

# **Yoga for Rehabilitation**

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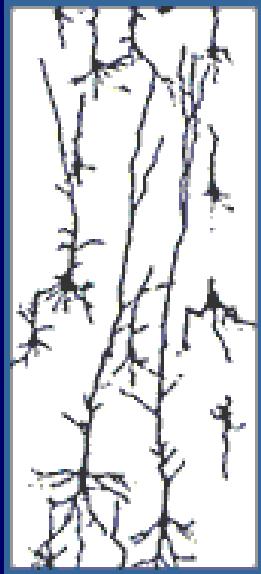
**SWAMI VIVEKANANDA YOGA  
RESEARCH FOUNDATION,  
BANGALORE, INDIA**

- **Rehabilitation...**
- **Derived from the Latin word "*rehabilitare*" meaning to make fit again.**

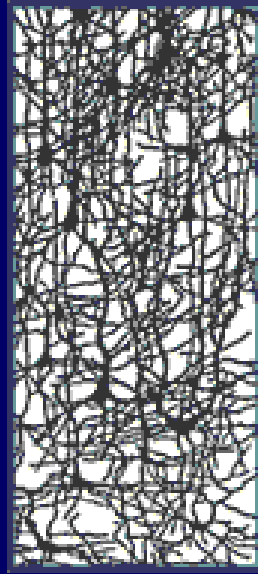
# **Rehabilitation: mediated via the brain**

- **CAN THE BRAIN CHANGE ?**
- **GENETIC (Nature)**
- **EXPERIENCE (Nurture)**

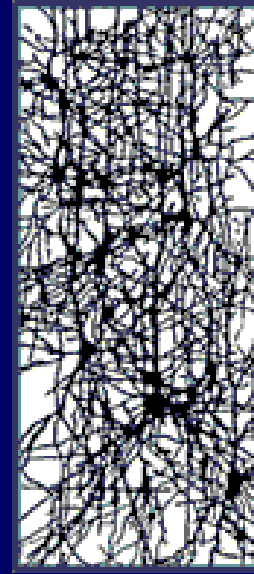
# How does the brain change from birth onwards?



**Birth**



**15 months**



**2-3 years**

# WHAT 'models' the brain?

- Nutrition
- Environmental stimulation
- Learning
- Social contact
- ..... & Yoga ( *which includes all the above*)

# Environmental Stimulation

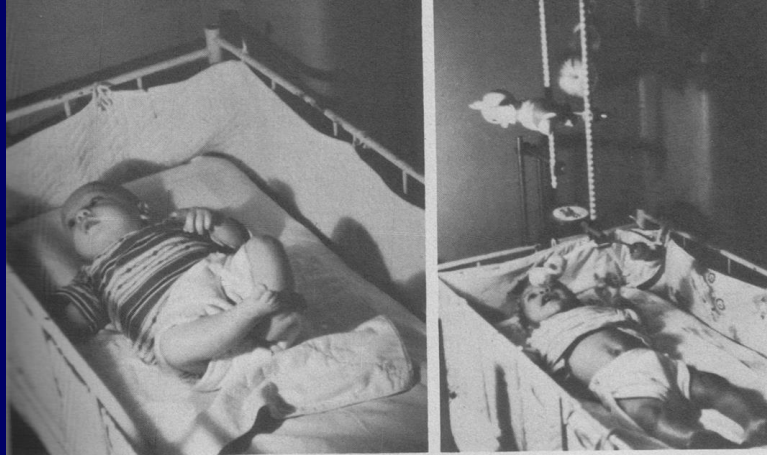
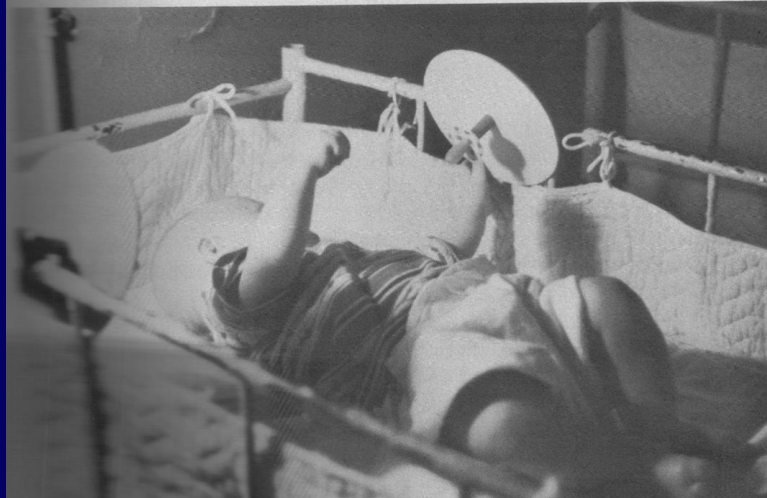


Figure 4.14 A situation in which visual motor coordination is tested. (From B. L. White & E. Held. Plasticity of sensory motor development. In J. F. Rosenblith & W. Allinsmith (Eds.), *Readings in child development and educational psychology*. (2nd ed.) Boston: Allyn and Bacon, copyright © 1966. By permission.)

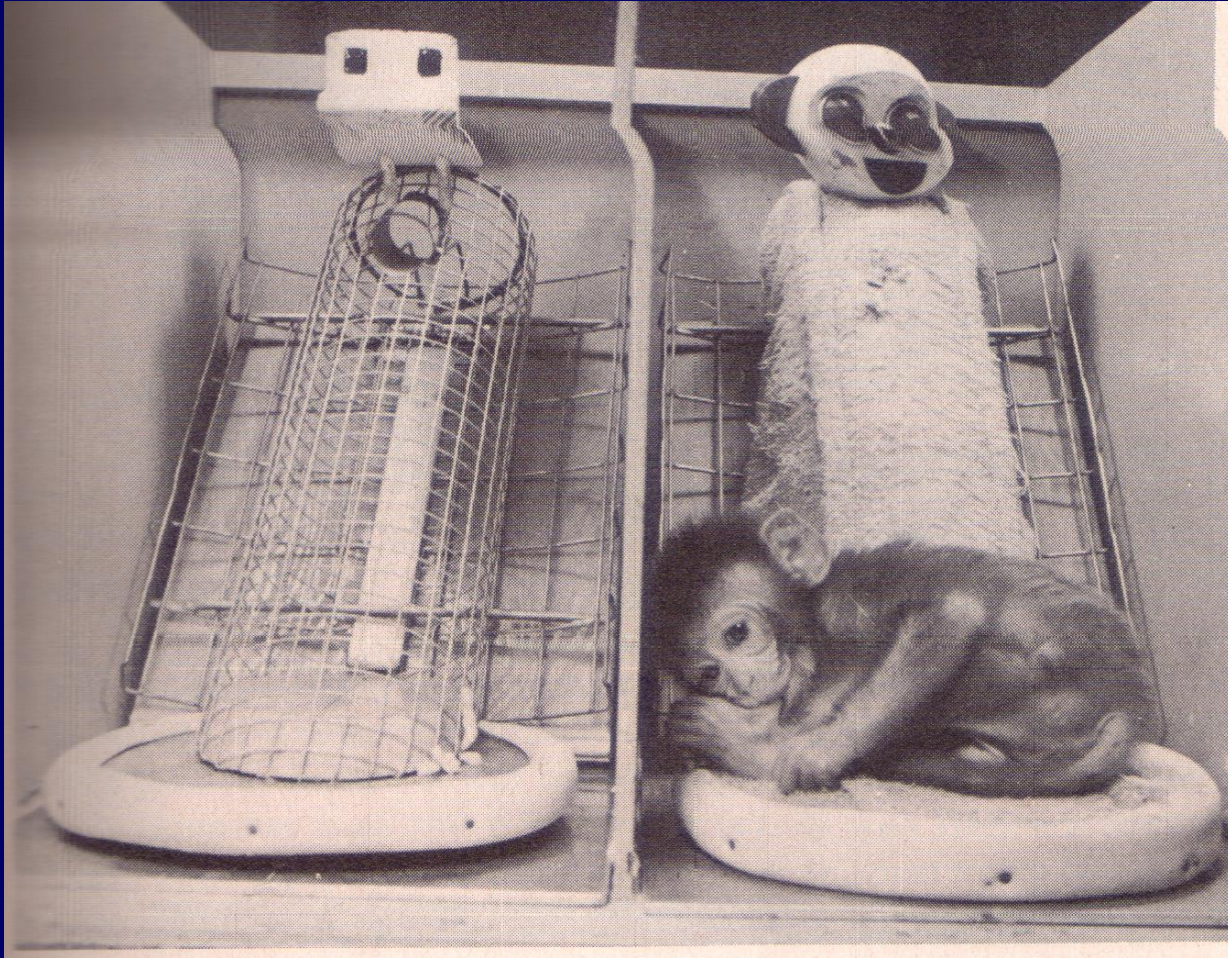


# Social Contact





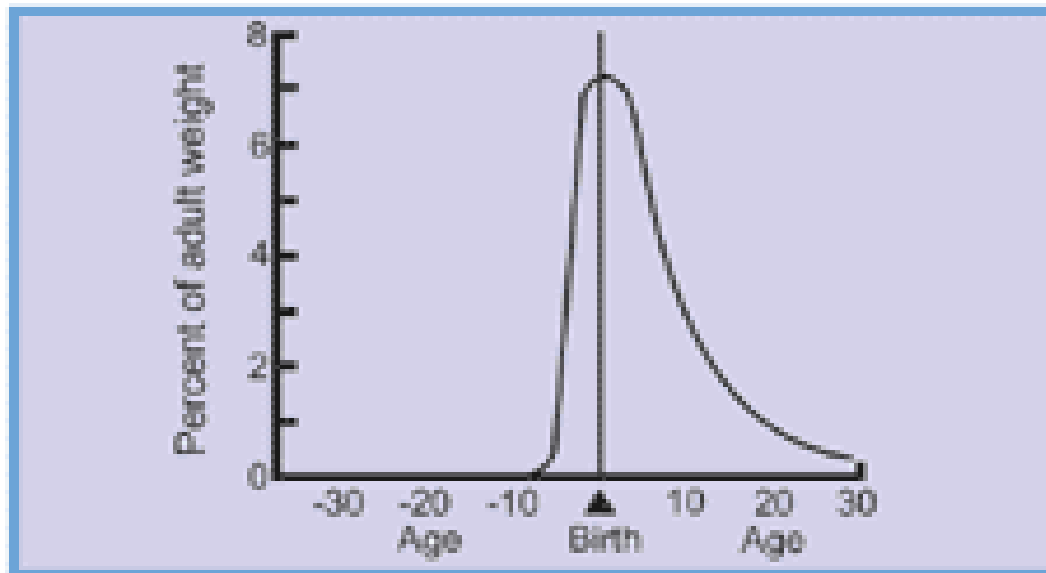
# Social Contact





# When can change happen?

The Human Brain Spurt Chart



Most of the human brain growth spurt occurs postnatally. This is characterized by extraordinary biochemical activity and high susceptibility to insult.

