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Evidence Based Yoga: osteoporosi e disturbi cognitivi

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Sondaggio Teis 2019

Metodo: intervista 8.6.19

Intervistati: n. 17 insegnanti di Yoga esperti, Italia

Domanda 1:

In base alla tua esperienza, negli ultimi 10 anni, sono aumentate le persone che vengono a praticare yoga per problemi di salute ?

14 Si 3 Non lo so

Domanda 2:

Negli ultimi 10 anni sono aumentati i medici che hanno un atteggiamento positivo verso lo yoga?

17 Si 0 Non lo so

Evidence based Yoga

Dal 1990 in poi si sono diffusi nella medicina il concetto e la pratica della **Evidence Based Medicine (EBM)**

Nel 1996 uno dei padri dell' EBM, D L Sackett, scrive:
La medicina basata sull'Evidenza è l'uso accurato, esplicito e saggio della evidenza corrente nel prendere decisioni sulla cura del singolo paziente. La pratica della medicina basata sull'evidenza significa l'**integrazione** della **competenza clinica consolidata individuale** con la **migliore evidenza esterna disponibile** derivante da una **ricerca sistematica**"²

² Sackett DL, Rosenberg WM, Gray JA, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. BMJ. 1996 Jan 13;312(7023):71-2. PubMed PMID: 8555924. "Evidence based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external clinical evidence from systematic research"

l'EBM è quindi essenzialmente **un processo cognitivo e decisionale** per migliorare la cura del paziente³

L'EBM ha progressivamente influenzato la letteratura scientifica ed il lavoro quotidiano dei medici, fino a costituire la base per le linee-guida mediche

³ “ External clinical evidence both invalidates previously accepted diagnostic tests and treatments and replaces them with new ones that are more powerful, more accurate, more efficacious, and safer.” Sackett DL op cit

Osteoporosi & Yoga

Osteoporosi - introduzione

“L’osteoporosi è caratterizzata da una bassa massa ossea e da un deterioramento strutturale del tessuto osseo, con un conseguente aumento della fragilità ossea, con conseguenti fratture non collegate ad un trauma significativo. L’incidenza dell’osteoporosi aumenta in modo marcato con l’età e nelle donne aumenta dal 2% a 50 anni a più del 25% ad 80 anni. Si stima che in Italia soffrano di osteoporosi 3,5 milioni di donne ed 1 milione di uomini....il rischio di fratture è anche aumentato da fattori come lo stile di vita, i trattamenti farmacologici, la storia familiare ed altre condizioni che causano l’osteoporosi secondaria”⁴

⁴ Cianferotti L, Brandi ML. [Guidance for the diagnosis, prevention and therapy of osteoporosis in Italy](#). Clin Cases Miner Bone Metab. 2012 Sep;9(3):170-8. Epub 2012 Dec 20. PubMed PMID: 23289033

La prima valutazione diagnostica si fa con esami del **sangue** e delle **urine**⁵:

VES, emocromo, elettroforesi proteica, fosfatasi alcalina totale, creatinina, calcio (corretto per l'albumina), fosforo, calcio urinario delle 24 ore

A livello strumentale per la valutazione si usa la **densitometria ossea**⁶
(DEXA ovvero MOC)

⁵ Modificato da Cianferotti L. op. cit.

⁶ Lewiecki EM. **Osteoporosis: Clinical Evaluation**. 2018 Apr 23. In: De Groot LJ, Chrousos G, Dungan K, Feingold KR, Grossman A, Hershman JM, Koch C, Korbonits M, McLachlan R, New M, Purnell J, Rebar R, Singer F, Vinik A, editors. Endotext [Internet]. South Dartmouth (MA): MDText.com, Inc.; 2000-. Available from <http://www.ncbi.nlm.nih.gov/books/NBK279049/> PubMed PMID: 25905277
The World Health Organization (WHO) diagnostic classification (Table 1) (3) is made by bone mineral density (BMD) testing with dual-energy X-ray absorptiometry (DXA) using the T-score, calculated by subtracting the mean BMD (in g/cm²) of a young-adult reference population from the patient's BMD and dividing by the standard deviation (SD) of the young-adult reference population. The International Society for Clinical Densitometry (ISCD) recommends that BMD be measured at the lumbar spine (ideally L1-L4)"

La **malattia** è **multifattoriale** ed anche il trattamento deve quindi esserlo.

