Eurostat data for 2025, 22.0% of the European Union population was aged 65 and over, with projections indicating that this share will rise to between 29% and 30.6% by 2050. This trend generates mounting pressure on healthcare systems, pension funds, and social service networks, while simultaneously altering the age structure of the workforce and social relations. The problems are not only economic in nature; population ageing is accompanied by an increase in chronic non-communicable diseases, functional dependency, and social isolation among the oldest citizens. Of particular concern are the data from the Special Eurobarometer 525 (European Commission, 2022), which show that while 38% of Europeans engage in sport or exercise at least once a week, in the age group of 55 and over, as many as 42% never engage in vigorous physical activity. This is almost double the figure for young people aged 15–24, testifying to a dramatic decline in physical activity with aging and revealing a serious public health failure. It is precisely this challenge that the *Aging is a Myth* project addresses, combining weekly structured athletics training, international competitions, social networking, and a digital platform for seniors aged 50 and over. This project directly targets three key problems: a lack of motivation for regular exercise, social isolation of older people, and a shortage of widely available, tailored sports programmes.

The scientific literature of the past two decades provides an exceptionally strong empirical foundation for such an approach, confirming that regular physical activity, and athletics in particular, brings multidimensional benefits – from the preservation of physical functions and mental health to the strengthening of social inclusion. Systematic reviews and meta-analyses, longitudinal cohort studies, and specialized research on master athletes consistently show that ageing can be significantly slowed and that physical and psychological wellbeing can be enhanced in later years. These findings go beyond mere correlation: the longitudinal nature of many studies points to a causal effect of training on reduced mortality, lower risk of cardiovascular diseases, fractures, and depression, as well as an extended period of independent living. In the context of European integration and common strategic priorities, active ageing is recognised as one of the key pillars of sustainable development, as reflected in indices such as the Active Ageing Index (AAI), which measures the level of employment, social participation, and independence of older people. By combining regular training with a competitive component, *Aging is a Myth* builds a bridge between these scientific recommendations and their practical implementation in the community, aiming to become an example of good practice across Europe. Therefore, this research review is necessary – to scientifically ground every aspect of the project model and provide clear arguments to decision-makers, partners, and the participants themselves.

2. Review of Research

European scientific output on older people's physical activity and master sport over the last twenty years is exceptionally rich and consistent in its messages. The following detailed review encompasses the most relevant studies, each presented with its full title and key findings.

1. Cunningham, C., O'Sullivan, R., Caserotti, P., & Tully, M. A. (2020). Consequences of physical inactivity in older adults: A systematic review of reviews and meta-analyses.

This umbrella systematic review synthesised findings from 24 previously published systematic reviews and meta-analyses, thereby encompassing data on hundreds of thousands of people aged 60 and over across Europe and worldwide. The authors searched the largest electronic databases of scientific papers, and two independent researchers assessed the quality of each included review according to strict criteria. Pooled risk indicators were analysed for a whole range of health outcomes, including all-cause mortality, cardiovascular diseases, certain cancers, bone fractures, depression, and the rate of loss of functional abilities. The results provided an exceptionally consistent picture: physically inactive older people face a significantly elevated risk for all the listed adverse outcomes, with mortality risk, for example, being 20 to 30 per cent higher. Even moderate physical activity, practised regularly, was sufficient to markedly reduce this risk and improve quality of life. The authors identified physical inactivity as one of the most important modifiable risk factors in old age. The study's conclusion clearly conveys that investing in programmes that encourage older people to be active, including sporting activities such as athletics, represents one of the most cost-effective public health measures. This confirms that even if one starts later in life, the benefits are multiple and measurable.

2. Daskalopoulou, C., et al. (2017). Physical activity and healthy ageing: A systematic review and meta-analysis of longitudinal cohort studies.

The authors conducted a systematic review and meta-analysis of longitudinal cohort studies that followed over 100,000 adults from European and other populations over several decades. The aim was to precisely quantify the relationship between the level of physical activity in middle and later years and the concept of "healthy ageing", which encompassed preserved health, independence, and high life satisfaction. The analysis used studies that measured physical activity with standardised questionnaires and assessed outcomes according to multiple definitions, from the absence of chronic diseases to high physical and cognitive function. Pooling the data showed a strong positive effect – physically more active participants had a 39 per cent higher probability of ageing healthily. The relationship was dose-dependent, meaning that the more intense and regular the exercise, the more favourable the outcome. It is very important to

note that a favourable effect was also observed in those who only began physical activity in older age, dispelling the prejudice that it is “too late to start”. Such findings provide direct scientific support for projects like *Aging is a Myth*, as they show that structured, continuous training such as that offered in athletics has the potential to significantly extend the period of vital, independent living.