— age in months

Adapted from Dobbing J

...before birth, throughout life

# Yoga and the Brain

1. *Yogah cittavrtti nirodah*

**Yoga is the process of gaining mastery over mental modifications**

Patanjali's Yoga Sutras 1:2

2. *Manah prasamanopayah yogah ityabidheeyate*

**Yoga is the skill to calm the mind**

Yoga Vasista

3. *Samatvam yoga uchyate*

**Yoga is equilibrium**

Bhagavadgita

# **Rehabilitation**

- ▶ **Mentally challenged children**
- ▶ **Children with impaired vision**
- ▶ **Adolescents in a remand home**
- ▶ **Medical conditions (other than schizophrenia)**
- ▶ **The aged**
- ▶ **Chronic schizophrenia**
- ▶ **Occupational stress**

# **Mentally challenged children (a one year controlled trial)**

- ▶ **Motor co-ordination**
- ▶ **Social skills**
- ▶ **Mental IQ**

**Reference:**

**Journal of Mental Deficiency Research, 1989**

## **Mechanisms ?**

# Mechanisms ?

- ▶ **Poor attention span**
- ▶ **Easy distractibility**
- ▶ **Low sympathetic tone**
- ▶ **Accordingly yoga practices selected**

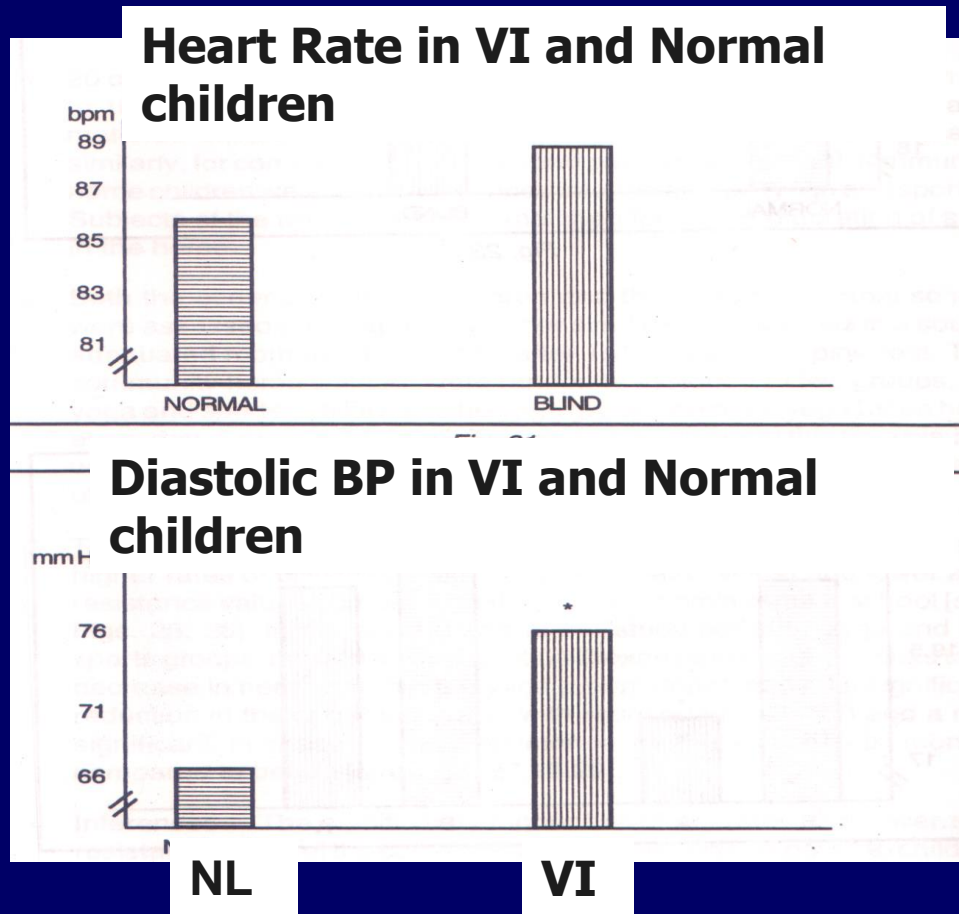
**Reference:**

**Indian Journal of Physiology and Pharmacology, 1999**



# Children with impaired vision

Reference: International Journal of Rehabilitation and Health, 1999



**Congenitally blind versus Normal vision**

# Congenitally Blind

Reference:: International Journal of Rehabilitation and Health, 1999

Congenitally  
blind versus  
Normal vision

## Breath Rate in VI versus Normal groups

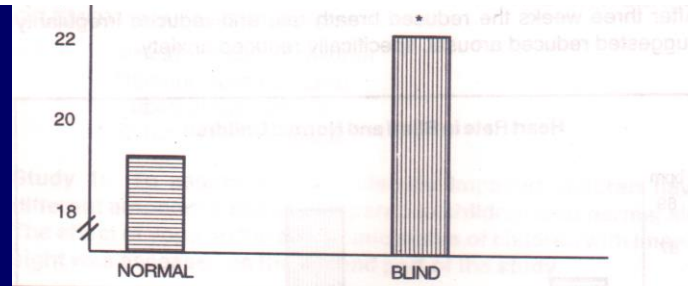
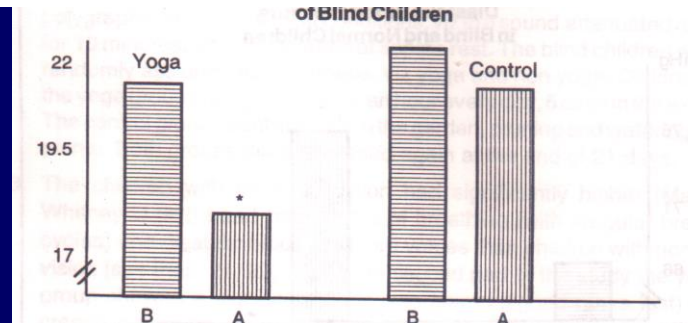


Fig. 23

## Breath Rate In Yoga versus Gardening groups



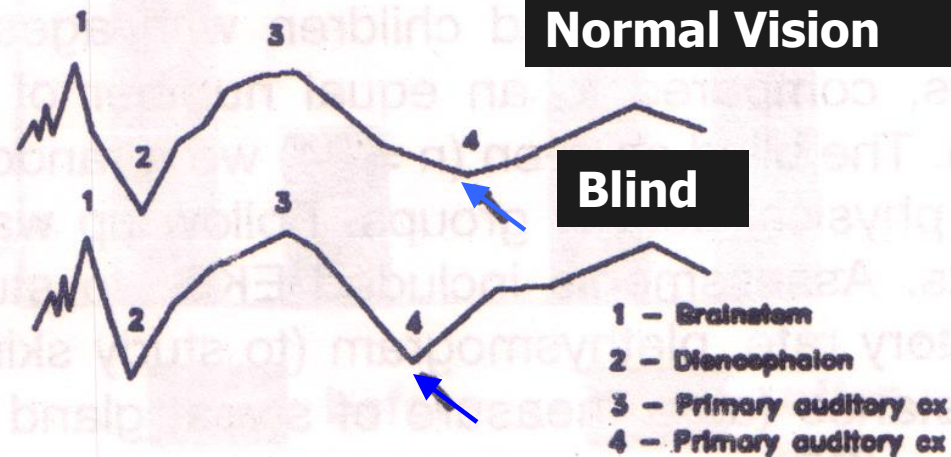
YOGA

GARDENING

Yoga versus  
Gardening

# Can the blind really hear better?

## Middle latency auditory evoked potentials (schematics)



The arrows indicate the shorter latency in the blind

## References:

International Journal of Neuroscience, 1997, 1998  
Perceptual and Motor Skills, 1998. .

# **Children with impaired vision: Yoga compared with Gardening (3 weeks follow-up)**

- Reduces physiological signs of anxiety
- ? May improve existing abilities (e.g., hearing, as an on-going study)

