The origins of Western mind–body exercise methods

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Background: Over recent decades, mind–body exercise methods have gained international popularity and importance in the management of musculoskeletal disorders.

Objectives: The scope of this paper was to investigate: the origins of Western mind–body methods, their philosophies, exercises, and relationship with mainstream healthcare over the last two centuries.

Major findings: Within a few decades of the turn of the 20th century, a cluster of mind–body exercise methods emerged from at least six pioneering founders: Checkley, Müller, Alexander, Randell, Pilates, and Morris. Each was based upon a similar exercise philosophy and similar functional movement-harmonizing exercises. This renaissance of independent mind–body schools occurred in parallel with the demise of the 18th and 19th century gymnasium Physical Culture movement and the concurrent emergence of bodybuilding and strength training. Even though mostly forgotten today, Western mind–body exercise methods enjoyed celebrated success during the first half of the 20th century, were hailed by medical and allied health practitioners and practiced by millions from society’s elite to deprived minorities.

Conclusions: Rediscovering the Western mind–body exercise movement is hoped to facilitate official healthcare establishment recognition of this kind of training as an integral entity. This may widen research opportunities and consolidate approaches toward: optimal musculoskeletal rehabilitation and injury prevention, promotion of a healthy active lifestyle environment in the modern world, and enhancement of the natural pain-free human athletic look, feel, and performance.

Keywords: Functional exercises, Harmonious movements, Physical therapy, Preventative medicine, Active lifestyle, History

Introduction
Natural movement-harmonizing exercises and stretches have likely been practiced since the beginning of mankind. Forms of non-strenuous rhythmical functional movements were used for three main purposes: To manage and prevent musculoskeletal disorders, to maintain a naturally healthy body and mind, and to enhance athletic performance. Around the turn of the 20th century, at least six independent Western modern mind–body (MMB) methods emerged simultaneously. This phenomenon occurred during the same era in which Einstein, Picasso, Freud, and Stravinsky also broke away from dominating and restrictive establishment controls, subsequently freeing their fields. The cultural changes and personal emancipation that MMB pioneers brought to the exercise world were no less dramatic, yet significantly less documented.

The purpose of this paper is to investigate the history, origins, and influences of Western MMB training, to raise healthcare stakeholders’ awareness of this type of training and to initiate the consideration of official acceptance of MMB methods as an independent exercise category alongside aerobic training and weightlifting. This would provide decision-makers and individuals with new tools to prescribe optimal exercise combinations for remedial purposes, prevention of pathologies, and obesity as well as general health and performance enhancement. Significantly, these are the major factors that facilitate a regular active lifestyle.

Background
Tracing the origins of Western MMB training suggests that the regular practice of movement-harmonizing exercises was embedded in ancient Greek culture. Calisthenics in Greek means strength and beauty, a combination highlighted in Greek mythology and everyday life. This philosophy engendered sporting activities that were practiced to facilitate self-empowerment and prepare for events such as the Olympic Games or military actions. Today, Calisthenics refers to full-body movement exercises benefiting the body and mind by employing functional motions such as bending, stretching, twisting, kicking, jumping, push-ups, sit-ups, and squats.

An early detailed documentation of a Western mind–body exercise philosophy was created in the late 18th
century by Swedish medical gymnastics teacher Pehr Henrik Ling (1766–1839), who is remembered as the father of Swedish Gymnastics. Ling developed an apparatus-free method to improve functional movement and concurrently address the concept of prevention and healing of human diseases.\(^9\) His early age rheumatism, experiences as a Fencing Master and his studies of medicine at Uppsala University influenced his ideas on the remedial benefits of physical training.\(^9\) His 1853 book ‘Gymnastic Free Exercises’ stated: ‘It cannot be denied that the art of preventing disease is far preferable to that of curing it.’\(^6\) Ling regarded his ‘gymnastic free exercises’ as one of two separate yet related systems; the other being competitive gymnastics and athletics. Together, these two systems defined what became the Physical Culture or Gymnasium Movement of the 19th century.\(^5\) Ling founded the Royal Gymnastic Central Institute in Stockholm in 1822, was an elected member of the Swedish General Medical Association, member of the Swedish Academy, and a Titular Professor. However, Ling remained indifferent to these honors due to the lack of the establishment’s implementation of his methods.\(^7\)