Sia nella prevenzione che nella terapia non farmacologica i **3 interventi principali** sono:

- calcio
- vitamina D
- attività fisica

Una recente rassegna ha studiato l'azione dell'**attività fisica** nella prevenzione e nella terapia dell'osteoporosi nelle **donne in post-menopausa** ⁷. Queste le conclusioni:

“i nostri risultati indicano un effetto relativamente piccolo statisticamente significativo, ma possibilmente importante, dell'**esercizio** sulla densità ossea comparata con il gruppo di controllo [che non ha fatto l'attività fisica, ndt]. L'esercizio ha la potenzialità di essere una via sicura ed effettiva di evitare la perdita di osso nelle donne in post-menopausa”

⁷ Howe TE, Shea B, Dawson LJ, Downie F, Murray A, Ross C, Harbour RT, Caldwell LM, Creed G. **Exercise for preventing and treating osteoporosis in postmenopausal women**. Cochrane Database Syst Rev. 2011 Jul 6;(7):CD000333. doi: 10.1002/14651858.CD000333.pub2. Review. PubMed PMID: 21735380 “Our results suggest a relatively small statistically significant, but possibly important, effect of exercise on bone density compared with control groups. Exercise has the potential to be a safe and effective way to avert bone loss in postmenopausal women.”

Osteoporosi e Yoga - evidenze scientifiche

“Yoga and osteoporosis” in PubMed: 28 articoli⁸
altri articoli reperibili in Google Scholar o Research gate o con
referenze incrociate

La maggior parte degli altri studi sono editoriali o case reports

La ricerca bibliografica ha evidenziato **10 studi** che hanno
documentato effetti dello Yoga, in generale **positivi**.

Negli studi sono state usate diverse pratiche di yoga, fra cui:
asana, surya namaskara, pranayama, recitazione di mantra,
meditazione, rilassamento

In uno studio è stato praticato prima il pranayama e poi in una
seconda fase asana.

⁸ Ricerca effettuata il 05/06/2019

Referenze

Prasad, Kalepu & Raju et al. (2004). **Effect of pranayama and yoga on bone metabolism in normal healthy volunteers.** Journal of Exercise Physiology Online. 7. 58

https://www.researchgate.net/publication/258289602_EFFECT_OF_PRANAYAMA_AND_YOGA_ON_BONE_METABOLISM_IN_NORMAL_HEALTHY_VOLUNTEERS

Phoosuwan M, Kritpet T, Yuktanandana P. **The effects of weight bearing yoga training on the bone resorption markers of the postmenopausal women.** J Med Assoc Thai. 2009 Sep;92 Suppl5:S102-8. PubMed PMID: 19891384

FISHMAN, Loren M. **Yoga for osteoporosis: a pilot study.** Topics in Geriatric Rehabilitation, 2009, 25.3: 244-250

https://www.researchgate.net/publication/232144370_Yoga_for_Osteoporosis_A_Pilot_Study

Oswal P, Nagarathna R, Ebnezar J, Nagendra HR. **The effect of add-on yogic prana energization technique (YPET) on healing of fresh fractures: a randomized control study.** J Altern Complement Med. 2011 Mar; 17(3):253-8. Epub 2011 Mar 9. PubMed PMID: 21417810

Kumar A, Archana E, Pai A, Nayak G, Shenoy RP, Rao A. **Serum mineral status and climacteric symptoms in perimenopausal women before and after Yoga therapy, an ongoing study.** J Midlife Health. 2013 Oct;4(4):225-9. doi: 10.4103/0976-7800.122251. PubMed PMID: 24381464

Kim S, Bemben MG, Knehans AW, Bemben DA. **Effects of an 8-Month Ashtanga-Based Yoga Intervention on Bone Metabolism in Middle-Aged Premenopausal Women: A Randomized Controlled Study.** J Sports Sci Med. 2015 Nov 24;14(4):756-68. eCollection 2015 Dec. PubMed PMID: 26664272

Motorwala ZS et al. **Effects of Yogasanas on osteoporosis in postmenopausal women.** Int J Yoga. 2016 Jan-Jun;9(1):44-8. doi: 10.4103/0973-6131.171717. PubMed PMID: 26865770

Lu YH, Rosner B, Chang G, Fishman LM. **Twelve-Minute Daily Yoga Regimen Reverses Osteoporotic Bone Loss**. Top Geriatr Rehabil. 2016 Apr;32(2):81-87. Epub 2015 Nov 5. PubMed PMID: 27226695

Stone TM et al. **An Evaluation of Select Physical Activity Exercise Classes on Bone Metabolism**. Int J Exerc Sci. 2018 May 1;11(2):452-461. eCollection 2018. PubMed PMID: 29795726

