

A systematic review on the application of Aikido as a psychosomatic tool in therapeutic setting (Part I)

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Summary

It is our contention that Aikido may have sufficient support for its use in complementary therapies in the field of clinical treatment. However, as far as we are aware, no extensive scientific studies highlighting the application of Aikido as a psychosomatic therapy in the field of psychological behavioural disorders has been carried out. Our aim here was to conduct a systematic review of scientific studies associated with the possible psychosomatic benefits of Aikido practice and to examine whether there is any theoretical basis for this psychosomatic health connection. In terms of methodology, a systematic review of published scientific literature on health and Aikido was conducted in adherence with PRISMA guidelines. Three aspects of the application of Aikido were identified, one corresponding to phases more susceptible to psycho-emotional instability such as during the period of adolescence; another aspect related to the treatment of overcoming trauma in subjects with post-traumatic stress disorder and the final aspect related to the improvements as a result of the practical intervention of mindfulness. It is evident from our review, that the treatment of Aikido as a discipline with psychotherapeutic potential requires further expert analysis from a cross-disciplinary and interdisciplinary perspective, which would involve establishing a suitable intervention model in order to attain a deeper understanding of the discipline of Aikido. Moreover, a mastery of the field of psychology and psychiatry is required to understand the internal cognitive processes of the subjects studied.

Key words:

Proprioception. Mindfulness. Martial arts. Complementary therapy. Health. Well-being.

Una revisión sistemática sobre la aplicación del Aikido como una herramienta psicósomática en sectores terapéuticos (Parte I)

Resumen

Hasta donde tenemos conocimiento no existe un campo de carácter científico extenso de la aplicación terapéutica de relación psicósomática en el Aikido, en el entorno de los trastornos y afecciones psicológicas del comportamiento. Partimos de la hipótesis de que el Aikido podría tener un respaldo suficiente en su uso en terapias complementarias al ámbito de los tratamientos clínicos. Nuestra finalidad fue realizar una revisión sistemática sobre los estudios de carácter científico asociados a los posibles beneficios psicósomáticos de la práctica del Aikido y comprobar si hay una teoría entre esta conexión de salud psicósomática. Metodológicamente se realizó una revisión sistemática de la literatura científica publicada en materia de salud y Aikido. Para su elaboración se han seguido las directrices de la declaración PRISMA. Se observan tres vertientes de aplicación del Aikido, una correspondiente a fases más susceptibles de inestabilidad psicoemocional como es la adolescencia. Otra vertiente relacionada con el tratamiento de superación de traumas en sujetos con trastorno por estrés postraumático y una última relacionada con la mejora de los aspectos relacionado con la intervención práctica de mindfulness. Se evidencia que el tratamiento del Aikido como una disciplina con potencial psicoterapéutico que requiere de un mayor análisis de expertos desde una perspectiva transdisciplinar e interdisciplinar, que permita encontrar un modelo de intervención idóneo para tener un conocimiento más profundo de la disciplina del Aikido. Además, se requiere un dominio del campo de la psicología y de la psiquiatría que permita entender los procesos cognitivos internos de los sujetos estudiados.

Palabras clave:

Propiocepción. Mindfulness. Artes marciales. Terapia complementaria. Salud. Bienestar

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Introduction

It was in the 1960s that the germ of scientific studies exploring the psychological dimension of Martial Artists began. This is the case of Kroll & Carlson in 1967¹ whose aim was to investigate the personality profiles of participants in amateur karate. Three years later Kroll & Crenshaw in 1970² described the personality traits among karatekas, comparing them with gymnasts, football players and wrestlers. In the same year, Pyecha³ defined the personality traits of Judo in relation to other sport disciplines. In 1980, Rothpearl⁴ obtained a considerable sample size of 152 karate practitioners for the study of personality. Fuller⁵ after analysing the psychological traits common to Martial Arts students, reflected on the transfer of training programmes to other population groups and the expectation of their psychological benefit. It was from 1980 onwards that there was a more convincing approach to the psychotherapeutic applications of Martial Arts, with Aikido appearing for the first time in this field of study⁶. And, it was in the 1980s and 1990s that Aikido featured in the academic world as a Martial Art with an acknowledged psychotherapeutic potential, intervention and psychological application.

Benedetti⁷ pointed out that sportsmanship or competition strips Aikido of its essence and that, moreover, Aikido is not just a grouping of oriental fighting techniques, such as is the case of competitive Judo or Karate. Aikido, besides being a Martial Art originating in Japan in the samurai tradition, gives the human being access to another way of being, to a real change⁸. It is thus a highly sophisticated Martial Art which is different from other Martial Arts⁹.