In parallel, Prussian nationalist and exercise instructor Friedrich Ludwig Jahn (1778–1852) advocated strengthening one’s mind and body through gymnastics.\(^8\) Jahn invented the standard equipment of modern gymnastics; the parallel bars, rings, balance beam, horse, and horizontal bar\(^4\) and in 1811, founded the Physical Culture Movement in Germany.\(^8\) Ling and Jahn’s Physical Culture gained following and flourished in gymnasiums throughout Europe and later in the United States of America until the end of the 19th century. However, toward the end of the century, the original concept of harmonious interaction between the competitive and holistic exercise systems eroded and deteriorated. This was due to the late 19th century shift in the gymnasium environment toward harsh paramilitary style training.\(^9\)\(^–\)\(^11\) The fatal blow to traditional Physical Culture in gymnasium clubs occurred at the turn of the 20th century when the new bodybuilding exercise force emerged and dramatically superseded the entire gymnasium floor space.\(^12\) This forced both traditional Physical Culture systems to require new professional establishments. Competitive athletes and gymnasts started training under ‘The International Gymnastics Federation’ (established in 1881)\(^13\) and within the ‘International Olympic Committee’ (established in 1894).\(^14\) Concurrently, mind–body enthusiasts migrated to new independent schools, in which pioneers could express their opinions freely and gain popular following. Between 1890 and 1925, at least six new MMB schools emerged, sharing a similar exercise philosophy and practicing similar exercises. These methods, which are the focus of this paper, were led by six charismatic pioneers: Checkley, Müller, Alexander, Randell, Pilates, and Morris.

**MMB Pioneers**

**Edwin Checkley (1847–1925)**

In 1890, English-born American physician Edwin Checkley published ‘A Natural Method of Physical Training’ in which he presented his MMB philosophy. Checkley’s exercise method was non-competitive, did not encourage physical or mental exhaustion, and did not require equipment. The aim was ‘to feel naturally light and strong and to have an effective body.’\(^9\) Checkley expressed his dismay toward the vigorous and ‘unnatural’ athletic training methods utilized in the gymnasiums at the time, as well as toward the new mechanized ‘muscle-molding schemes’ he referred to as ‘straining’ more than...
training.’ He criticized the ethics of aggressive performance-enhancing gymnastic and athletic training techniques claiming they were not natural, therefore harmful for the body and mind. In comparison, Checkley described animals in nature that sustain a lifetime of health, fitness, and beauty by performing seemingly effortless movements on a regular basis.9 Perhaps ironically, Checkley’s philosophy and exercises famously ‘converted’ Alan Calvert, the weightlifting pioneer who founded the Milo Bar-bell Company in 1902 and started Strength Magazine in 1914 (Figures 1, 2).12

Jørgen Peter Müller (1866–1938)
In 1904, Danish prize-winning athlete and gymnastics educator JP Müller followed Checkley’s exercise philosophy with the publication of ‘My System’. This book described how the relatively healthy, average person could keep fit, fortify health and stamina, and increase physical and mental efficiency with 15 min of daily exercise. He claimed: ‘If people only knew how much more, how much better and how much longer they can enjoy life, instead of being controlled by a weakly body, they have a strong and healthy one at their command!’15 Müller was born a weak child and developed an exercise routine to re-build his own body, inspired by the harmony of ancient Greek statues. His routine included exercising natural functional movements, self-massage of skin in fascial lines, exposure to the sun, and bathing in cold water in addition to running on the balls of the feet as an aerobic activity.15,16 He regularly exposed his physique publicly and famously demonstrated his exercises and outdoor activities wearing a loincloth, including skiing St Moritz.17 He stated:15

Make use of fresh air and clean water; let the sun shine upon you, and do not let a day pass without every muscle and every organ in your body being set in brisk motion, even if only for a short time.