Phoosuwan M, Kritpet T, Yuktanandana P.
The effects of weight bearing yoga training on the bone resorption markers of the postmenopausal women.
J Med Assoc Thai. 2009

Tipo di studio: studio pilota

Durata: 12 settimane

gruppo **Yoga**: 19 donne, 3 sessioni\ settimana di 50 min.

gruppo **controllo**: 14 donne, nessun intervento

non osteopenia od osteoporosi all'inizio studio

valutazione: **riassorbimento osseo** (beta-CrossLaps)

Risultati: “il training con il **weight bearing yoga** ebbe un effetto **positivo** sull’osso rallentando il riassorbimento osseo che è in indicatore fondamentale per la salute umana in quanto indica la **riduzione del rischio osteoporotico** nelle donne in post-menopausa”

Cos'è il weight bearing Yoga?

Il termine è stato preso da un importante articolo del 2007

Sinaki M. The role of physical activity in bone health: a new hypothesis to reduce risk of vertebral fracture. Phys Med Rehabil Clin N Am. 2007 Aug;18(3):593-608, xi-xii. Review. PubMed PMID: 17678769.

Author information: (1)Department of **Physical Medicine and Rehabilitation**, Mayo Clinic, USA.

Abstract:

Locomotion has always been a major criterion for human survival. Thus, it is no surprise that science supports the

dependence of bone health on **weight-bearing** physical activities. The effect of physical activity on bone is site-specific. Determining how to perform osteogenic exercises, especially in individuals who have osteopenia or osteoporosis, without exceeding the biomechanical competence of bone always poses a dilemma and must occur under medical advice.

This article presents the **hypothesis** that back exercises performed in a **prone position**, rather than a vertical position, may have a greater effect on **decreasing the risk** for vertebral fractures without resulting in compression fracture.

The risk for vertebral fractures can be reduced through improvement in the **horizontal trabecular connection** of vertebral bodies.

Motorwala ZS et al. Effects of Yogasanas on osteoporosis in postmenopausal women. Int J Yoga. 2016

pazienti: n=30 donne (45-62 anni) con osteoporosi postmenopausale (t-score <- 2.5) Misurazione della densità ossea (BMD) all'inizio e dopo **6 mesi**

intervento: 1 ora \giorno per 4 gg\settimana per 6 mesi

pratiche: mobilizzazione articolare, surya namaskara, asanas, pranayama, mantra om

outcome: il BMD della colonna vertebrale passò da - 2.69 a - 2.55 (altamente significativo)

Lu YH, Rosner B, Chang G, Fishman LM. Twelve-Minute Daily Yoga Regimen Reverses Osteoporotic Bone Loss. Top Geriatr Rehabil. 2016

Autore corrispondente: Fishman LM **Columbia University, New York**

Obiettivo: misurare l'effettività di un gruppo selezionato di asanas nell'aumentare il BMD

Metodo: n=741 arruolati con confronto BMD prima e dopo l'intervento con lo Yoga; n=227 hanno avuto **successo** nello studio (essere riusciti ad effettuare correttamente le asanas), fra cui 202 **donne**. Età media 68.2 anni. Osteopenia o osteoporosi nel **83%** dei casi

Misurazioni: **DEXA** Dual-energy x-ray absorptiometric scans all'inizio dello studio e dopo **2 anni** di pratica

Intervento: asanas per 12 minuti insegnate con DVD
12 posizioni con lo scopo di aumentare il BMD nella **colonna vertebrale, anca, femore (fig.1)**

- 1) *Vriksasana*—tree,
- (2) *Trikonasana*—triangle,
- (3) *Virabhadrasana II*—warrior II,
- (4) *Parsvakonasana*—side-angle pose,
- (5) *Parivrtta Trikonasana*—twisted triangle,
- (6) *Salabhasana*— Locust,
- (7) *Setu Bandhasana*—bridge,
- (8) *Supta Padangusthasana I*—supine hand-to-foot I,
- (9) *Supta Padangusthasana II*—supine hand-to-foot II,
- (10) *Marichyasana II*—straight-legged twist,
- (11) *Matsyendrasana*—bent-knee twist,
- (12) *Savasana*—corpse pose.

Outcome: aumento del BMD/mensile statisticamente significativo per la colonna vertebrale e per il femore.

Sicurezza: “non è stato riportato o documentato nessun evento avverso importante collegato allo Yoga”

Conclusione: “le 12 posizioni studiate sono un metodo sicuro ed effettivo di invertire la perdita ossea nella colonna vertebrale e nel femore ed hanno indicazioni più deboli sull’effetto positivo sull’anca in toto misurata con il DXA scan. Vi è una evidenza qualitativa di un miglioramento della qualità ossea come effetto della pratica di Yoga”

Vi sono case reports di fratture vertebrali associate allo Yoga?