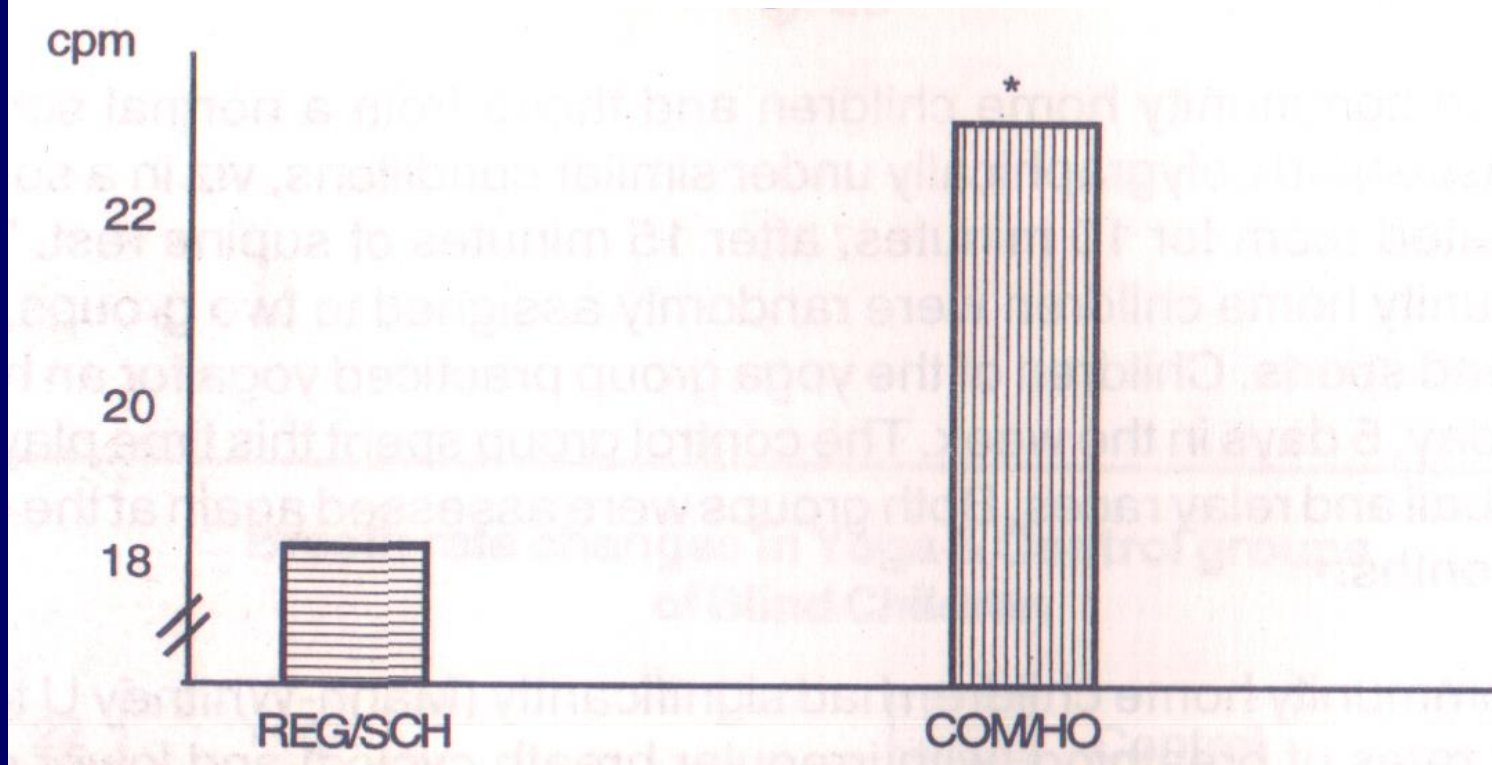
## **References:**

- International Journal of Rehabilitation and Health, 1999
- International Journal of Neuroscience, 1997, 1998
- Perceptual and Motor Skills, 1998. .

# Adolescents in a remand home

Reference: Perceptual & Motor Skills, 1997

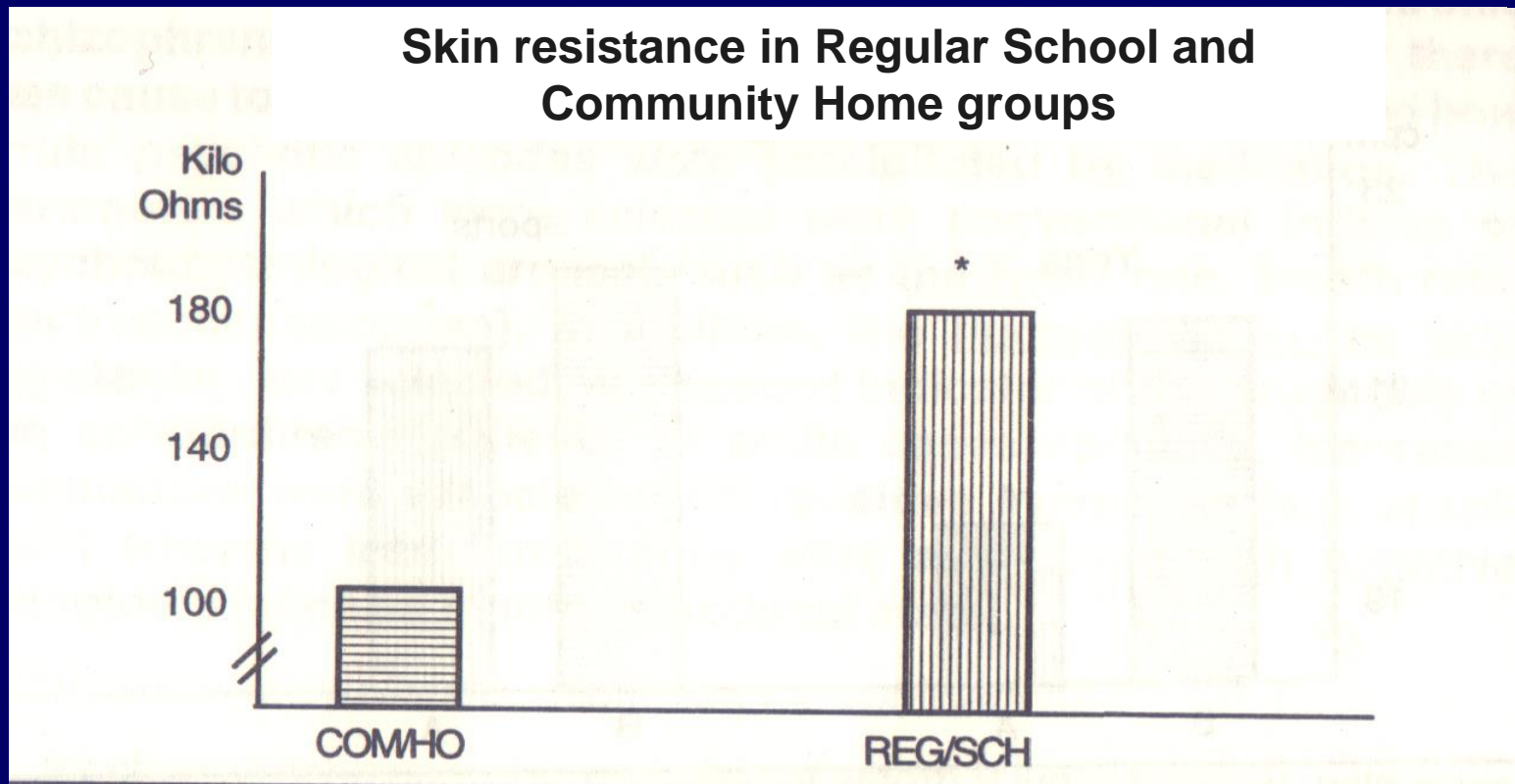
Breath rate in children from a Regular School  
& from a Community home





# Adolescents in a remand home

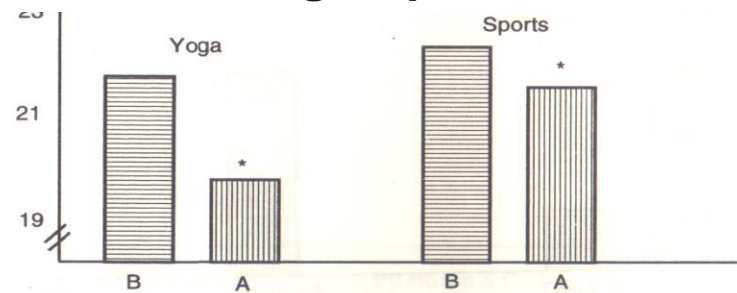
Reference: Perceptual & Motor Skills, 1997