With his philosophy and training, Müller was a legendary athlete in Denmark, winning national athletic events from running, javelin throwing, speed walking, and discus throwing to boxing and cross-country skiing.15,16 Müller, like Checkley, took a firm stand against exercise machinery, stating they were unnecessary and harmful with advocates described as having ‘biceps or triceps … as their chief credentials.’15 After ‘My System’ was published, Müller traveled throughout Europe with lectures and exercise demonstrations and settled in London in 1912, to establish the ‘Müller Institute’ in which he offered group and individual classes to the public.15,16 During the 1920s, the method’s most popular decade, Müller’s books sold by the millions and his exercises were practiced extensively, including Franz Kafka and the Prince of Wales.16,17 He was conferred a knighthood by the King of Denmark in 1919 and his work was granted patronage by the Prince of Wales in 1925.15,16

In his homeland of Denmark, Müller was a controversial figure. Some conceived his liberal philosophy and promotion of exposing the entire body to the sun to be anti-Lutheran and even pornography. During the last few years of his life, Müller returned to Denmark and vigorously promoted a natural ‘healing spring’, causing further resentment for being perceived as over-spiritual. After Müller’s death in 1938, a memorial bronze statue was erected by the Danish Government, however, he is since mostly forgotten by the general public (Figures 2–4).18

Frederick Matthias Alexander (1869–1955)
Around 1900, Tasmanian-born Australian professional reciter and theatrical producer Frederick Alexander developed a novel methodology to harmonize full-body functional movements. As a child, Alexander suffered respiratory ailments, leading to the initial purpose of developing the method – to normalize his personal voice function in order to materialize a stage performance dream. In 1902, Alexander established the Sydney Dramatic and Operatic Conservatorium and in 1904, moved to London to spread his teaching method. During the first years, Alexander focused on teaching ‘full chest breathing’ techniques mainly to stage artists and people with breathing pathologies.19 However, he soon discovered that retrieving the natural ‘conscious control’ via mindful postures and movements resulted in benefits not only for the vocal health and performance but also the health and performance of the whole body and mind.20 This holistic evolvement
In 1912, John Shields Fairbairn, a leading consultant obstetrician at St Thomas Maternity Hospital, London, started a program to revolutionize the medical approach to child delivery.22 This aimed to replace the 19th century medical practice of heavily medicating women during labor and the common use of force to deliver. To implement his vision of providing pregnant women with education and natural physical health for childbirth and recovery, Fairbairn chose Midwife and Physiotherapist Minnie Randell (1875–1974) to lead the newly founded St Thomas School of Physiotherapy, which served as the project’s education and training center.

Randell, (whose brother Francis William Randell and wife Jessie experienced two failed births in 1907 and 1913)24 was inspired by Ling’s philosophy and exercises of preventative medicine.22 Her repertoire included full-body movement exercises in the lying, sitting, and standing positions.25 The objectives of the pre-natal exercises were ‘to improve the physical and mental wellbeing of the patient – encourage a cheerful and confident outlook towards her confinement and so to help herself effectively during labour’. Pre-natal training included education, stretching, relaxing, and deep breathing with many free arm movements to improve circulation. The daily home exercises were designed to improve muscle tone, increase flexibility, and control of movement. The post-natal exercises were designed to improve the condition of relaxed muscles, in particular the abdominal muscles, so that the figure is restored to normal after confinement.26 As a reflection of the women’s suffrage movement, Randell encouraged female students to use their knowledge and healthy physical ability to gain self-empowerment and help others to do the same. She encouraged women to teach spouses to perform and to teach the exercises calmly and confidently; to reinforce

The St Thomas Hospital project

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The teamwork between parents and to be of practical assistance during childbirth.

Fairbairn also chose Obstetrician Kathleen Olga Vaughan, who in 1912 had just returned from several years of women’s health medical service in India. In the sub-continent, Vaughan was amazed that mostly affluent women suffered physically and mentally from childbirth, while poor women typically gave birth with relative ease. She explained that the active indigenous Indian lifestyle and regular exercises that maintain a functional pelvic anatomy were abandoned by the affluent. Vaughan also observed that traditional Indian women, who covered their entire body with garments, were at risk of medical dangers including osteopenia due to sunlight deprivation.

By the 1930s, the method was flourishing and the St Thomas faculty was reinforced with two of Randell’s distinguished physiotherapy graduates: Australian hockey star and medical student Barbara Mortimer Thomas (1910–1940), who served as main instructor, and English dancer and choreographer Margaret Morris (1891–1980), who already used remedial exercises in her dance teaching. Exercising to the beat of classical music, the dance moves and grace typical of the St Thomas Method exercises are attributed to Morris.