Aikido as a method was created and developed by Morihei Ueshiba (1883 Tanabe-1969 Iwama) in Japan between 1930 and 1960¹⁰. For Morihei Ueshiba, Aikido was the continuation of a syncretic process that began in Japan in the early 17th century, in which the traditional fighting arts (*bushido*) were transformed into disciplines of character development and paths to self-realisation (*budo*)¹¹. This process evolved thanks to the contributions of Chinese and Indian doctrines that shaped the Nipponese spirit, influenced by Zen Buddhism, Taoism and Confucianism⁸. It is, in essence, the consequence of an evolution and adaptation of many Martial Arts systems integrated into a single Eastern philosophical thought process⁶.

Aikido goes beyond the concept of combat, and aims to rediscover a state of psychophysical balance¹² that allows the spontaneous harmonisation of one's existence with the cosmos⁸. Aikido is literally broken down into the following parts: *ai* (union), *ki* (energy), and *do* (way). These three elements have been translated in different ways although they always derive the same meaning: the method or way (*do*) for the harmony or union (*Ai*) of the mental energy or spirit (*ki*)⁶. It is known, for example, that the proprioception factor is one of the most crucial senses for the survival of the human being with a networked system that extends throughout the organism. In this context, survival proprioception plays a fundamental role in the bonding between aikidokas (Aikido practitioners)¹³. Sanati *et al.*¹⁴ locate this essential factor in the joints and specifically through body contact of the wrists as a site of physical conflict and vulnerability in Aikido practitioners. This process of movement control is governed by a trait of 'self-stimulation' or circular action of the nervous system with the environment in which it interacts¹⁵. Proprioception, although most of the time managed unconsciously, is fundamental

to the human experience as it allows us to adapt to our environment. It has been described that the sense of proprioception is constituted by populations of neurons or mechanosensors distributed throughout the body known collectively as proprioceptors¹⁶. These are generators of proprioceptive impulses or afferent neuronal excitatory flow that travels to higher structures such as the cerebellum, sensorimotor cortex and hypothalamus. It is noted that states of abnormal emotional tension are relieved in various relaxation therapies by reducing proprioceptive impulses impinging on the posterior hypothalamus. The hypothalamus is a neuroendocrine integrating organ located in the central region of the brain that regulates emotional balance. Therefore, the management of proprioception in human development is essential for harmonious human behaviour¹⁷.

The model of overcoming the original martial character acquired by Aikido has been a process of transformation unprecedented in the history of Martial Arts. In the practice of Aikido, a vital philosophy is forged based not only on experiencing symbolic defeat without losing one's life, but on symbolic victory unified for both practitioners. As mentioned previously, all the philosophical and religious sources of Aikido such as Zen Buddhism, Taoism and Confucianism⁸ make the discipline of Aikido very different from other Martial Arts. This fact has been due to the capacity of synthesis of the Japanese people throughout history with a tradition of the various currents of thought⁸.

Undoubtedly, Aikido was chosen by Morihei Ueshiba to be the discipline which would transfer the best of traditional arts into a product of ancient wisdom¹⁸. This diverse legacy endows Aikido with certain therapeutic potential value based on how we approach this Art or system of bodily interaction. Lukoff & Strozzi-Heckler¹⁹ approach the character of Aikido by alluding to the psychological healing potential in the incorporation of meditation, concentration and breathing techniques from Zen Buddhism. Lukoff & Strozzi-Heckler¹⁹ further point out that the combination of features such as social contact, physical exertion and, above all, a practice of compassion and self-compassion give Aikido substantial psychosomatic benefits. Morihei Ueshiba distinguishes between body and spirit in terms of a human-being's make-up. For Morihei Ueshiba, the body was that which could blur the light of the spirit and Aikido the means to enlighten the being again⁸. In this sentence of Ueshiba, we can see the therapeutic purpose of Aikido and how, from the beginning, the union between *psyche* and *soma* is a close one.

In this way, the very idiosyncrasy of Aikido means that it creates a very significant symbolic psychosomatic relationship between the pair of practitioners during practice and this is at the origin of its creation. The practice translates into a continuous bodily self-analysis of how to overcome a conflict or struggle in addition to survival and awareness of the other. Morihei Ueshiba implements a modern methodology based on how to manage and resolve an attack in the most relaxed way possible. From the point of view of *tori* (in the role of receiving an attack from *uke*)⁹ points out that the purpose of Aikido is to resolve a physical conflict, managing the attack in the most harmless way and without harming the attacker. Saposnek⁶ describes that the role of *uke*, the attacker, is challenging *tori*, to provoke the confrontation and demonstrate his power over *tori*. The message can literally be translated as: 'you will not be able to change me because I am more powerful than you when I attack you'. This 'conflict', however, becomes an 'opportunity' to learn and

teach the challenger more constructive and harmless ways of asserting their power. The challenger *uke* must accept the mastery of *tori*'s role, not to resist and accept the change they teach you if you are open to it. So *uke* must assume that it is useless to act by force based on the principle of non-resistance in order not to experience harm and thus learn 'non-aggressiveness'. Snell²⁰ in this sense, transcribes the shared subjective experience of what he calls 'intersubjective states' of four aikidoka, in the first person, with foundations from Western phenomenology, Zen Buddhism and Shinto, somatic and choreographic practices.