# Adolescents in a remand home: Yoga vs. Sports

Reference: Perceptual & Motor Skills 1997

**Breath rate: Yoga and Sports groups**

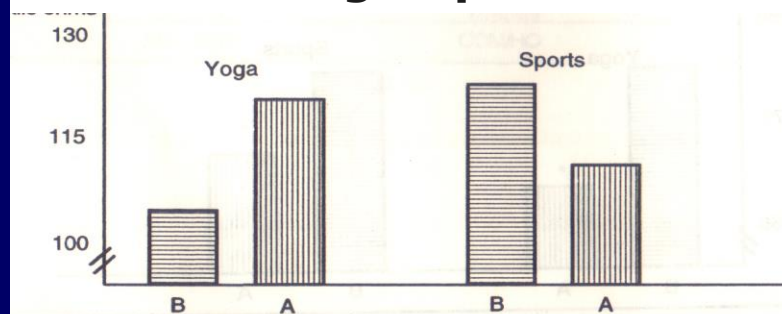


*Fig. 28*

**YOGA**

**SPORTS**

**Skin resistance: Yoga and Sports groups**



# **Adolescents in a remand home**

**Yoga versus Games (6 months) improves:**

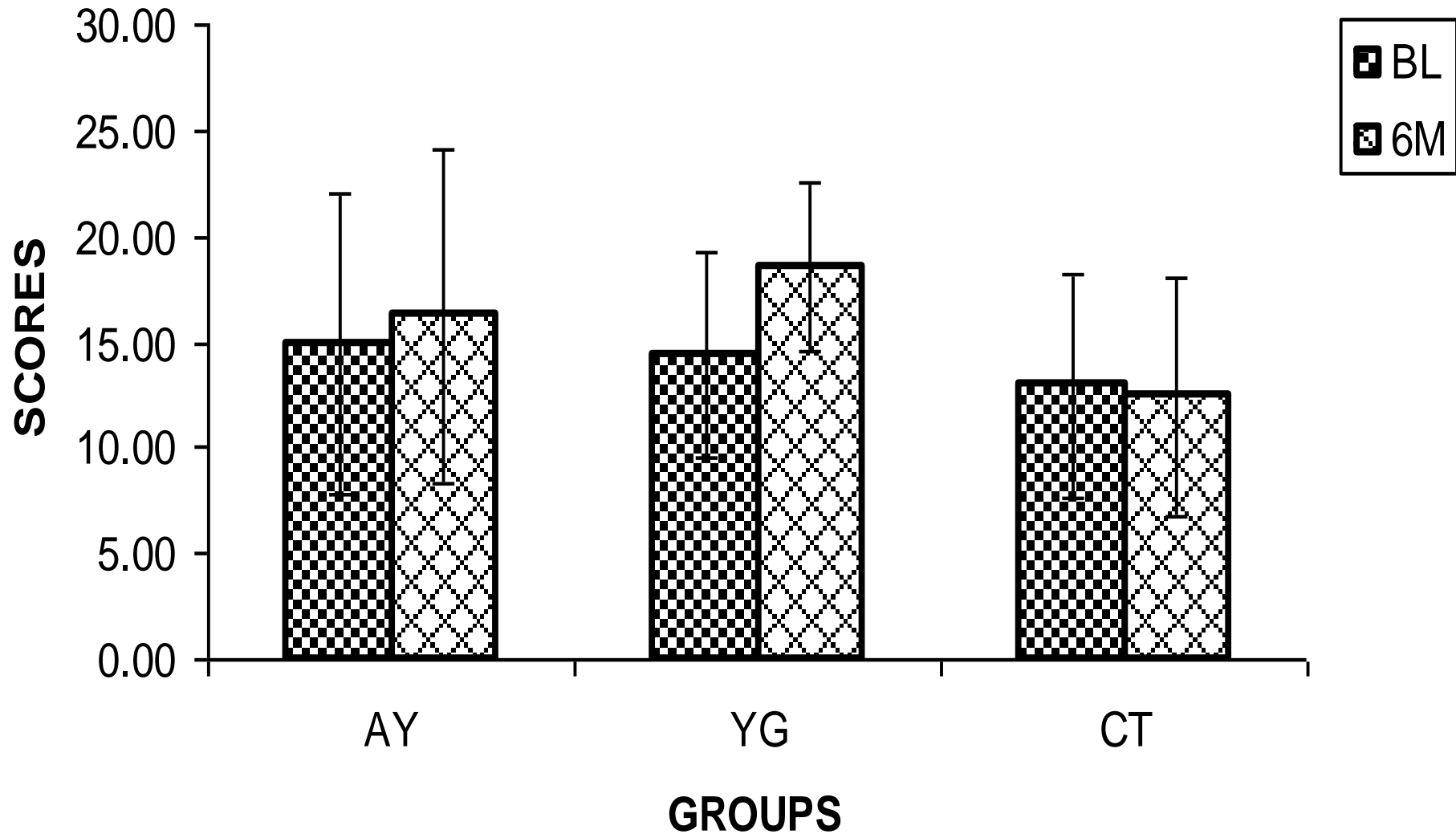
- 1. Performance in various skilled activities  
(possible use in vocational training)**
- 2. Reduces stress**

## **References:**

- 1. Indian Journal of Physiology and Pharmacology, 1997**
- 2. Perceptual and Motor Skills, 1997**

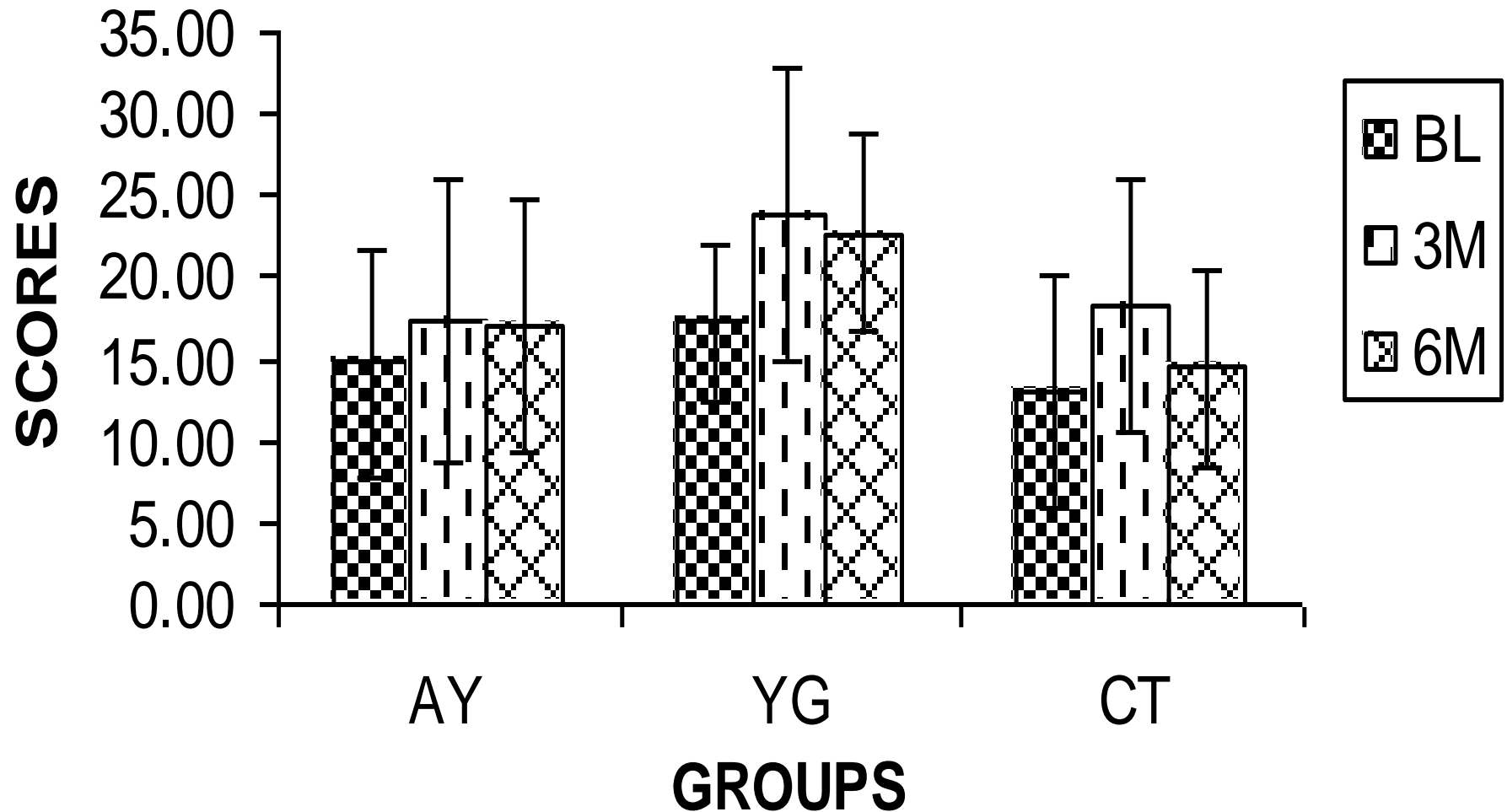
# Yoga for older persons (n = 69)

## GAIT AND BALANCE



# Yoga for older persons

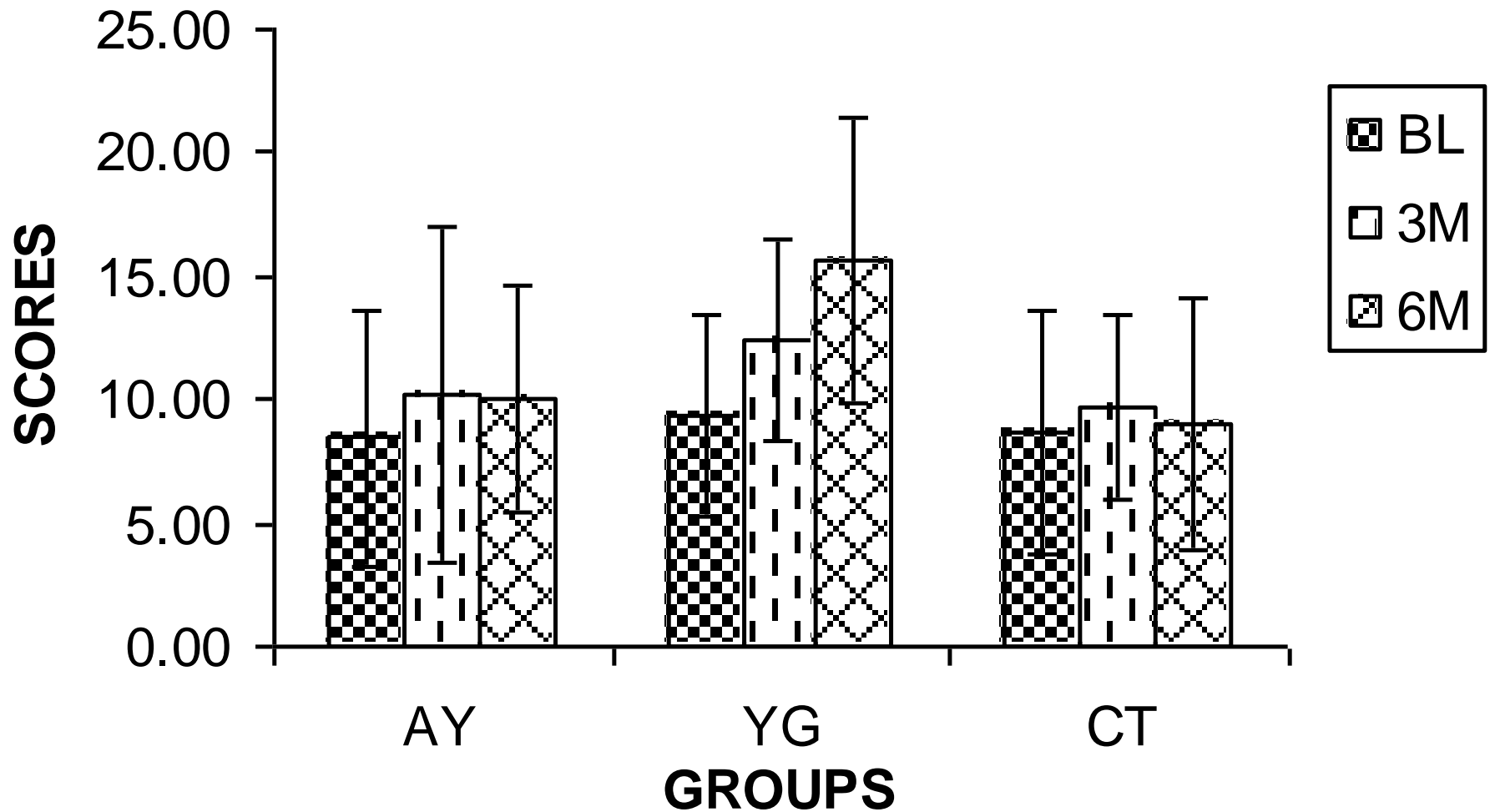
## WECHSLER MEMORY SCALE: DIGIT SPAN FORWARD