Publications, establishment recognition, and public support followed the success. In 1932, Fairbairn was elected President of the Royal College of Obstetricians and Gynaecologists. In 1936, Morris (in collaboration with Randell) published ‘Maternity and Post-Operative Exercises,’ that illustrated exercises for pregnant and puerperal women and those who had been operated on. The book emphasized breathing, relaxation, conscious training of the pelvic floor muscles, and re-establishing good posture. A year later, Morris published ‘Basic Physical Training’ for the general public, dedicated to ‘all those who, realising the inter-dependence of mental and physical well-being, are working to raise the standard of health.’ In 1939, Randell published her seminal textbook ‘Training for Childbirth - From the Mothers Point of View’ which described her philosophy in detail with related anatomy and pathology and exercise descriptions and instructions. This was followed up in 1949 with ‘Fearless Childbirth’, a practical manual for mothers-to-be.

In 1937, Randell’s number-two Thomas was sent to Australia to lecture on the St Thomas Project, teach the exercises, and assist local physiotherapists with the program’s implementation. There are multiple indications of an unknown video Thomas made during this visit, and it was reported later that as a result of the visit, the St Thomas method was implemented in maternity hospitals in Sydney and Melbourne; the exercises were used by physiotherapists on an individual basis and that Thomas was remembered as a pioneer of Australian antenatal physiotherapy.

In London, the Medical Officer of Thorpe Coombe maternity hospital approved and implemented the St Thomas method in 1940, presented as ‘Training for Childbirth - and After.’ There was also interest from the USA, but this option did not materialize.

The St Thomas method, however, did not survive World War II, besides the mentioned indications of use in Australia a decade later, and Randell’s work has since been forgotten. Various factors might attribute to this, including the tragic loss in 1940 when two bombs hit St Thomas hospital killing four physiotherapists including Thomas; and the promotion of rival London obstetric group, led by Grantly Dick-Read and Physiotherapist Helen Heardman, with the concept of natural childbirth. This movement gained favor with the healthcare establishments, chartered physiotherapists and the general public at the ultimate expense of the St Thomas Project. Randell left St Thomas physiotherapy school in 1945, just before the Chartered Society of Physiotherapy imposed a new syllabus. She received the royal title of OBE and extended her career interest with a focus on gynecological cases; in 1948, she co-founded the Obstetric Association of Chartered Physiotherapists, was awarded an honorary fellowship of the Chartered Society of Physiotherapists and was later remembered as the pioneer of modern women’s health physiotherapy (Figures 1, 5–7).

**Joseph Hubertus Pilates (1880–1967)**

One of the most recognized MMB pioneers was Joseph Hubertus Pilates, born near Dusseldorf in Germany to a prize-winning gymnastics father and naturopath mother. According to Pilates historians’, he was a bullied child who suffered asthma and a weak body that he overcame as a teenager by learning anatomy from medical books and the practice of sports such as wrestling and gymnastics. During this process, he developed a model body, which was even displayed in anatomy classes. In 1912, Pilates moved to
England to become a professional boxer. He found employment as a circus performer and fitness trainer for Scotland Yard. With the outbreak of World War I in 1914, being German, Pilates was placed in an ‘alien camp,’ initially in Lancaster where he trained fellow inmates and conceptualized his method of Contrology. He was later moved to the Isle of Man where he had duties training the injured inmates in their wards. It was there that Pilates started to connect springs to the hospital bed frames modifying them into effective and comfortable exercise devices which later evolved to become modern Pilates equipment.

In 1918 following WWI, Pilates returned to Germany where he started training dancers and quickly gained acclaim. However, to avoid Contrology being used by the German army, Pilates moved to the USA in 1925 and opened the Pilates Universal Studio in Manhattan. Pilates swiftly gained prominence with dancers and celebrities, which led to his notoriety as a New York City exercise personality. In 1932, Pilates taught Contrology exercises at the mythological Jacob’s Pillow Dance Festival as he did every summer until 1951. He claimed that ‘sports are wonderful … but of little value for correcting what’s wrong with you … corrective exercise is the only way to build a beautiful, strong, youthful body.’ He explained in his 1939 book ‘Your Health’: ‘Practically all human ailments are directly traceable to wrong habits which can only be corrected through the immediate adoption of right (natural, normal) habits’ … ‘the present day efforts of our so-called health departments are in vain so far as physical health is concerned’ … ‘this condition will prevail until such time as marks the recognition of a standard formation of sound and sane physical culture, based upon the natural laws of life.’ In his 1945 book ‘Return to Life Through Contrology,’ Pilates clearly supported Checkley, Müller, and Alexander stating that ‘Contrology is not a system of haphazard exercises designed to produce only bulging muscles’ … ‘Rather, it was conceived to limber and stretch muscles and ligaments so that your body will be as supple
remained within mainstream acceptance and popularity as ‘Pilates’.39,42