Sfeir JG, Drake MT, Sonawane VJ, Sinaki M. Vertebral compression fractures associated with yoga: a case series. European journal of physical and rehabilitation medicine, 2018, 54.6: 947-951. Epub 2018 Apr 24. PubMed PMID: 29687967

BACKGROUND: The importance of exercise in skeletal health is increasingly recognized by both patients and providers. However, the safety of prescribed or recreational exercise in at-risk populations remains under-reported and under-publicized. Yoga has gained widespread popularity due to its physical and psychological benefits. When practiced in a population at increased fracture risk, however, some yoga

poses may increase fracture risk, particularly at the spine, rather than increasing BMD as noted in recent popular press reports.

CASE REPORT: **Nine subjects** (8 women) with a median age of 66 years (range 53-87), developed vertebral compression fracture (VCF) one month to six years after initiating yoga-associated spinal flexion exercises (SFE). VCF presented with back pain and occurred in the thoracic spine (N.=6), lumbar-spine (N.=4) and cervical-spine (N.=1). Four patients had osteoporosis by BMD criteria prior to VCF and 2 had osteopenia (median T-score -2.35; range -3.3 to +2.0).

Interestingly, **all patients had their lowest T-scores at the spine**. Three patients had a history of fragility fracture prior to the index VCF.

While one patient had primary **hyperparathyroidism** and another was treated with high dose **prednisone**, no **other risk factors** for bone loss including medications or secondary osteoporosis causes were identified in the other patients.

CLINICAL REHABILITATION IMPACT: This study identified patients in whom increased torsional and compressive mechanical loading pressures occurring during yoga SFE resulted in de novo VCF. Despite the **need for selectivity in yoga poses in populations at increased fracture risk**, both scientific and media reports continue to advertise yoga as a bone protective activity. Accordingly, yoga is misconceived as a 'onesize-fits-all' prescription. Instead, the **appropriate selection of patients** likely to benefit from yoga must be a cornerstone of fracture prevention.

Escludendo le asana, altre pratiche Yoga possono essere utili nella riparazione delle fratture?

Oswal P, Nagarathna R, Ebnezar J, Nagendra HR. The effect of add-on yogic prana energization technique (YPET) on healing of fresh fractures: a randomized control study. J Altern Complement Med. 2011 Mar;17(3):253-8. Epub 2011 Mar 9. PubMed PMID: 21417810

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Ebnezar Orthopaedic Centre, Parimala Speciality Hospital, Bengaluru, **India**.

Swami Vivekananda Yoga Research Foundation (SVYASA), Bengaluru, **India**.

OBJECTIVES: The objective was to study the effect of the **add-on yogic prana energization technique** (YPET) on healing of fresh fractures.

MATERIALS AND METHODS: Thirty (30) patients (22 men and 8 women) between 18 and 55 years with simple extra-articular fractures of long and short bones were selected from the outpatient department of **Ebnezar Orthopaedic Centre** and **Parimala Speciality Hospital**, Bengaluru. They were randomized into yoga (n = 15) and control (n = 15) groups. Compound, complicated, pathologic fractures, old fractures, and those associated with dislocations were excluded.

Both groups received the conventional plaster of paris immobilization of the fracture site as the primary treatment. The yoga group, in addition, practiced **YPET twice a day** (30 minutes/session) for 2 weeks using taped audio instructions

after learning under supervision for 1 week. YPET is an advanced yoga **relaxation practice** that involves breath regulation, chanting, and visualization, which according to yogic science revitalizes the tissues by activating the subtle energies (prana) within the body. Both the groups were assessed on the 1st and 21st day by the Numerical Pain Rating Scale for pain (NRS), tenderness (0-4), swelling (0-4), fracture line density (1-4), and the bridging of cortices (1-4).

RESULTS: Two (2) groups were matched on all variables. The Wilcoxon test showed significant improvement in both groups on all variables. Pain reduction (NRS) was better ($p = 0.001$ Mann-Whitney test) in the YPET group (94.5%) than in the control group (58.6%); Tenderness reduced ($p = 0.001$) better in the YPET group (94.4 %) than in the control group (69.12%); Swelling reduced by 93% in the YPET group and by 69.4% in controls (between-groups $p = 0.093$, i.e.,

nonsignificant); increase in fracture line density was better ($p = 0.001$) in the YPET group (48%) than in the control group (18.25%). The number of cortices united was significantly better ($p = 0.001$) in the YPET group (81.4%) than in controls (39.7 %).