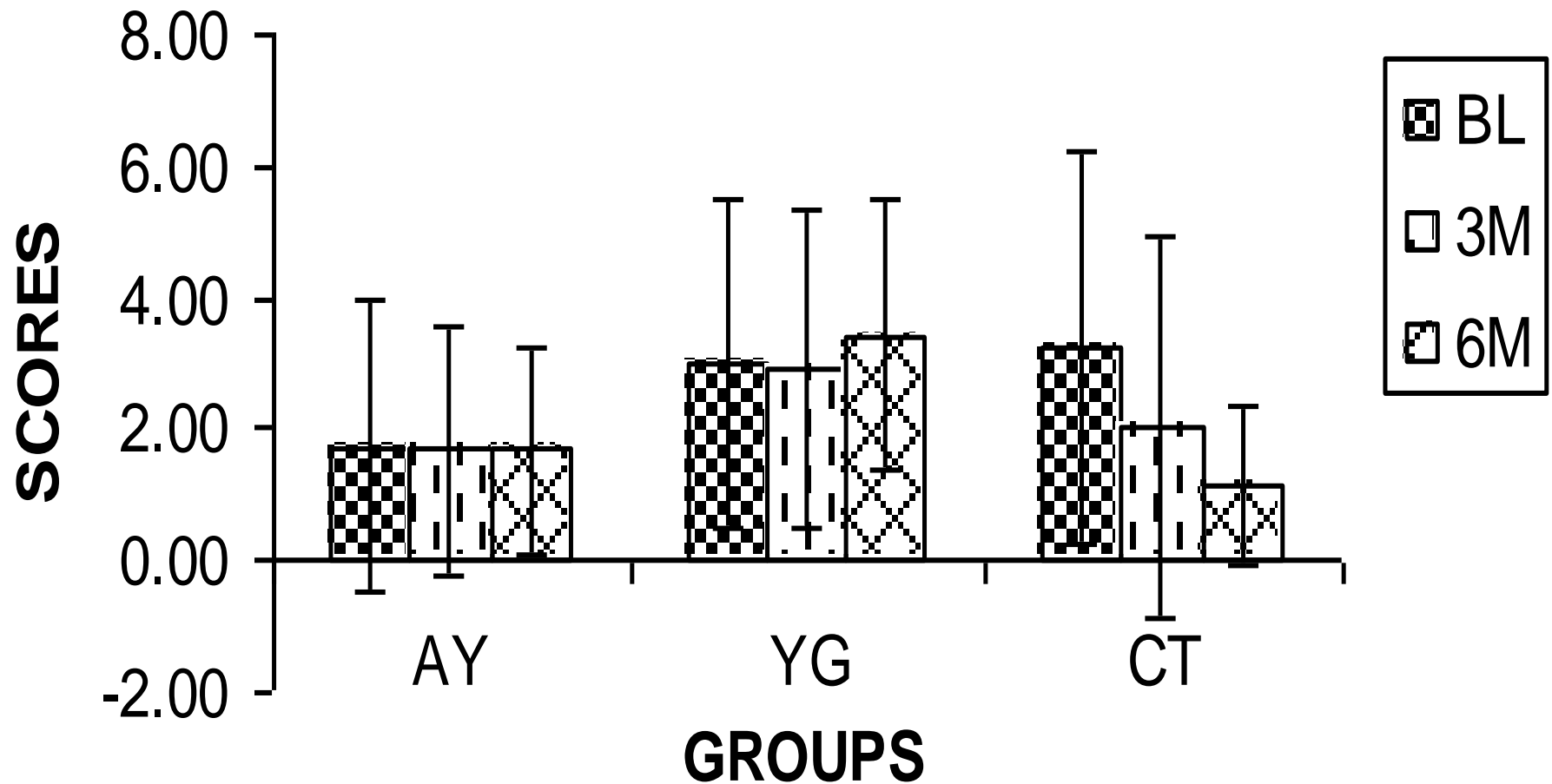
# Yoga for older persons

## WECHSLER MEMORY SCALE: DIGIT SPAN BACKWARD



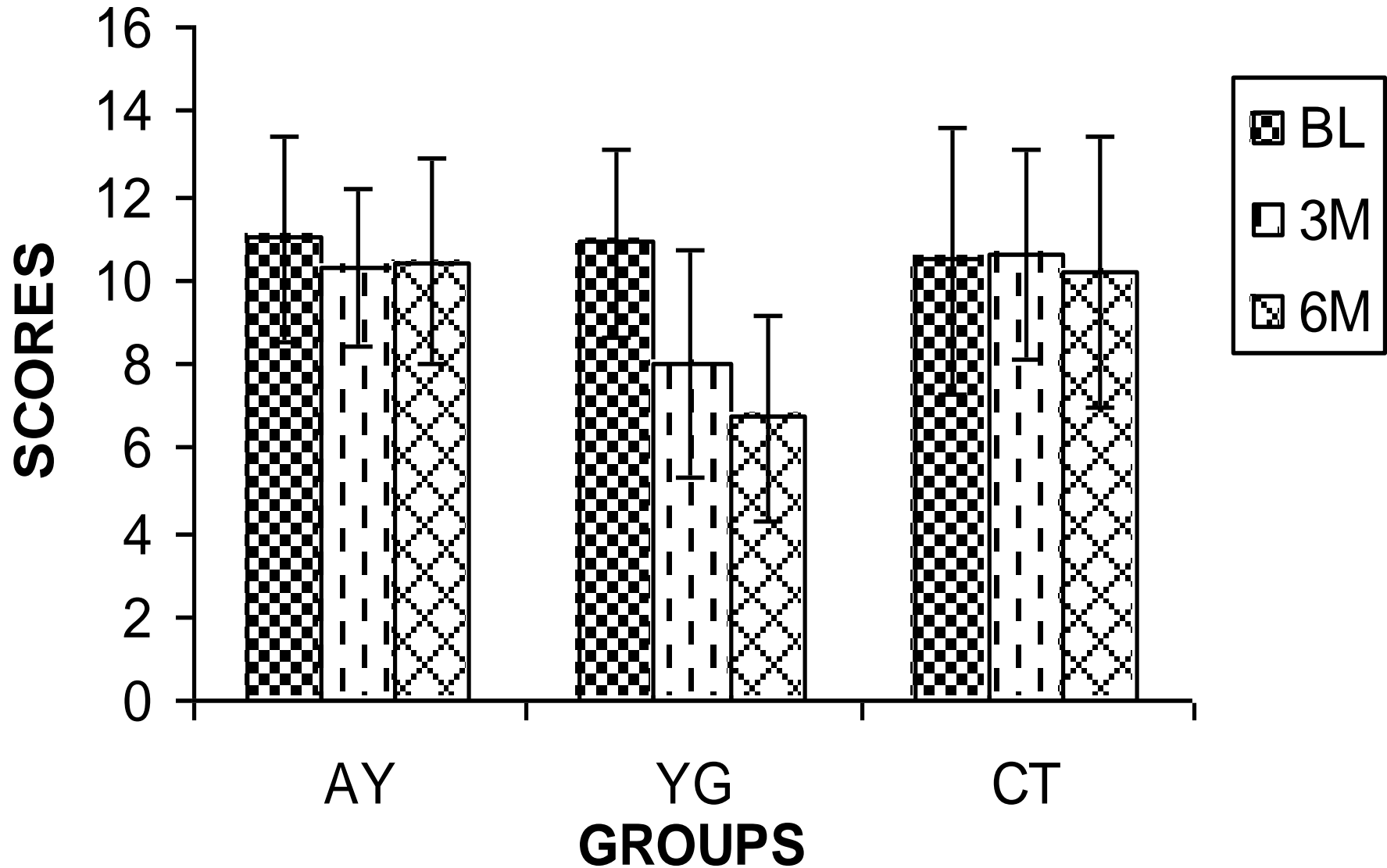
# Yoga for older persons: Difficult Associate Learning