From a historical perspective, Pilates grew up with the mind–body approaches that were popular in Germany at the turn of the 20th century. However, he developed ‘Contrology’ as a concept method only after the several years in which he was free to roam and consolidate his self-learning process in England between 1912 and 1914. According to this research, it is likely he was exposed during these formative years in England to the prominent mind–body methods of Müller and Randell.

Pilates and his followers stood apart from the other MMB schools for surviving a turbulent century, for making multiple millions of people healthier in mind and body and for being a major force in reintroducing mind–body methods to healthcare establishments today. Furthermore, Pilates deserves credit for inventing his ingenious exercise equipment, which uniquely blends in harmoniously with the universal mind–body philosophy.

Margaret Morris (1891–1980)

By 1925, Margaret Morris had already integrated remedial exercises within her newly established dance school, Margaret Morris Movement (MMM). Her philosophy claimed that natural dance moves should be healthy and constructive for the body and mind, rather than the deleterious moves dancers were expected to practice and perform at the time. Morris saw the connections between breathing, stamina, range of motion, posture, health, vitality, and how these freed the body to dance and the mind to be creative.49 This philosophy extended itself to the use of natural dance moves as remedial exercises and a healthy active lifestyle. During 1925 and 1926, Morris presented her method to doctors and midwives in England, France, and Switzerland, among them the St Thomas team. As a result of this meeting, Morris enrolled to study physiotherapy under Randell and graduated in 1933 with distinction.30 Throughout her decade of collaboration with Randell and the St Thomas Project, Morris continued to educate and run MMM with great appreciation from top-tier dancers, students, and artistic critiques. By 1939, her teachers developed movement education and dance centers in 10 countries, most still active today (Figures 7–9).30

Later mind–body methods

Indian yoga gurus started arriving to the West at the turn of the 20th century, however, yoga as it is known today only evolved as a popular method to ‘stay healthy and relaxed’ during the second half of the century.50 There was no contact found between the sporadic early yoga arrivals to the West and the MMB pioneers discussed within this research. However, Eastern mind–body practices profoundly influenced Randell and Morris, most probably via Vaughan, who had just returned from years of obstetric work and eye-opening behavioral observations.
Checkley, Müller, Alexander, and Pilates initiated their interests from a self-requirement to improve health or overcome functional loss. They subsequently used their bodies as a model to demonstrate their method’s effectiveness and encourage others. Despite their turn of the 20th century separation from the gymnasium ‘Physical Culture’ and new independence, all six MMB pioneers advocated their exercises as an adjunct to other sports and regular daily activity; Müller recommended running on the balls of the feet as an aerobic activity, Pilates worked with dancers, while Morris, who besides her dedication to dance and dancers’ health also published ‘Tennis by Simple Exercises’ in 1937 together with French tennis mega-star Suzanne Lenglen.

The daily practice of the mind–body exercises took only a few minutes, to blend in with modern life rather than to dominate it. The exercises could be performed in private with no competitive, commercial, or political emphasis or personal ignominy. The MMB pioneers were against unnatural purpose-made exercise machinery, which was viewed as unnecessary and even dangerous. An exception was Pilates and his equipment. However, the revolutionary devices were designed (and succeeded) to improve the effect of Contrology exercises and philosophy, and to enhance the method’s natural experience and acceptance.

Within the MMB philosophical approach, the body’s nutritional and movement systems were integral. The key to maintaining a healthy digestive system and reducing fat percentage lay in regular exercise practice and a balanced diet. Checkley ridiculed fad diets, claiming they were unnecessary and irrelevant to a long-term solution. Müller claimed that ‘When your digestive system has been invigorated through physical exercise you can safely eat almost every kind of food’. Pilates recommended ‘to eat only enough food to restore the fuel consumed by the body’.