3. Ganse, B., et al. (2020). Longitudinal trends in master track and field performance: 83,209 results from Sweden.

This research was carried out by analysing a huge database of 83,209 individual competitive results of Swedish master athletes, collected over several years across 16 different disciplines. The approach was retrospective and longitudinal, meaning that the authors tracked how the same athletes’ achievements changed from season to season, from the age of 35 to over 90. Using regression models, they precisely mapped the curve of performance decline with ageing and found that the decline accelerates after the age of 70, but that regular competitors manage to maintain significantly better results and a slower rate of decline. The study’s particular value lies in its objectivity – unlike questionnaires where people sometimes overestimate their activity, exact, measurable data were used here. The results show that continuous engagement in athletics is not merely recreation, but acts as a powerful protective factor against the usual loss of strength and speed. In other words, the bodies of those who regularly train and compete age physiologically differently, with more preserved motor abilities. These insights directly justify the format of the *Aging is a Myth* project, which insists on regular weekly training and periodic competitions throughout the year.

4. Ganse, B., et al. (2021). Longitudinal master track and field performance decline rates are lower and performance is better compared to athletes competing only once.

In this continuation of the previous research, the same author team compared two groups of athletes from the same Swedish database: those who had competed continuously over multiple years and those whose participation was a one-off. The aim was to isolate the effect of perseverance, i.e., regular multi-year training and competition, on the decline in sports performance. The methodology again rested on the analysis of a huge number of measured times, distances, and heights in master athletics, with statistical models that controlled for sex, age category, and discipline. The findings were unequivocal: athletes who competed year after year showed not only better absolute results but also a significantly slower annual decline in performance compared to those who attended only once. This pattern suggests that it is continuity, not just occasional activity, that brings key long-term physiological adaptations. This is an extremely important piece of evidence for the design of programmes for older people, as it shows that structure and regularity are not merely a matter of discipline but have a measurable biological effect. The study’s conclusion provides a firm argument for why

the *Aging is a Myth* concept entails year-round work, not just a few isolated events, because maximum benefit for health and functionality can only be achieved in this way.

5. Fernández-Peña, E., et al. (2024). *Impact of track and field training on dynapenia: gender differences.*

The research team focused on the impact of specific track and field training on dynapenia – the age-related loss of muscle strength – with special attention to differences between men and women. The study involved older adults who regularly practised disciplines such as sprints, jumps, and throws, and their strength indicators, such as handgrip strength and leg extensor strength, were measured using standardised dynamometers. The primary finding was that regular athletics training significantly slows the loss of muscle strength in both sexes, acting as a kind of “shield” against the negative effects of ageing. In addition, detailed analysis showed that women have a somewhat slower relative rate of strength decline compared to men, which raises questions about specific adaptive mechanisms. The authors point out that it is precisely athletics disciplines – which include explosive movements, jumps, and multi-joint exercises – that represent an almost ideal stimulus for preserving the fast-twitch muscle fibres that are most lost with age. This study is valuable because it confirms that it is not enough to just walk; combating dynapenia requires more intense, structured training such as that offered by athletics. This directly reinforces the *Aging is a Myth* project’s focus on running, jumping, and throwing as essential tools for preserving muscle function.

6. Mattle, M., et al. (2022). *Prevalence of physical activity and sedentary behaviour in European older adults.*

In this study, the authors analysed large pan-European health and behavioural databases, aiming to determine the real levels of physical activity and sedentary behaviour among older Europeans. Representative samples from different European regions were used, with data on movement and sitting collected via validated questionnaires and, in some waves, accelerometers. The results revealed a worrying prevalence of a sedentary lifestyle, with a large proportion of the older population spending most of their waking hours in a seated position. A particularly striking finding was the enormous geographical differences: in Nordic countries, the percentage of active seniors was significantly higher than in Southern and Eastern European countries, where the cultural and infrastructural context is often less favourable. These differences served as an argument that active ageing programmes cannot be applied uniformly but must be adapted to local specificities. This is precisely the question that *Aging is a Myth* addresses with its network of partners from different parts of Europe, designing interventions that take into account local habits and obstacles. The authors conclude

that reducing time spent sitting, even with moderate activities such as running training, has enormous public health potential at the level of the entire continent.