Aikido is a system of interaction of circular forces, undifferentiated cause-effect relationship, mixed for mutual conflict resolution (neutralisation of aggression and redirection of energies) where duality (good-evil, friend-enemy) is eliminated in order to enter into the unity of the relationship⁶. Aikido in its essence is based on overcoming the duality model of 'I win and you lose', to 'you win and I win', a prerequisite for healthy personal relationships from a psychosocial point of view⁹ where the component of proprioceptive and emotional regulation is a key factor of this model of interaction. In this way, 'enemies' are cognitively and deliberately re-educated to be 'partners' and 'attacks' are 'opportunities'. Furthermore, the blurred perceptual boundaries between self and other are reinforced, helping to refocus negatively connoted situations to neutral and non-threatening ones⁵.

In spite of all of this established research regarding the psychosomatic dimension of Aikido, to the best of our knowledge, there is no extensive scientific field of therapeutic application of this psychosomatic relationship in Aikido applied in the fields of psychological disorders. For this reason, and given the particular characteristics of this Martial Art in its origin, we decided to analyse the reviewed academic bibliography of Aikido to check if this analysis would support our hypothesis regarding Aikido and its possible application to therapies related to the fields of psychology and psychiatry. Therefore, we proposed to carry out a systematic review of the scientific studies associated with the possible psychosomatic benefits of the practice of Aikido and to check if there is a theory between this connection of psychosomatic health and proprioception in pairs.

Material and method

In this study a systematic review was conducted of the published scientific literature on proprioception and Aikido in adherence with the PRISMA guidelines for systematic reviews²¹. The process of elaboration involved different phases which are detailed below.

Initial phase / systematic search

The first searches were conducted during the first quarter of 2022 by combining the terms 'aikido', 'proprioception', 'physical sense' and 'health' in the databases Web of Science, Scopus, Ebsco-Host, Dialnet, PubMed, ScienceDirect and Sport Discus. Subsequently, a combination, using the Boolean operators 'and', 'or' or 'near' was used to include both terms, i.e., aikidō (the Japanese term 合気道、合氣道, and its romanised equivalent), proprioception, sensitivity, kinaesthesia as well as their English translations. Martial Arts was a catch-all term used in

the Dialnet or Ebsco-Host databases to find the associations with Aikido as it could itself be part of another semantic or knowledge field. These searches yielded a considerable number of results, some of which were duplicated or of little use to the review. Aikido and Health terms were entered into all the databases, to establish a comparative framework between studies applying Aikido within the field of both Physical and Psychological Therapies.

Inclusion and exclusion criteria / application filters

Once the study of the field of application and the possible combinations of the terms of interest had been carried out, appropriate criteria were applied for each filter to select the results.

For the first filter consisting of reading the 'Title of the manuscript', the search was restricted to scientific journal articles, excluding other publications such as letters, commentaries, editorials, articles for which only abstracts were available, book chapters, final works such as undergraduate, postgraduate or doctoral theses (inclusion criterion 1). No date limitation (inclusion criterion 2) or linguistic restriction was imposed on the search (inclusion criterion 3), given the specificity of the topic, with the exception of articles written in Asian languages whose abstracts were not translated into English (exclusion criterion 1).

According to these criteria, and on the basis of the title alone, 51 articles were considered eligible (after eliminating duplicates between databases), as the subject matter did not correspond to the topic to be addressed. The second filter was applied, the reading of the abstract of the article, and from this reading 32 were discarded, as the subject matter had to be contextualised within the area of knowledge of Aikido and health (inclusion criterion 4) or the field of application of the previously associated terminology (n = 19). Next, we proceeded to the third level or filter, the reading of the 'body of the article'. This stage took into account the existence of Aikido training programmes and the analysis of this intervention on the subjects (inclusion criterion 5). Protocols that were merely descriptive of the technical skills of Aikido learning development were excluded (exclusion criterion 2). In addition, any kind of theoretical essay or dissertation on psycho-cognitive skills that did not focus on the practical application of improvement skills was excluded as well (exclusion criterion 3) (n=11). The remaining articles were included because of their subject-specific therapeutic treatment of these psychocognitive skills (n=8). Finally, 8 articles met the inclusion criteria and were selected for the systematic review. All of them aimed at our objective, i.e. to establish a relationship between Aikido and health aspects related to therapy and psychocognitive functional improvement (Figure 1).

Manual search

Lastly, Google Scholar was used with the combinations seen in previous searches to check whether any articles that had not appeared in the previous searches might have been left out. After applying the corresponding filters, the four articles found were not included as they were duplicates of those found in other databases already consulted. The results obtained in the different databases and the choice of articles in order to elaborate the flow chart are shown below (Table 1).

Figure 1. Adaptation of the filtered phases regarding the inclusion/exclusion criteria of the systematic review to a Flow Diagram.