**Discussion**

**MMB pioneers and exercise philosophy**

This section outlines the shared characteristics of the six aforementioned MMB pioneers. They all elaborated in length on their philosophy and exercises from a personal perspective, leading to a similar notion that the innate ability to stand and move harmoniously as a normal manner provides multiple advantages. These include physical and mental health, reduced movement-based symptoms, prevention and optimal injury and sickness recovery, enhanced physical performance, retention of the natural human form, and the ability to control the harmonious body rather than acquired movement impairments.

The exercises developed by Checkley, Müller, Randell, Alexander, Pilates, and Morris were secular in nature. The holistic unity between harmonious movements and beauty, health, performance and youth, between the body and mind, and between human and nature were all emphasized yet these universal concepts were unimpeded by religious, political, or commercial influences. The exercises were simply harmonious functional human movements learned from observations of nature.
The exercises

The practice of the MMB methods is generally emphasized in three areas. Firstly, human movement is achieved with involvement of a centrally controlled dynamic synergy between the body’s stability and mobility movement elements. This ensures all the muscles of the body concurrently employ or counter movement forces which results in visible harmonious movements. Secondly, functionality is required as the MMB is aimed at correct natural movements that reflect the requirements of activity and life in the modern world. Consequently, non-functional movements are unjustified as an MMB exercise. Thirdly, learning of MMB exercises requires a cognitive focus on achieving harmonious functional movements. With practice, the cognitive learning process enables an automatic and harmonious physical performance, making the exercises as well as everyday tasks easier, safer, and more efficient. The MMB exercises were intended by their creators to be healthy and enjoyable, a cultural alternative to the practice of aggressively overtraining the body and accepting pain and injury as normal components of sport.

The MMB exercises are not pathology orientated or sport specific, rather all exercises are recommended for everybody, whether they are injured, healthy, or a competitive athlete; the ability to perform the exercises represents the normal. The exercises and sequence do not change, besides the difficulty levels which are adjusted according to the individual level of practice. The MMB progressions occur when the exercises become easier and eventually autonomous and harmonious, ensuring the short- and long-term benefits of practice. Harmonious breathing and relaxation techniques are employed in every exercise repetition. Furthermore, there is the recommendation to train daily in relaxed environments, with abundant fresh air and appropriate sunlight levels and to bath regularly. Studio training is recommended for beginners, people with ailments or performing athletes.

Expected effects

All six MMB pioneers expected near magical effects from the regular non-exhausting practice of their exercise regimes. This promised a lifetime of optimal health, beauty, and strength for the body and mind. Further, expected benefits include improved quality and efficacy of daily activities, looking and feeling good, making life itself easier and more pleasurable with a disappearance or reduction of symptoms while improving postures. This leads to increased self-esteem, reduced health costs, and the expectation of a longer and high-quality life. It is interesting to note that all six MMB pioneers enjoyed long and fruitful lives that reflect this philosophical model within real life examples: Checkley died in 1925 at 78; Müller in 1938 at 72; Alexander in 1955 at 86; Randell in 1974 at 99; Pilates in 1967 at 87; and Morris in 1980 at 89.

Conclusions

This research has revealed a forgotten chapter in recent history of physical rehabilitation, medicine, and sports. Independent MMB methods have enjoyed celebrated success since 1890 and the exercises have changed the lives of millions of individuals, from common citizens to athletic performers, celebrities and Royalty. The MMB methods have provided immense personal hope and also national pride, however, to date, they have not been communally recognized as an official clinical tool or as an independent sporting category. As the scope of this paper was limited to readily available published documents, resorting at times to third-source century-old information, it is hoped that the publication will instigate further investigations to the origins of MMB methods and the general history of movement-harmonizing exercises. As the six MMB pioneers were presented in this paper as part of a broad historic movement, it is expected that future research will expose multiple other like-minded exercise methods that were developed during the same era and in similar circumstances. This will provide current MMB educators and practitioners with a wealth of information and new angles of approach that remain applicable today. To support the official healthcare identification of MMB methods as an independent activity category besides aerobic training and weightlifting, high quality research through both prospective randomized and blinded investigations along with subsequent systematic reviews and meta-analysis will eventually be required. Standardized baseline measures and criteria will be needed with external standards including functional status outcomes and appropriate statistical analysis. As an independent category, the communal value of MMB methods can be validated scientifically and accepted as evidence-based healthcare.

Notes on contributors

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