CONCLUSIONS: Add-on yoga-based YPET accelerates fracture healing.

L'articolo è stato incluso in una recente review che esamina i **possibili meccanismi** alla base delle pratiche di Yoga ⁹ e citato in un altro recente articolo che discute le premesse e le possibilità di un approccio olistico all'ortopedia in campo geriatrico¹⁰

⁹ MCCALL, Marcy C. How might yoga work? An overview of potential underlying mechanisms. Journal of Yoga & Physical Therapy, 2013

¹⁰ Ebnezar J, Bali Y, John R. Wholistic orthopedics: Is this the right way to treat geriatric orthopedic patients? Int J Yoga. 2017 Jan-Apr;10(1):40-43. Doi: 10.4103/0973-6131.194560. PubMed PMID: 28149067

Il pranayama praticato da solo (senza asanas) ha effetti sul metabolismo osseo?

Prasad, Kalepu & Raju et al. (2004). Effect of pranayama and yoga on bone metabolism in normal healthy volunteers. Journal of Exercise Physiology Online.

We studied the effect of Pranayama and yoga asanas on total serum calcium, ionized calcium, phosphorous, magnesium, total proteins, albumin, A/G ratio, creatinine and alkaline phosphatase in normal healthy males and females. The study was carried out in 2 phases.

In phase-I the subjects practiced 4 types of Pranayama for 30 days. Subsequently, in phase-II the subjects practiced thirty-six yoga asanas in addition to Pranayama for next 60 days. At the end of phase-I, there was a significant increase in serum total calcium, ionized calcium, A/G ratio and a significant fall of magnesium levels in both males and females.

At the end of Phase II, there was a significant reversal (less than the basal values) of total calcium, phosphorous and an increase in magnesium levels, whereas A/G ratio continued to be significantly elevated. Serum albumin and creatinine levels were significantly elevated only during Phase-II.

The study indicated that as long as the subjects practiced Pranayama alone there was a significant increase in total serum calcium and ionized calcium levels which was reversed with the addition of yogic asanas.

Pranayama may be recommended as a strategy to combat senile osteoporosis as well as post-menopausal osteoporosis. The mechanisms responsible for these responses remain unclear.

E quali sono gli effetti di pranayama insieme ad altre pratiche di yoga sull'osso?

Kumar A, Archana E, Pai A, Nayak G, Shenoy RP, Rao A. Serum mineral status and climacteric symptoms in perimenopausal women before and after Yoga therapy, an ongoing study. J Midlife Health. 2013

....” OBJECTIVE: The objective of this study is to assess the serum mineral status, anthropometric parameters and climacteric symptoms in perimenopausal women before and after yoga intervention.

SUBJECTS AND METHODS: A total of 30 subjects with perimenopausal symptoms, aged between 40 and 60 years (49.43 ± 6.15) were included in the study. Yoga intervention was given on a daily basis (45 min duration) for 12 weeks...

... A significant increase ($P < 0.001$) in serum calcium and copper and a marked decrease in serum magnesium ($P < 0.05$) and ceruloplasmin ($P < 0.028$) levels was observed, post yoga therapy.”

Perchè il pranayama può avere effetti sulla crescita ossea?

Martarelli D, Cocchioni M, Scuri S, Pompei P.
Diaphragmatic breathing reduces exercise-induced oxidative stress. Evid Based Complement Alternat Med. **2011**;2011:932430. doi: 10.1093/ecam/nep169. Epub 2011 Feb 10. PMID: **19875429**

Diaphragmatic breathing is relaxing and therapeutic, reduces stress, and is a fundamental procedure of Pranayama Yoga, Zen, transcendental meditation and other meditation practices. Analysis of oxidative stress levels in people who meditate indicated that meditation correlates with lower oxidative stress

levels, lower cortisol levels and higher melatonin levels. It is known that cortisol inhibits enzymes responsible for the antioxidant activity of cells and that melatonin is a strong antioxidant; therefore, in this study, we investigated the effects of diaphragmatic breathing on exercise-induced oxidative stress and the putative role of cortisol and melatonin hormones in this stress pathway. We monitored 16 athletes during an exhaustive training session. After the exercise, athletes were divided in two equivalent groups of eight subjects. Subjects of the studied group spent 1 h relaxing performing diaphragmatic breathing and concentrating on their breath in a quiet place. The other eight subjects, representing the control group, spent the same time sitting in an equivalent quite place.

Results demonstrate that relaxation induced by diaphragmatic

breathing increases the antioxidant defense status in athletes after exhaustive exercise. These effects correlate with the concomitant **decrease in cortisol** and the **increase in melatonin**.