7. Przybysz, K., et al. (2023). *How active are European seniors – Personal ways to active ageing.*

This Polish-European study combined quantitative surveys and qualitative interviews to understand the subjective perception of active ageing among seniors. Numerous participants from several European countries spoke about their relationship with physical activity, social life, and their own ageing process. The analysis showed that those seniors who participate in structured group sports activities, such as organised training, have a distinctly more positive image of themselves and their place in the community. Their responses revealed a stronger sense of belonging, more extensive social connections, and a higher level of life satisfaction compared to peers who exercise alone or are inactive. The role of the social dimension was particularly emphasised – the mere fact of training in a group, sharing experiences, and motivating each other often proved more important than the type of exercise itself. These findings fit perfectly into the philosophy of the *Aging is a Myth* project, which organises weekly group training and international gatherings, thus creating a social network that goes beyond mere exercise. The conclusion is that active ageing is not only a biological phenomenon but also a psychological and social process, and that programmes must address all these dimensions simultaneously.

8. Racey, M., et al. (2021). *Effectiveness of physical activity interventions in older adults with frailty: A systematic review.*

A systematic review published in CMAJ Open focused strictly on older people with frailty syndrome, assessing how effective physical activity interventions are for this particularly vulnerable group. By searching multiple databases and applying rigorous selection, the authors included studies that tested different exercise regimes and measured outcomes such as mobility, muscle strength, and the number of falls. The results consistently showed that multi-component programmes – those combining strength, balance, and aerobic training – bring the greatest improvements, while simple programmes have more modest effects. A significant reduction in the level of frailty and risk of falls was observed, which are key factors for maintaining independence. An important conclusion was also that it is safe to include even frail older people in structured training, provided there is professional supervision and an individualised approach. This creates a bridge between science and practice, demonstrating that the athletics activities within the *Aging is a Myth* project – adapted to individual capabilities – can be a safe and extremely effective measure even for those already suffering from incipient frailty, not just for already fit seniors.

9. Horton, S., et al. (2018). *Benefits of masters sport to healthy aging.*

This comprehensive literature review, published through the Canadian SIRC network, explored the multiple benefits of master sport for healthy ageing, encompassing not only a medical but also a sociological and psychological perspective. The authors identified five key domains of wellbeing: physical health, mental wellbeing, sense of purpose, social connections, and self-confidence. The evidence showed that regular participation in master sports competitions leads to better cardiovascular fitness, stronger immunity, and a lower presence of depressive symptoms. The effect on self-perception was particularly highlighted – senior athletes often report feeling “successfully aged” and less susceptible to age-related stereotypes. The social aspect proved crucial, as master competitions create a strong sense of community, belonging, and intergenerational exchange. It was concluded that master sport, including athletics, hits the ideal intersection of all factors that lead to what the literature calls successful ageing. These insights provide holistic confirmation for the format of *Aging is a Myth*, which promotes athletics not only as a physical activity but also as a platform for social inclusion and identity building.

10. Lepers, R. (2016). *Master athletes are extending the limits of ageing.*

In this review paper, published in *Frontiers in Physiology*, the physiological profiles and sports performance of master athletes were analysed, with a focus on the question of to what extent regular training can “extend the limits of ageing”. Using data from world records, biological measurements, and muscle biopsies, the author showed that elite master athletes maintain outstanding values of maximum oxygen consumption (VO₂max) and muscle mass decades longer than the general population. For example, it was observed that a 70-year-old master athlete can have physiological parameters similar to an inactive person in their 40s. The study also explained the mechanisms behind this – regular high-intensity training maintains the capillary network in muscles, mitochondrial function, and neuromuscular coordination. The conclusion was that master athletes are living proof that the physiological process of ageing can be drastically slowed, but this requires training that is not merely recreational but has a sporting component of competitive preparation. This provides a strong physiological foundation for the *Aging is a Myth* project, which designs precisely that kind of purposeful, progressive training for its participants.