## WECHSLER MEMORY SCALE: ASSOCIATE LEARNING (HARD)



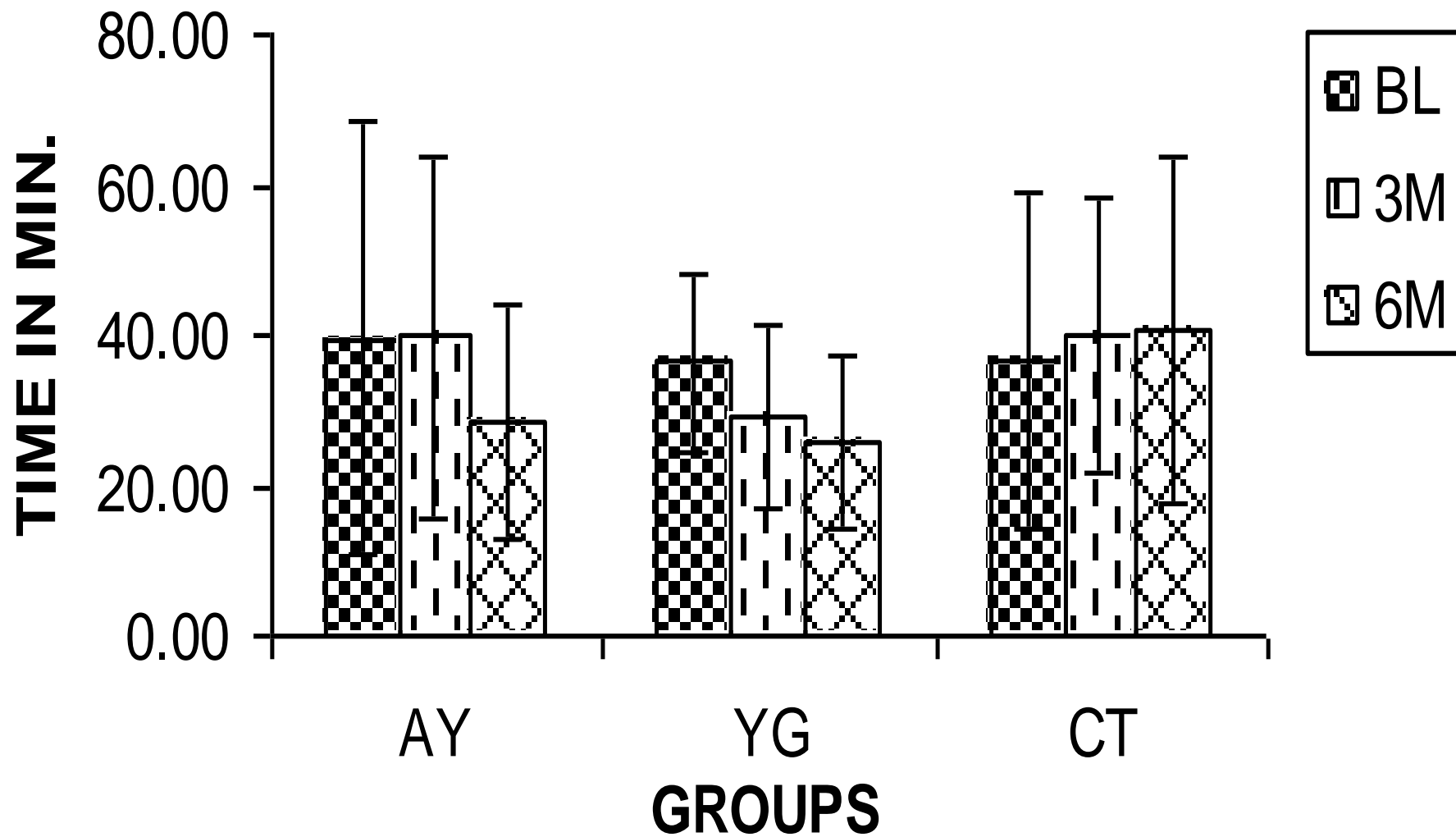
# Yoga for older persons

## GERIATRIC DEPRESSION SCALE



# Yoga for older persons

## SRQ: TIME TAKEN TO FALL ASLEEP



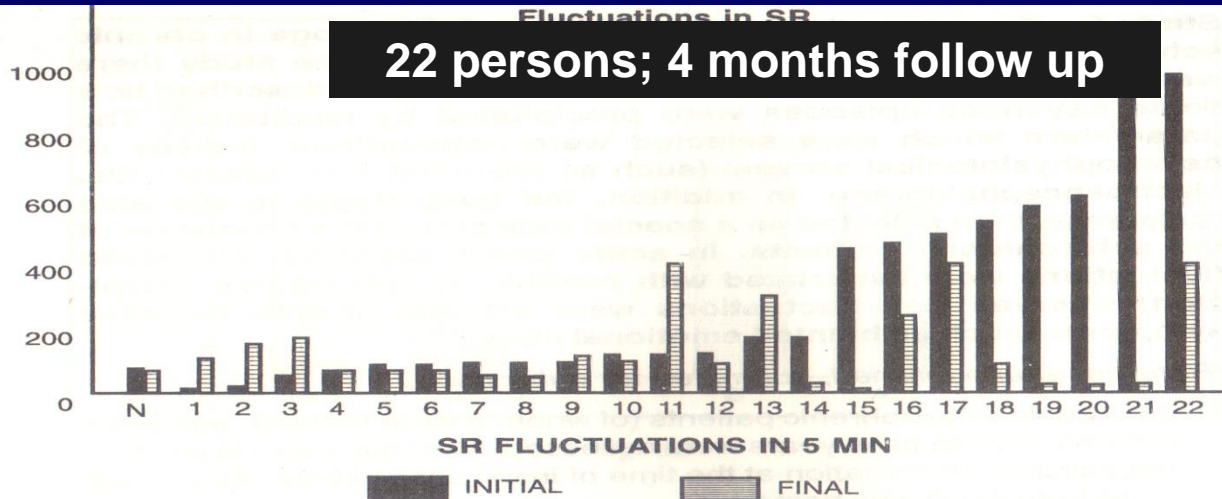
# **The aged improve : effect of yoga over 6 months**

- ▶ **Quality of sleep**
- ▶ **Mental state**
- ▶ **Gait & balance**
- ▶ **Memory (working memory; associate learning)**

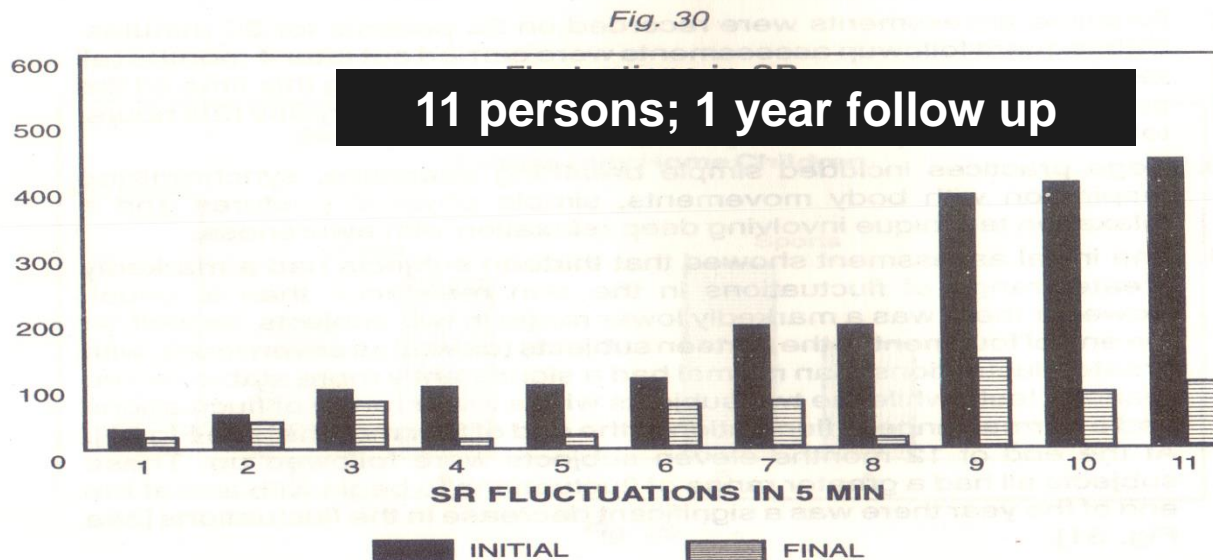
## **References:**

1. Abstract published in the proceedings of the 5th Scientific Congress of Federation of Asian and Oceanian Physiological Societies, Malaysia, 2002
2. Indian Journal of Medical Research, 2005

# Skin Resistance Fluctuations in Schizophrenics: Effect of Yoga



**Better mental  
stability**



# **Chronic Schizophrenics improve: based on a 4 year and 1 year follow-up and a 6 month controlled trial**

- 1. Orientation (of self and objects in space)**
- 2. Cognitive flexibility**
- 3. Attention span**

## **References:**

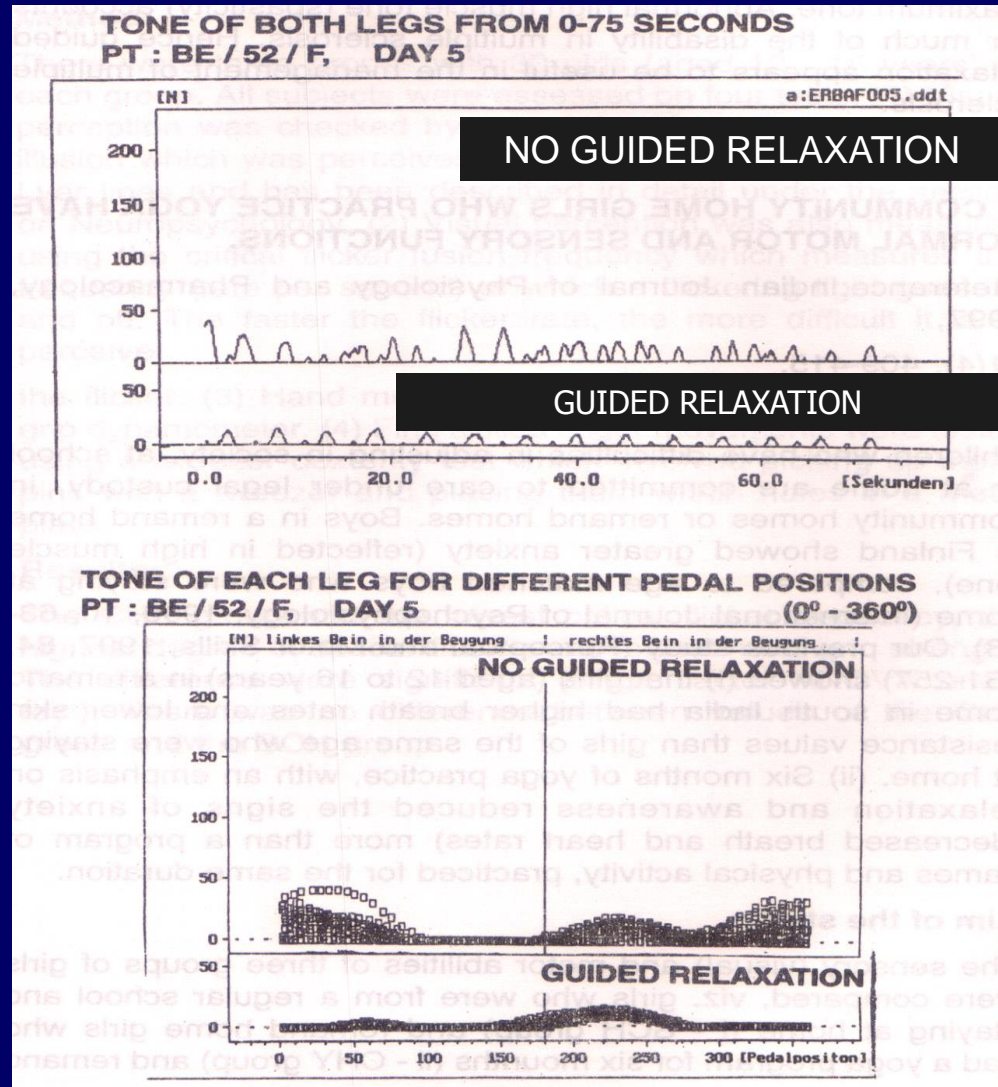
1. Indian Journal of Physiology and Pharmacology, 2001
2. Journal of Indian Psychology, 2003
3. Project report submitted to the Department of Indian Systems of Medicine and Homeopathy, Ministry of Health and Family Welfare, Government of India, 2001