The consequence is a lower level of oxidative stress, which suggests that an appropriate diaphragmatic breathing could protect athletes from long-term adverse effects of free radicals.

Yoga & Cognition

Yoga & aspetti cognitivi: evidenza scientifica

Gothe NP, McAuley E. Yoga and Cognition: A Meta-Analysis of Chronic and Acute Effects. Psychosom Med. 2015 Sep;77(7):784-97. PMID: 26186435

Author information: From the **Division of Kinesiology, Health and Sport Studies (Gothe)**, Wayne State University, Detroit, Michigan; Department of Kinesiology and Community Health (McAuley), University of Illinois at Urbana, Champaign, Illinois.

OBJECTIVES: To review and synthesize the existing literature on the effects of yoga on cognitive function by determining effect sizes that could serve as a platform to design, calculate statistical power, and implement future studies.

METHODS: Through electronic databases, we identified acute studies and randomized controlled trials (RCTs) of yoga that reported cognitive outcomes.

Inclusion criteria included the following: use of an objective measure of cognition and sufficient data reported to estimate an effect size. The meta-analysis was conducted using Comprehensive Meta-Analysis software. A random-effects model was used to calculate the overall weighted effect sizes, expressed as Hedge g .

RESULTS: 15 RCTs and 7 acute exposure studies examined the effects of yoga on cognition. A moderate effect ($g = 0.33$, standard error = 0.08, 95% confidence interval = 0.18-0.48, $p < .001$) of yoga on cognition was observed for RCTs, with the strongest effect for **attention and processing speed** ($g = 0.29$, $p < .001$), followed by **executive function** ($g = 0.27$, $p = .001$) and **memory** ($g = 0.18$, $p = .051$).

Acute studies showed a stronger overall effect of yoga on cognition ($g = 0.56$, standard error = 0.11, 95% confidence interval = 0.33-0.78, $p < .001$).

The effect was strongest for memory ($g = 0.78, p < .001$), followed by attention and processing speed measures ($g = 0.49, p < .001$) and executive functions ($g = 0.39, p < .003$).

CONCLUSIONS: Yoga practice seems to be associated with moderate improvements in cognitive function.

Although the studies are limited by sample size, heterogeneous population characteristics, varied doses of yoga interventions, and a myriad of cognitive tests, these findings warrant rigorous systematic RCTs and well-designed counterbalanced acute studies to comprehensively explore yoga as a means to improve or sustain cognitive abilities across the life span.

A quale età lo Yoga può dare benefici cognitivi?

Jarraya S, Wagner M, Jarraya M, Engel FA.

12 Weeks of Kindergarten-Based Yoga Practice Increases Visual Attention, Visual-Motor Precision and Decreases Behavior of Inattention and Hyperactivity in 5-Year-Old Children. Front Psychol. 2019 Apr 10;10:796. doi: 10.3389/fpsyg.2019.00796. eCollection 2019. PMID: 31024412

Author information: Jarraya S(1), Wagner M(2), Jarraya M(1), Engel FA(3):

(1)Research Unit, High Institute of Sport and Physical Education, University of Sfax, Sfax, **Tunisia**.

(2)Department of Sport Science, Bundeswehr University **Munich**, Neubiberg, **Germany**.

(3)Department Movement and Training Science, Institute of Sport and Sport Science, **Heidelberg University**, Heidelberg, **Germany**.

The present study assesses the impact of **Kindergarten**-based yoga on **cognitive performance**, **visual-motor coordination**, and **behavior of inattention and hyperactivity** in 5-year-old children.

In this randomized controlled trial, **45** children (28 female; 17 male; 5.2 ± 0.4 years) participated.

Over **12 weeks**,

15 children performed **Hatha-yoga** twice a week for 30 min,

another 15 children performed generic physical education (**PE**) twice a week for 30 min

and 15 children performed no kind of physical activities, serving as control group (**CG**).

Prior to (T 0) and after 12 weeks (T 1), all participants completed **Visual Attention and Visuomotor Precision subtests of Neuropsychological Evaluation Battery**

and teachers evaluated children's behavior of inattention and hyperactivity with the **Attention-Deficit/Hyperactivity Disorder (ADHD) Rating Scale-IV**.

At T 0, no significant differences between groups appeared.

Repeated measures analysis of variance revealed that following **Bonferroni-Holm corrections yoga**, in comparison to PE and CG, had **a significant positive impact on the development on behavior of inattention and hyperactivity**.