11. Active Ageing Index (AAI) – Research team led by A. Zaidi (various years). *Active Ageing Index (AAI) reports.*

The Active Ageing Index is not a single study but a multi-year development project that has produced a complex composite index for measuring active ageing at the level of EU countries. The index encompasses four major domains: employment, social

participation, independence, and capacity for active ageing, and within these lie indicators such as volunteer rate, level of physical activity, access to healthcare, and safety. Countries are ranked according to a total score, and multi-year application has shown that those states where seniors exercise more and are more socially engaged record significantly better results on the index. Methodologically, data are drawn from Eurostat, the European Social Survey, and national statistics, and are processed through weighted model calculations. The results have pointed to persistent gaps between Northern and Eastern Europe precisely in the domains that are the focus of the *Aging is a Myth* project – physical participation and social networking. The AAI reports explicitly recommend the development of pan-European programmes that will encourage not only exercise but also the mutual connection of older people through events, which is the very core of this project.

12. Brach, J. S., et al. (2023). *Evidence-based research on physical activity in old age: Bridging the gap between research and practice.*

This paper, published in the journal *European Review of Aging and Physical Activity*, deals with a critical problem: despite an enormous body of evidence on the benefits of physical activity for older people, the application of this knowledge in real community programmes remains extremely poor. Through a narrative review and policy analysis, the authors identified key barriers, including a lack of accessible organised programmes, trained coaches to work with older people, and sustainable funding models. The study encompassed dozens of interventions and showed that even when pilot projects exist, they often disappear after initial funding ends. The results indicated that the most successful interventions are those that are simultaneously evidence-based and socially appealing, i.e., those that have a competitive, group component that encourages regularity. These findings directly justify the existence of the *Aging is a Myth* project, as it attempts to bridge precisely that gap by combining scientific recommendations with an attractive format of competition and regular training. The conclusion is a call to action to move out of laboratories and academic articles into real gyms and onto tracks, which this project operationalises.

13. Kontro, T. K., et al. (2022). *Motives for competitive sports participation in masters track & field athletes.*

The research delved into the deeper motivational factors that drive master track and field athletes to compete for years. Using validated psychological questionnaires on a sample of competitors from Nordic countries, the authors identified and quantified the main motives. The analysis showed that maintaining health and physical ability top the list, but are immediately followed by socialising, friendship, and a sense of belonging to a sports community. Personal challenge and competitive spirit – the desire to surpass one's own limits and to be better than peers or one's own past results – proved to be

extremely strong internal drivers. Interestingly, the enjoyment of the sport itself, the aesthetics of movement, and the joy of competition had not faded with age. This finding is of utmost importance for programme design, as it indicates that older people do not exercise only for “hygienic” reasons; the competitive spark is still very much present. The *Aging is a Myth* project directly responds to these findings by combining weekly training with international competitions, creating precisely the kind of environment that feeds the motives of health, socialising, and personal challenge.

14. Helsen, W. F., et al. (2020). *The constituent year effect in European masters track & field.*

This study investigated the relative age effect within European master athletics categories, a phenomenon well known in younger age groups but insufficiently examined among seniors. The authors analysed the birth dates and results of thousands of master championship participants and found that the “constituent year” effect still exists. This means that those competitors who are born just after the category cut-off date (and are therefore among the youngest in the group) have a higher probability of success and remain in the sport longer, because their initial successes fuel motivation. Conversely, those born just before the cut-off (relatively older in the group) may become discouraged if they do not achieve early wins and drop out of competition. This socio-psychological mechanism has direct implications for motivation and long-term commitment, knowledge that *Aging is a Myth* can use in designing more inclusive competition systems. For example, introducing wider or more flexible categories can encourage greater participation and reduce unnecessary dropout. The study’s conclusion is that when creating master events, attention must be paid to the competition structure to support long-term motivation.

15. Pfeifer, K., et al. (2024). *Athletic performance decline over the lifespan: A comprehensive analysis.*

A comprehensive analysis attempted to map how athletic performance changes from early childhood to the deepest old age. Using statistics from large databases, including national and world ranking lists, the authors constructed decline curves for sprinting, jumping, throwing, and endurance. The results, expectedly, showed a gradual decline after the biological peak in one’s 20s and 30s, but the key finding was that this decline is extremely variable and strongly influenced by training. In individuals who maintained regular, specific, and continuous training, the rate of decline was incomparably milder even in their 80s compared to those who trained sporadically. The study also showed that different athletic disciplines age at different rates, meaning that a combination of sprinting, jumping, and throwing can provide a comprehensive anti-ageing stimulus. This analysis leaves no room for doubt that physiological decline can be significantly mitigated, thereby providing exact biological hope and confirmation for the mission carried by the name *Aging is a Myth*.