# Medical Rehabilitation

- Cardiovascular (*work done elsewhere*)
- Multiple Sclerosis
- Rheumatoid arthritis
- Pulmonary Tuberculosis

# Multiple sclerosis



# Rheumatoid arthritis

## Hand grip strength (% changes)

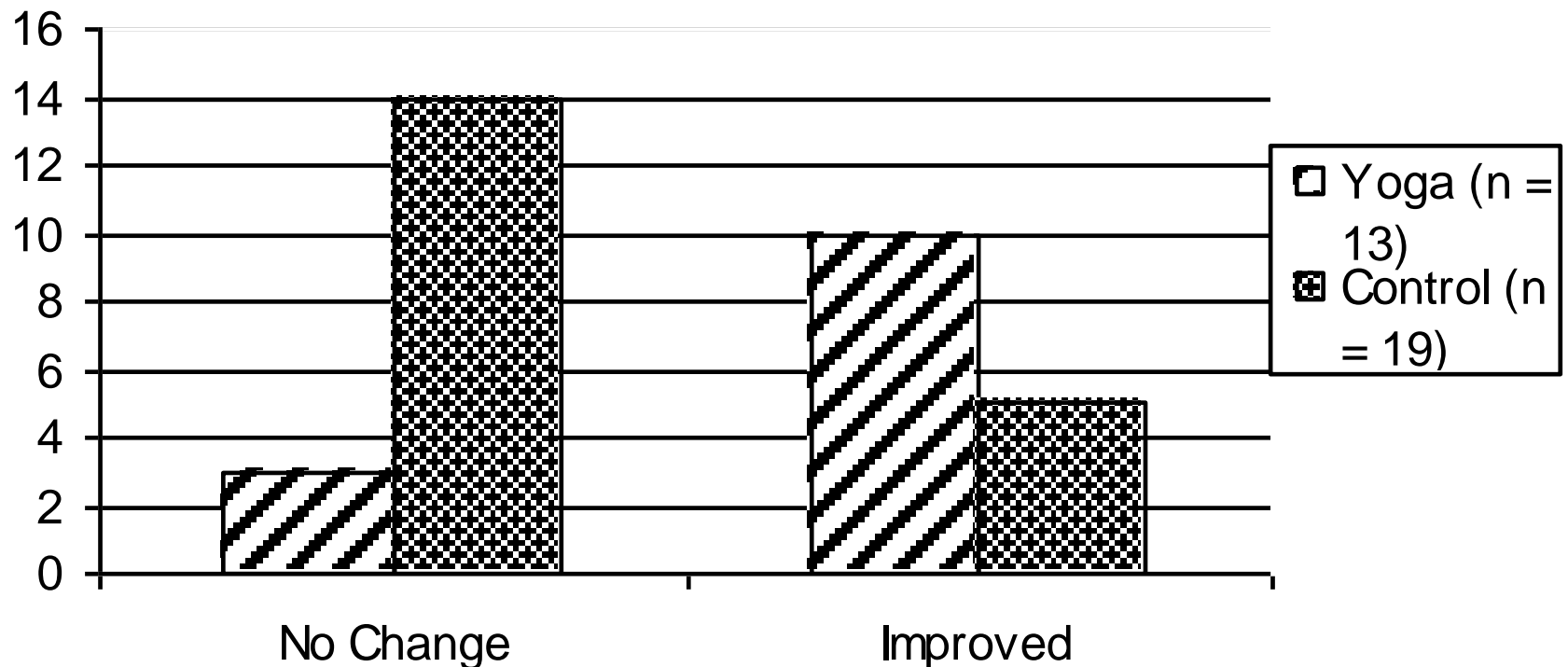
References: Br J Rheumatol, 1994; Indian J Physiol Pharmacol, 2001

	Group	Right hand	Left hand
<b>Males (n =10)</b>	<b>Yoga</b>	<b>+22.2**</b>	<b>+39.5**</b>
	<b>Control</b>	<b>+1.1</b>	<b>-1.6</b>
<b>Females (n = 10)</b>	<b>Yoga</b>	<b>+121.6***</b>	<b>+148.2***</b>
	<b>Control</b>	<b>-2.6</b>	<b>+5.3</b>