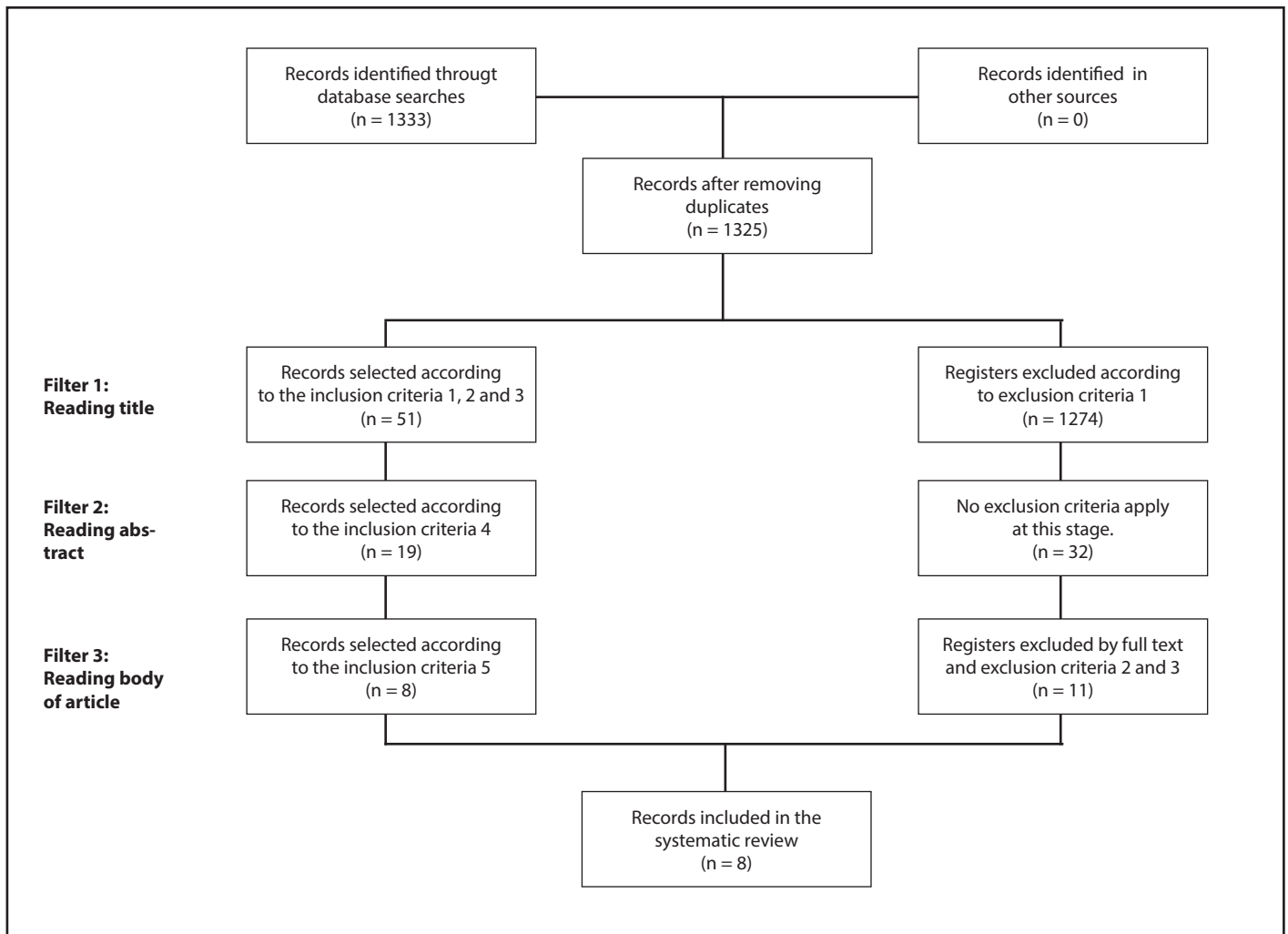


Table 1. Filters used for each database.

Database	Title reading	Abstract reading	Article reading
Web of Science	9	5	2
SCOPUS	7	2	0 (duplicates)
DIALNET	3	0	0
Sport Discus	12	3	2
PUBMED	14	6	4
Science Direct	6	3	0
Total	51	19	8
Google Scholar*	19	4	0 (duplicates)
Total	70	23	8

(*) A supplemental search on Google Scholar was conducted to ensure the systematic review. This last check confirmed that the final total results were definitely eight.

Results

From this search, our findings point to the 1990s as the starting point when the discipline of Aikido began to be incorporated into intervention programmes for the study of the emotional regulation of aggression²², and indeed, whether the practice of Aikido had any affect on self-esteem, anxiety and anger²³. It took more than a decade before studies related to the association of Aikido work with mindfulness²⁴ and its correlation with anxiety disorder²⁵, emerged. For example, Weiss *et al.*²⁶ implemented a programme applying Aikido instructions as a treatment for ex-war veterans suffering from Posttraumatic Stress Disorder (PTSD). Szabolcs, Szabo & Köteles²⁷ study among other oriental forms of physical activity what kind of affect the practice of Aikido and the study of the variable flow experience would have. Ben-Soussan *et al.*²⁸ study variables related to mindful movements. Elsewhere, Szabolcs *et al.*²⁹ evolve to a more complex analysis to analyse the impact of the practice on spirituality, mindfulness, body awareness, and self-compassion (Table 2).