Further, yoga has a significant positive impact on completion times in two visumotor precision tasks in comparison to PE. Finally, results indicate a significant positive effect of yoga on visual attention scores in comparison to CG.

12 weeks of Kindergarten-based yoga improves selected visual attention and visual-motor precision parameters and decreases behavior of inattention and hyperactivity in 5-year-old children.

Consequently, yoga represents a sufficient and cost-benefit effective exercise which could enhance cognitive and behavioral factors relevant for learning and academic achievement among young children.

Brunner D, Abramovitch A, Etherton J. A yoga program for cognitive enhancement. PLoS One. 2017 Aug 4;12(8):e0182366. Doi: 10.1371/journal.pone.0182366. eCollection 2017. PubMed PMID: 2878374

Età media partecipanti: 24.77

BACKGROUND: Recent studies suggest that yoga practice may **improve cognitive functioning**. Although preliminary data indicate that yoga **improves working memory (WM)**, high-resolution information about the type of WM subconstructs, namely maintenance and manipulation, is not available. Furthermore, the association between cognitive enhancement and improved mindfulness as a result of yoga practice requires empirical examination. **The aim of the present study is to assess the impact of a brief yoga program on WM maintenance, WM manipulation and attentive mindfulness**

“Working memory

WM is a limited-capacity cognitive system that involves the temporary storage, processing and manipulation of **information** [12] and is involved in a number of cognitive functions [13, 14], including reasoning, decision-making, learning, and behavior [15, 16]. WM is considered a part of the central executive function domain and may subserve all executive functions”

METHOD: one 60-minute **yoga** session per week for 6 weeks

“Hatha yoga employed in this study included **asanas** connected with **pranayama** and a 10-minute guided **mindfulness meditation** in supine rest.”

CONCLUSIONS: A 6-session yoga program was associated with improvement on manipulation and maintenance WM measures as well as enhanced mindfulness scores.

Additional research is needed to understand the extent of yoga-related cognitive enhancement and mechanisms by which yoga may enhance cognition, ideally by utilizing randomized controlled trials and more comprehensive neuropsychological batteries.

Klingberg T. Training and plasticity of working memory. Trends Cogn Sci. 2010 Jul;14(7):317-24. doi: 10.1016/j.tics.2010.05.002. Epub 2010 Jun 16. Review. PubMed PMID: 20630350

Author information: (1)Department of Neuroscience, [Karolinska Institute](#)...

Working memory (WM) capacity predicts [performance in a wide range of cognitive tasks](#). Although WM capacity has been viewed as a constant trait, recent studies suggest that it can be [improved by adaptive and extended training](#).

This training is associated with changes in brain activity in [frontal](#) and [parietal cortex](#) and basal ganglia, as well as changes in [dopamine](#) receptor density.

Transfer of the training effects to non-trained WM tasks is consistent with the notion of training-induced plasticity in a common neural network for WM.

The observed training effects suggest that WM training could be used as a **remediating intervention** for individuals for whom low WM capacity is a limiting factor for academic performance or in everyday life.

Gothe NP, Hayes JM, Temali C, Damoiseaux JS.
Differences in Brain Structure and Function Among
Yoga Practitioners and Controls.

Front Integr Neurosci. **2018** Jun 22;12:26. eCollection
2018. PMID:29988397

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Background: Yoga is a mind-body based physical activity that has demonstrated a variety of physiological, psychological and cognitive health benefits. Although yoga practice has shown to improve cognitive performance, **few studies have examined the underlying neurological correlates.**

Objective: The current study aimed to determine the differences in **gray matter volume** of the **hippocampus, thalamus and caudate nucleus** and brain activation during the Sternberg working memory task.

Method: Participants were **13 experienced yoga practitioners** (mean age = 35.8), defined as having more than 3 years of regular yoga practice, and 13 age- and sex-matched controls (mean age = 35.7). All participants completed a 6-min walk test to assess fitness, psychosocial and demographic questionnaires; and underwent magnetic resonance imaging to assess gray matter volume and brain activation.

Results: There were no group differences on demographic measures of income, education and on estimated VO2max or physical activity levels. **Gray matter** volume differences were observed in the left hippocampus, showing **greater volume in experienced yoga practitioners** compared to controls ($p = 0.017$). The functional MRI results revealed **less activation in the dorsolateral prefrontal cortex** in yoga practitioners compared to controls during the encoding phase of the Sternberg task ($p < 0.05$). Reaction time and accuracy on the task did not differ between the groups.

Conclusions: Our results suggest an **association between regular long-term yoga practice and differential structure and function of specific brain regions involved in executive function**, specifically working memory, which has previously shown to improve with yoga practice.