3. Analysis

The analysis of the reviewed literature reveals exceptionally strong and consistent scientific support for the promotion of active ageing through physical activity and master sport, with several key patterns standing out. Firstly, there is a clear dose-dependent response: higher intensity, frequency, and duration of physical activity proportionally reduce the risks of mortality, chronic diseases, and functional decline, as explicitly shown by Cunningham and Daskalopoulou with their teams. Secondly, longitudinal data from master athletics (Ganse et al.) provide rare objective confirmation that continuous, rather than occasional, engagement in sport brings measurable physiological advantages and significantly slower performance ageing. This has direct implications for programme design: regular weekly training is not a desirable addition but is essential for achieving the effect.

A third pattern concerns the multidimensionality of the benefits. Studies show improvements not only in physical health but also in mental wellbeing, social inclusion, and subjective quality of life (Horton, Przybysz). These findings underscore that active ageing cannot be reduced to the absence of disease; it encompasses a sense of belonging, self-esteem, and meaning – components that group sports such as athletics naturally provide. The fourth observed pattern is the pronounced regional differences across Europe (Mattle), which indicate the need for locally adapted yet connected programmes – exactly what *Aging is a Myth* intends with its network of partners from various European regions. The fifth pattern is the motivational structure of master athletes: competitive spirit, personal challenge, and social interaction (Kontro) form a unique combination that sustains long-term commitment, explaining why the project insists on a competitive element and not just recreational exercise.

The analysis also reveals a critical gap between evidence and practice, which Brach and colleagues (2023) highlighted. Despite an abundance of scientific confirmations, the real world lacks sustainable, accessible, and scientifically grounded programmes for older people, especially those that include high-intensity and sport-oriented activities. The *Aging is a Myth* project directly fills this void, offering a hybrid model that simultaneously respects the principles of progressive overload, individualisation, and safety. Physiological studies (Lepers, Pfeifer, Fernández-Peña) show that it is precisely the specific athletics stimulus – a combination of speed, strength, endurance, and coordination – that is most effective in combating sarcopenia, dynapenia, and neuromuscular deterioration. Finally, composite indicators such as the AAI confirm that active ageing is a multidimensional construct in which physical activity and social participation play a central role, and European comparisons unequivocally suggest that investing in sports for seniors brings social benefits at national and continental levels.

4. Conclusion

European scientific research over the past two decades provides compelling and consistent evidence of the multiple benefits of regular physical activity and master athletics for active and healthy ageing. Longitudinal studies, meta-analyses, and intervention research show that the combination of structured training and competitive performance yields the best results in preserving physical functions, mental health, and social inclusion. The *Aging is a Myth* project is completely aligned with these scientific recommendations through its unique model of six international running and athletics events combined with weekly training sessions in each partner country. This hybrid approach directly overcomes identified barriers such as lack of motivation, accessibility, and continuity, offering a clear structure and long-term incentive to remain in the programme.

The findings from the literature directly justify the project's focus on athletics as a discipline that simultaneously develops strength, speed, endurance, and coordination, thereby providing a comprehensive anti-ageing stimulus that can be individually dosed. Moreover, the competitive and group aspects create a social network that increases motivation, belonging, and psychological wellbeing – elements whose importance is confirmed by both motivational and social research. Based on the reviewed evidence, it can be expected that the project will significantly contribute to improving participants' quality of life, reducing the risk of chronic diseases, and strengthening the European network of active seniors. In addition to individual benefits, the project has the potential to generate wider societal effects, including relief for healthcare systems, promotion of intergenerational solidarity, and regional connection.

Implementing such a model is not simple and requires careful planning, trained coaches, and the assurance of safety, especially for seniors with incipient frailty, as also highlighted in the literature. Nevertheless, the evidence is clear: the benefits far outweigh the risks when the principles of progressive overload and professional guidance are respected. Finally, *Aging is a Myth* is not only a practical intervention but also a scientifically grounded platform that actively responds to European priorities in the areas of health, social inclusion, and active ageing. Its results, if systematically monitored and evaluated, could become a model of good practice replicated across the Union, thereby contributing to a vision of Europe where old age represents not a limitation but a new vital force.

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