Table 3 shows the methodological characteristics of the studies found. We can classify two large groups, those studies that directly select Aikido practitioners by passing questionnaires to them or by carrying out tests through cohorts of their practice, studying their effects before and after their training^{23,24,27} or in a cross-sectional manner comparing Aikido practitioners directly with other populations^{28,29}. Another group where an intervention programme is applied based on the characteristics of Aikido and designed exclusively for the subjects to practise this Japanese Martial Art for the first time are pre-adolescent initiates, i.e., 22 young university students²⁵ and war veterans with PTSD²⁶.

Table 4 reflects a wide range of variables analysed with each of its scales in which the authors have examined, the extent to which, Aikido

can be inferred in terms of modifying the management of emotions that make up the personal behavioural traits of each individual. Firstly, we find frustration, tolerance, problem behaviours, self-control and aggressive behaviour²²; secondly, self-esteem, state-anxiety and anger²³; and thirdly, self-esteem and anger²⁴; fourth, PTSD and symptoms of depression²⁶; fifth, mindfulness and the psychic and somatic components of anxiety²⁵; sixth, flow experience (in other words, skill-challenge harmony and oneness with the experience) and positive affect and negative affect²⁷; in seventh Mindful Movement (Time-production task and Homolateral interlimb coordination task)²⁸; and finally, spirituality, mindfulness, body awareness, and self-compassion²⁹.

Table 2. Descriptive data.

	Authors (Year)	Title	DOI	Journal	Location*
1	Jorge Delva-Tauiliili (1995)	Does brief Aikido training reduce aggression of youth?	10.2466/pms.1995.80.1.297	<i>Perceptual and Motor Skills</i> . 80:297-298	Hawaii, Honolulu (USA)
2	Yumi Akuzawa Foster (1997)	Brief Aikido Training versus Karate and Golf Training and University Students' Scores on Self-Esteem, Anxiety, and Expression of Anger	10.2466/pms.1997.84.2.609	<i>Perceptual and Motor Skills</i> . 84:609-610	Wichita, Kansas (USA)
3	John Lothes II, Robert Hakan, Karin Kassab (2013)	Aikido Experience and its Relation to Mindfulness: A Two-Part Study	10.2466/22.23.PMS.116.1.30-39	<i>Perceptual & Motor Skills: Learning & Memory</i> . 116(1):30-39	Wilmington, North Carolina (USA)
4	Tobias C. Weiss, Benjamin D. Dickstein, Joseph E. Hansel, Jeremiah A.Schumm, Kathleen M. Chard (2017)	Aikido as an Augment to Residential Posttraumatic Stress Disorder Treatment	10.1037/mil0000194	<i>Military Psychology</i> . 29(6):615-622	Cincinnati, Ohio (USA)
5	Rodrigo Cuéllar Hidalgo, Aldo Bazán Ramírez, Gerardo Alonso Araya Vargas (2019)	Effects of Aikido practicing on mindfulness and anxiety in Costa Rican university students	10.47197/retos.v0i35.62044	<i>Retos</i> . 35:13-19	San José (Costa Rica)
6	Zsuzsanna Szabolcs, Attila Szabo, Ferenc Köteles (2019)	Acute Psychological Effects of Aikido Training	10.33607/bjshs.v11i2i1.778	<i>Baltic Journal of Sport & Health Science</i> . 1(112):42-49	Budapest (Hungary)
7	Tal Dotan Ben-Soussan, Joseph Glicksohn, Antonio De Fano, Federica Mauro, Fabio Marson, Manuela Modica, Caterina Pesce (2019)	Embodied time: Time production in advanced Quadrato and Aikido practitioners	10.1002/pchj.266	<i>Psychology Journal</i> . 8:8-16	Roma (Italy)
8	Zsuzsanna Szabolcs, Barbara Csala, Attila Szabo, Ferenc Köteles (2021)	Psychological aspects of three movement forms of Eastern origin: a comparative study of Aikido, Judo and Yoga	10.1080/11745398.2020.1843507	<i>Annals of Leisure Research</i> 1-21	Budapest (Hungary)

(*) Location of the Research Group from which the interest in carrying out a quasi-experimental analysis on the analysis of psychological variables in Aikido has arisen.

Table 3. Objectives and methodologies.

	Authors (Year)	Objective	Sample	Design	Intervention*
1	Delva-Tauiliili (1995)	To examine whether the practice of Aikido, a non-violent Japanese martial art, effectively reduces aggressive behaviour of preadolescent youth	42 Male Preadolescent Youth, Asian and Pacific Islanders aged 9-12 years (Experimental group: 21 subjects; Control group of 21 subjects on waiting list)	Pre-test and post-test mean scores were performed and compared between the control and experimental groups, before and after 2 weeks of daily training from Monday to Friday	Training on the Basic Principles of Aikido with a methodological structure adapted in the school for pre-adolescents

(continue)

Table 3. Objectives and methodologies (continuation).