Future studies need to examine intervention effects of yoga and explore its potential to maintain and improve cognitive health across the lifespan through longitudinal and intervention studies.

Lo Yoga può avere effetti sugli MCI?

Definizione MCI secondo OMS

F06.7 Mild cognitive disorder ICD 10 ¹¹

A disorder characterized by **impairment of memory, learning difficulties**, and **reduced ability to concentrate** on a task for more than brief periods. There is often a marked feeling of **mental fatigue** when mental tasks are attempted, and new learning is found to be subjectively difficult even when objectively successful.

¹¹ International classification of diseases version: 2016
cd.who.int/browse10/2016/en

None of these symptoms is so severe that a diagnosis of either dementia (F00-F03) or delirium (F05.-) can be made. This diagnosis should be made only in association with a specified physical disorder, and should not be made in the presence of any of the mental or behavioural disorders classified to F10-F99.

The disorder may precede, accompany, or follow a wide variety of infections and physical disorders, both cerebral and systemic, but direct evidence of cerebral involvement is not necessarily present...

Farhang M, Miranda-Castillo C, Rubio M, Furtado G.
Impact of mind-body interventions in older adults with mild cognitive impairment: a systematic review.
Int Psychogeriatr. 2019 Feb 4:1-24. PubMed PMID: 30712518

“The number of people with MCI or dementia is expected to grow due to the aging population (Karssemeijer et al., [2017](#)). **MCI is considered as a transitional state** between normal change of cognitive function and early dementia (Innes et al., [2016](#)). Individual formally diagnosed with MCI are at high risk of development into Alzheimer’s or other types of dementia. **Between 5% to 15% of people with MCI convert to AD each year”**

“In summary, there were some data indicating that **mind-body interventions were beneficial** for ameliorating some outcomes in older people with MCI.

The data available suggest that mindfulness-based stress reduction and also Tai Chi lead to improvement in cognitive function and everyday activities functioning of older adults with MCI.

Additionally, there were data available on lower risk of dementia at one year after receiving Tai Chi intervention.

Finally, mindfulness intervention improved mindfulness skills, well-being, acceptance and awareness MCI.

Some evidence suggests that mind-body interventions such as MBSR, Tai Chi and **yoga** may contribute to **reduce stress reactivity, depression and risk of falling**, but much of these data were difficult to interpret, given the variation of the interventions, outcome measures and reporting.

This review also yielded evidence for the potential benefits of long-term mind-body interventions as a feasible non-pharmacological therapeutic intervention option for older adults with MCI. **Future research in this area could promote the integration of mind-body interventions into mainstream clinical practice.**

The results of **this review could serve as validation of complementary approaches** to classic medical models in helping to improve cognitive performance, functionality and mental health of an aging population”

Eyre HA, Siddarth P, Acevedo B, Van Dyk K, Paholpak P, Ercoli L, St Cyr N, Yang H, Khalsa DS, Lavretsky H.

A randomized controlled trial of Kundalini yoga in mild cognitive impairment. Int Psychogeriatr. 2017 Apr;29(4):557-567. Epub 2017 Jan 16. PubMed PMID: 28088925

CONCLUSION:

This is **the first RCT to compare KY effects** on cognition and mood compared to gold standard, active control **MET**, for individuals with MCI.

Both groups demonstrated **improvement in verbal and visual memory.**

The KY group showed broader effect on executive functioning, depressed mood, and resilience with greater and sustained improvement in mood, compared to MET.

These encouraging effects of yoga intervention should be further addressed in future longitudinal clinical trials directed at prevention of cognitive decline that will integrate the use of biomarkers of treatment response to shed light on the underlying mechanisms of response to the interventions.”

Evidence Based Yoga

si può definire come

l'integrazione sistematica e accurata

**dell'esperienza individuale
dei praticanti ed insegnanti di Yoga**

**con le evidenze scientifiche
ed i testi classici dello Yoga**

a beneficio dell'umanità

Risorse – Tools

PubMed: <https://www.ncbi.nlm.nih.gov/pubmed>

ResearchGate: <https://www.researchgate.net>

Google Scholar: <https://scholar.google.com>

DeepL (traduttore): <https://www.deepl.com>

NB: questo file si trova sul sito della Società Italiana di Medicina Omeopatica, nell'home page sezione Evidence il file è Open access. Si può scaricare ed utilizzare citando la fonte

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http://www.omeomed.net/sub_index/evidence/2019_giugno_valeri_eby_yoga_osteoporosi_disturbi_cognitivi.pdf

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