Authors (Year)	Objective	Sample	Design	Intervention*
2 Foster (1997)	To investigate if Aikido training is effective in improving selected aspects of personality	69 volunteers were university physical education students from Ohio State University and Stanford University. The 4 initiation groups were divided into three modalities: experimental group of 20 Aikido initiates, 24 karate initiates, 13 golf initiates. There was also a control group of 12 golf initiates	Pre-test and post-test of the means of the variables were carried out over a period of 10 weeks of training	Aikido initiation course in the University context
3 Lothes II, Hakan, & Kassab (2013)	To examine the potential association of training in Aikido may have on mindfulness	179 adult participants over 18 years of age were recruited via email and online. Study I: Experimental group: 159 participants (111 male, 48 female) Aikido students. Control group: 20 participants (4 male, 16 female) psychology students with no martial arts experience. Study II: Experimental group: 12 volunteer Aikido practitioners (3 females, 9 males). Control group: 20 psychology students (13 females, 7 males)	Study I: A cross-sectional data collection for the questionnaires for each subject was carried out online. It took 5 months to collect the 159 surveys and the levels of experience were compared with the ranks acquired and the length of practice experience Study II: Longitudinal design of the experimental group with a control group	Study I: There was no training programme designed <i>ex-profeso</i> within the context of Aikido schools in the USA. Study II: A design was made to insert Mindfulness practices during their Aikido training
4 Weiss <i>et al.</i> (2017)	To examine the effects of augmenting an evidenced-based residential Posttraumatic Stress Disorder (PTSD) treatment program for veterans with group-based instruction in Aikido	193 Former Vietnam War veterans (108 men/85 women) receiving residential treatment for Post-Traumatic Stress Disorder at a Midwest Veterans Affairs Medical Center. Cognitive processing therapy was part of their primary treatment	Quasi-experimental cohort design with a 7-week follow-up for an overall duration of 52 months. Measurement cohorts were applied to both groups of 85 women and 108 men assigned to practise Aikido and non-Aikido in such programmes	Specially designed programme as complementary therapeutic treatment for war veterans
5 Cuéllar, Bazán & Araya (2019)	To examine the effect of practising Aikido on mindfulness and anxiety state in university students with no previous experience in martial arts	24 students from the University of Costa Rica. The experimental group consisted of 12 students from different careers (10 males and 2 females; ages 18-62 years); and the control group consisted of 12 students from the Bachelor in Human Movement Sciences (9 males and 3 females; ages 21-34 years)	Quasi-experimental design, with pre- and post-treatment measurements, with one experimental group and one active control group. Implementation programme based on an 11-week training programme (two weekly sessions of 2 hours each)	Specially designed programme in a context outside of Aikido schools
6 Szabolcs, & Szabo, Köteles (2019)	To examine for the first time the hypothesis that Aikido training, like many other western forms of organised physical activities, has acute psychological benefits as manifested via favourable changes in affect and the flow experience	53 participants were recruited from Aikido clubs of the Aikido Foundation in the metropolitan area of Budapest aged 18-57 years (85% male-15% female). who practised Aikido as a regular recreational activity	Cohort design at least 3 surveys data collections were conducted for one of the variables and another at least 1 time	The programme included the Aikido sports schools' own training sessions
7 Ben-Soussan <i>et al.</i> (2019)	To examine the effect of Mindful Movements (MMs-specific types of mind-body coordination-demanding physical activity) on Time Perception (TP)	34 healthy adults volunteered, including 11 practitioners of Aikido (4 males and 7 females) and 9 practitioners of advanced Quadrato Motor Training (4 males and 5 females) and 14 physically inactive controls (7 males and 7 females)	A mixed observational study	There was no specific design. They were collected directly from the Aikido Schools
8 Szabolcs <i>et al.</i> (2021)	To examine four characteristics rooted in Eastern philosophy and religious practice, i.e spirituality, mindfulness, body awareness, and self-compassion in healthy individuals	Experimental group of 265 subjects (Aikido with n= 121, 18% female: average age 37+11 years; Yoga with 75, 84% female, average age 44+11 years)- Control group with 76 subjects, 67% female, average age 27 + 9 years old	Cross-sectional study collecting survey data via online questionnaires from subjects belonging to their own sports schools	There was no intervention programme or implementation in the design

*Context of Aikido intervention in this study based on the phases, exercises and fundamentals that are developed in its routines or training protocols.

Table 4. Variables, scales of measurement and results.

Authors (Year)	Psychological, somatic, cognitive and emotional variables	Scales and measures	Relevant results	Conclusions
1 Delva-Tauiiili (1995)	<ul style="list-style-type: none"> - Frustration tolerance - Problem behaviours - Self-control - Aggressive behaviour 	<ul style="list-style-type: none"> - Teacher's Self-control Rating Scale and on aggressive behaviour - Subscales of the Child Behaviour Rating Scale 	No significant differences were found in aggressive behaviour and self-control between the Aikido group and the control group	Methodological limitations such as the lack of randomisation in the groups and the short training time are not sufficient to have a significant effect
2 Foster (1997)	<ul style="list-style-type: none"> - Self-esteem - State-anxiety - Anger 	<ul style="list-style-type: none"> - Self-esteem Scale - State-trait Anxiety Inventory - Anger Expressions Scales from the State-Trait Anger Expression Inventory 	No significant differences were found between the pre-test and post-test in the Aikido group in terms of self-esteem, state anxiety, trait anxiety or anger expression. The Karate group showed significantly lower means on trait anxiety, state anxiety and anger expression	The subjects should be observed for several years of training to evaluate changes in test scores
3 Lothes II, Hakan, & Kassab (2013)	<ul style="list-style-type: none"> - Mindfulness Skills - Mindfulness attention awareness 	<ul style="list-style-type: none"> - Kentucky Inventory of Mindfulness - Skills and Mindfulness Attention Awareness Scale 	The results of both studies show significant increases in mindfulness scores with Aikido training	This kind of field of knowledge requires longitudinal designs and empirical research to progress further
4 Weiss <i>et al.</i> (2017)	<ul style="list-style-type: none"> - Posttraumatic Stress Disorder (PTSD) - Depression symptom 	<ul style="list-style-type: none"> - PTSD Checklist Stressor Specific Version (PCL5) - Clinician Administered PTSD-Scale (CAPS) - Beck Depression Inventory: Second Edition (BDI-II) 	Female veterans who received Aikido experienced a greater decrease in self-reported PTSD and depression symptoms during treatment. No benefits were found in men	The results of this study are affected by certain limitations such as not using a randomised design, which increases the risk of possible therapist and Aikido instructor effects. Furthermore, a better understanding of the mechanism underlying Aikido needs to be developed to help clinicians
5 Cuéllar, Bazán & Araya (2019)	<ul style="list-style-type: none"> - Mindfulness - Psychic Component (PC) of anxiety - Somatic Component (SC) of anxiety 	<ul style="list-style-type: none"> - Mindfulness Attention Awareness Scale (MAAS) - Hamilton Anxiety Scale (HAS) 	Positive effects of Aikido practice on mindfulness and anxiety status were evident. Overall, Aikido practice showed significant effects on mindfulness and anxiety PC and a significant and small effect on SC	The results show that practising Aikido, as might be the case with other martial arts, brings a benefit in mood that exceeds that which can be obtained from regular physical activity as part of an active lifestyle
6 Szabolcs, & Szabo, Köteles (2019)	<ul style="list-style-type: none"> - Flow experience - Skill-challenge harmony - Oneness with the experience. - Positive affect and negative affect 	<ul style="list-style-type: none"> - 10-item psychometrically validate Hungarian version of this instrument (PANAS-HU) based in The Positive Affect Negative Affect Scale (PANAS) - The Hungarian Flow State Questionnaire (FSQ): derived from several versions of the Flow State Scale (FSS) 	The flow experience in aikidokas is similar to aerobic or spinning exercise. More experienced aikidokas reported a higher skill-challenge harmony than less experienced martial artists	These findings reveal relatively clearly for the very first time in the literature that Aikido practice has acute, or immediate, psychological benefits similar to other martial arts and exercises
7 Ben-Soussan, <i>et al.</i> (2019)	<ul style="list-style-type: none"> - Time Production (TP): link bodily perception, human time perception and Mindfulness - Homolateral interlimb coordination - Creativity 	<ul style="list-style-type: none"> - TP/Time-production task - Homolateral interlimb coordination task - Creativity Task (Alternate Uses Task) 	No differences were found between the Aikido and the control group	Future studies should extend the current results, including a larger sample, several training regimes for interventional testing, and additional neuroscientific measures to investigate the hypothesized neural mechanisms
8 Szabolcs <i>et al.</i> (2021)	<ul style="list-style-type: none"> - Spirituality - Mindfulness - Body awareness - Self Compassion 	<ul style="list-style-type: none"> - The Spiritual Connection Questionnaire (SCQ-14) - Mindful Attention Awareness Scale (MAAS). 15-item scale - The Body Awareness Questionnaire (BAQ) - The Self-Compassion Scale (SCS) 	Generally, higher levels of mindfulness, spirituality, body awareness and self-compassion were found in the Eastern movement forms (Yoga, Aikido and Judo) in contrast to the controls. However, in comparison to Aikido and Judo, Yoga emerged to be the most prominent with respect to the examined four characteristics	Intervention studies are needed to explore the causal relationship(s) between these practices and the variables studied, which may lead to safe recommendations for selecting a specific activity for mental health benefits

Bibliography

1. Kroll W, Carlson BR. Discriminant Function and Hierarchical Grouping Analysis of Karate Participants' Personality Profiles'. *Res Q Am Assoc Health Phys Educ.* 1967;38:405-11.
2. Kroll W, Crenshaw W. Multivariate personality profile analysis of four athletic groups. In: Kenyon GS. *Proceedings of the Second International Congress of Sport Psychology.* Chicago: Athletic Institute; 1970. p.97-106
3. Pyecha J. Comparative effects of judo and selected physical education activities on male university freshman personality traits. *Res Q Am Assoc Health Phys Educ.* 1970; 41:425-31.
4. Rothpearl A. Personality traits in martial artists: A descriptive approach. *Percept Mot Skills.* 1980;50:395-401.
5. Fuller JR. Martial arts and psychological health. *Br J Health Psychol.* 1988;61:317-28.
6. Saposnek DT. Aikido: A model for brief strategic therapy. *Fam Process.* 1980;19:227-38.
7. Benedetti S. *Aikido. Le livre du Débutant.* Aix en Provence. Les Éditions du soleil Levant; 1993.
8. Protin A. *Aikido, un art martial, une autre manière d'être.* St Jean de Braye. Editions Dangles; 1977.
9. Crum T. *The magic of conflict: Turning a life of work into a work of art.* New York. Touchstone; 1987.
10. Westbrook A, Ratti O. *Aikido and the dynamic sphere.* Tokyo. Charles E. Tuttle Publishing Co. Inc.; 1970.
11. Rothman, R. *Aikido Sensibilities: The Sociosomatics of Connection and Its Role in the Constitution of Community at North Bay Aikido in Santa Cruz, California.* [Doctoral thesis]. Santa Cruz. University of California; 2000.
12. Noy C. An aikidōka's contribution to the teaching of qualitative inquiry. *Qual Res J.* 2015;15:4-21.
13. Hourani L, Tueller S, Kizakevich P, Lewis G, Strange L, Weimer B, et al. Toward preventing post-traumatic stress disorder: development and testing of a pilot predeployment stress inoculation training program. *Mil Med.* 2016;181:1151-60.
14. Sanati E, Kordi YA, Parandavarfard S, Yazdani F. Comparison of sense of wrist joint position between aikidokas and healthy people. *J Martial Arts Anthropol.* 2021;21:38-46.
15. Gibson JJ. *The senses considered as perceptual systems.* Boston. Houghton Mifflin Company; 1966.
16. Tuthill JC, Azim E. Proprioception. *Curr Biol.* 2018;28:R194-R203.
17. Gellhorn E. Motion and emotion: The role of proprioception in the physiology and pathology of the emotions. *Psychol Rev.* 1964;71:457-72.
18. Stevens J. *Paz abundante.* Barcelona. La biografía de Morihei Ueshiba, fundador del aikido. Biblioteca Salud. Editorial Kairós; 1997.
19. Lukoff D, Strozzi-Heckler R. Aikido: A martial art with mindfulness, somatic, relational, and spiritual benefits for veterans. *Spiritual Clin Pract.* 2017;4:81.
20. Snell C. At the threshold: approaching inter-subjectivity in the creative process with somatic Aikido methodology. *J Dance Somat Pract.* 2012;4:249-56.
21. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, Shamseer L, Tetzlaff JM, Akl EA, Brennan SE, Chou R. Declaración PRISMA 2020: una guía actualizada para la publicación de revisiones sistemáticas. *Rev Esp Cardiol.* 2021;74:790-9.
22. Delva-Tauillili J. Does brief Aikido training reduce aggression of youth? *Percept Mot Skills.* 1995;80:297-8.
23. Foster YA. Brief aikido training versus karate and golf training and university students' scores on self-esteem, anxiety, and expression of anger. *Percept Mot Skills.* 1997;84:609-10.
24. Lothes J, Hakan R, Kassab K. Aikido experience and its relation to mindfulness: A two-part study. *Percept Mot Skills.* 2013;116:30-9.
25. Cuellar Hidalgo R, Bazán Ramírez A, Araya Vargas GA. Effects of practicing aikido on mindfulness and anxiety in Costa Rica university students. *Retos.* 2019:13-9.
26. Weiss TC, Dickstein BD, Hansel JE, Schumm JA, Chard KM. Aikido as an augment to residential posttraumatic stress disorder treatment. *Mil Psychol.* 2017;29:615-22.
27. Szabolcs Z, Szabo A, Kóteles F. Acute psychological effects of aikido training. *Balt J Sport Health Sci.* 2019;1.
28. Ben-Soussan TD, Glicksohn J, De Fano A, Mauro F, Marson F, Modica M, et al. Embodied time: Time production in advanced Quadrato and Aikido practitioners. *PsyCh Journal.* 2019;8:8-16.
29. Szabolcs Z, Csala B, Szabo A, Kóteles F. Psychological aspects of three movement forms of Eastern origin: a comparative study of aikido, judo and yoga. *Ann Leis Res.* 2021:1-21.