# Pulmonary Tuberculosis

Reference: Respirology, 2004

NUMBER OF PATIENTS SHOWING CHANGES IN  
SPUTUM CULTURE



# Occupational Stress

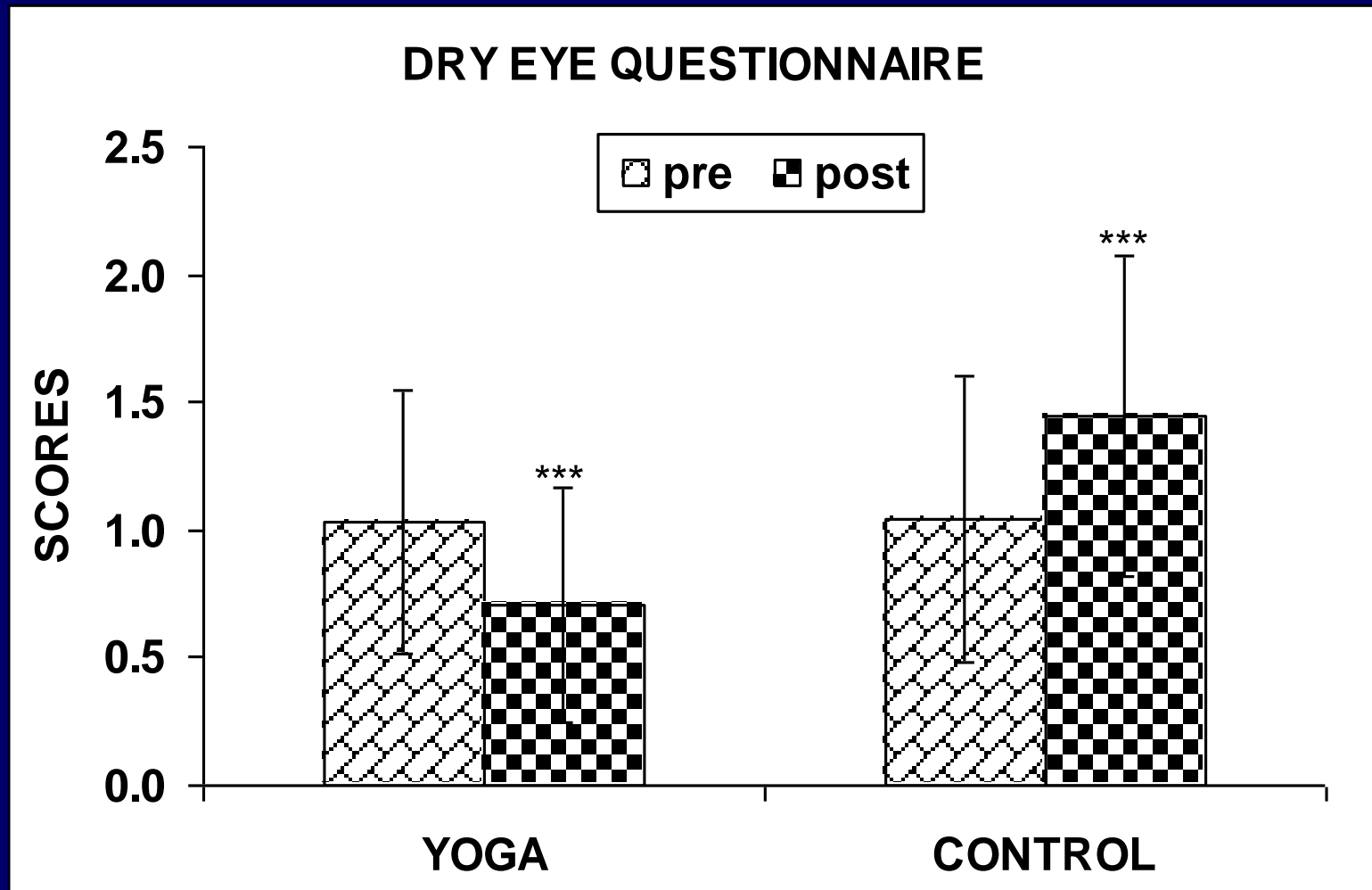
## Various occupations

- ▶ Aviation
- ▶ Railway engine drivers
- ▶ Long term computer users



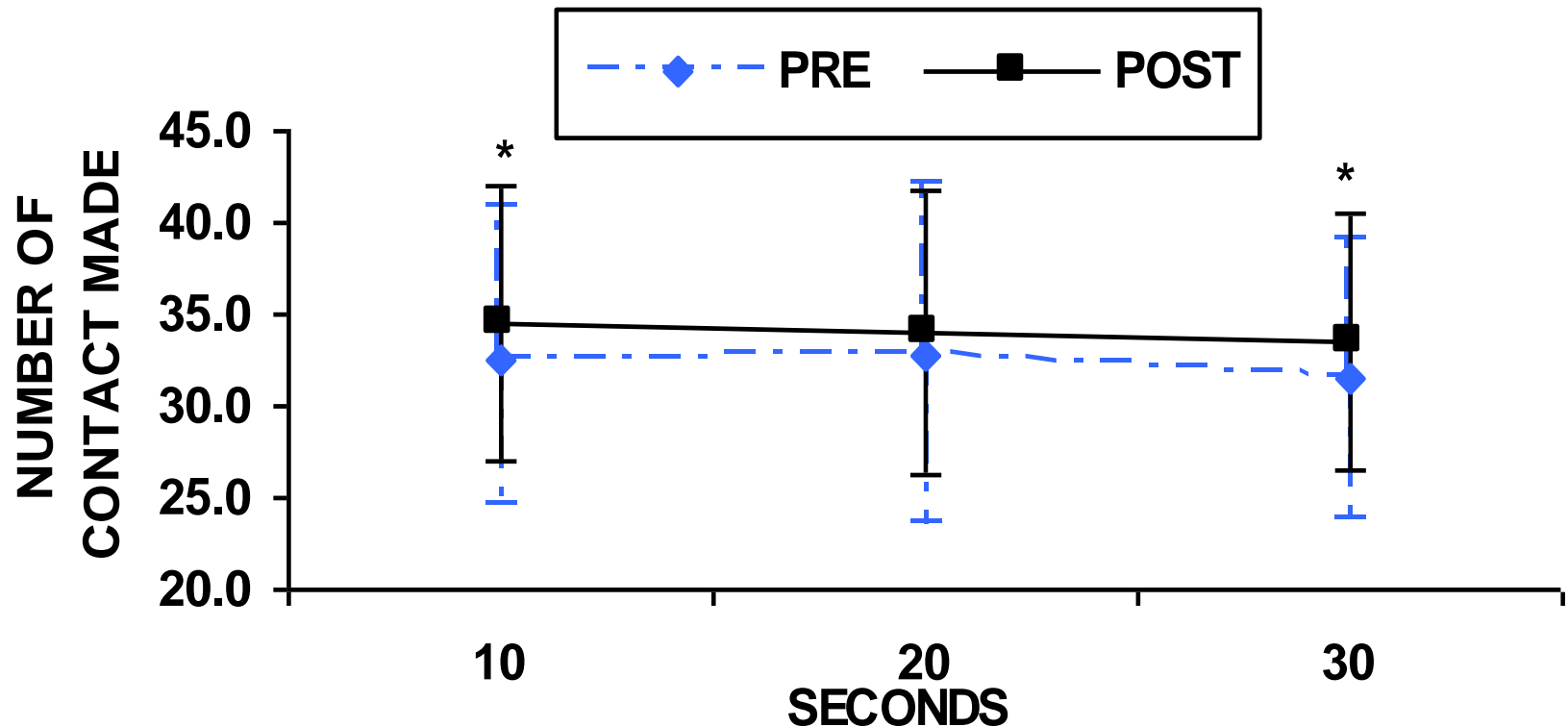
# Yoga for Professional Computer Users:

## Visual strain



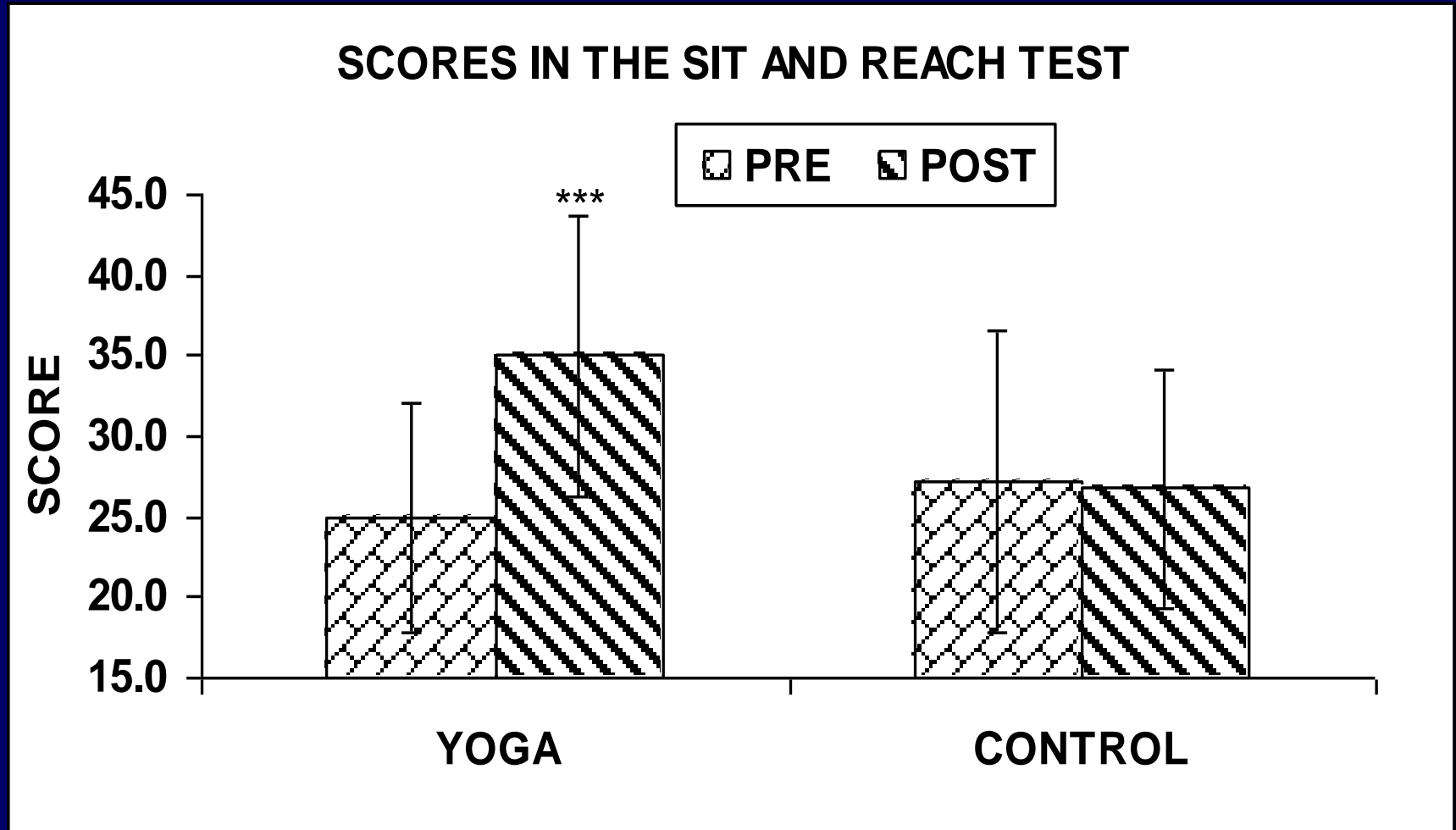
# Yoga for Professional Computer Users: Musculoskeletal performance

CHANGE IN NUMBER OF CONTACTS MADE AT 10, 20,  
AND 30 SECONDS FOR THE RIGHT HAND IN YOGA GROUP

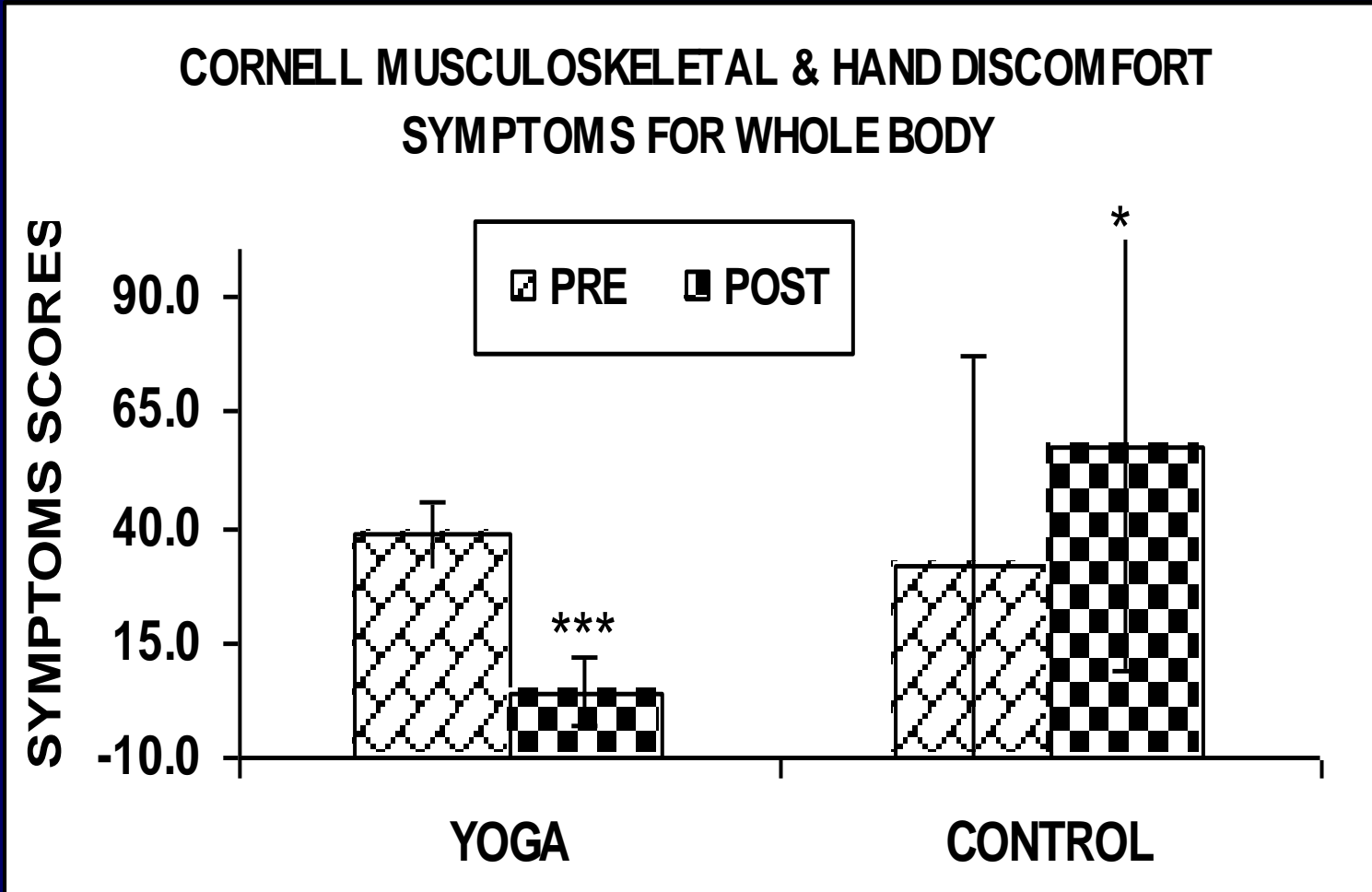




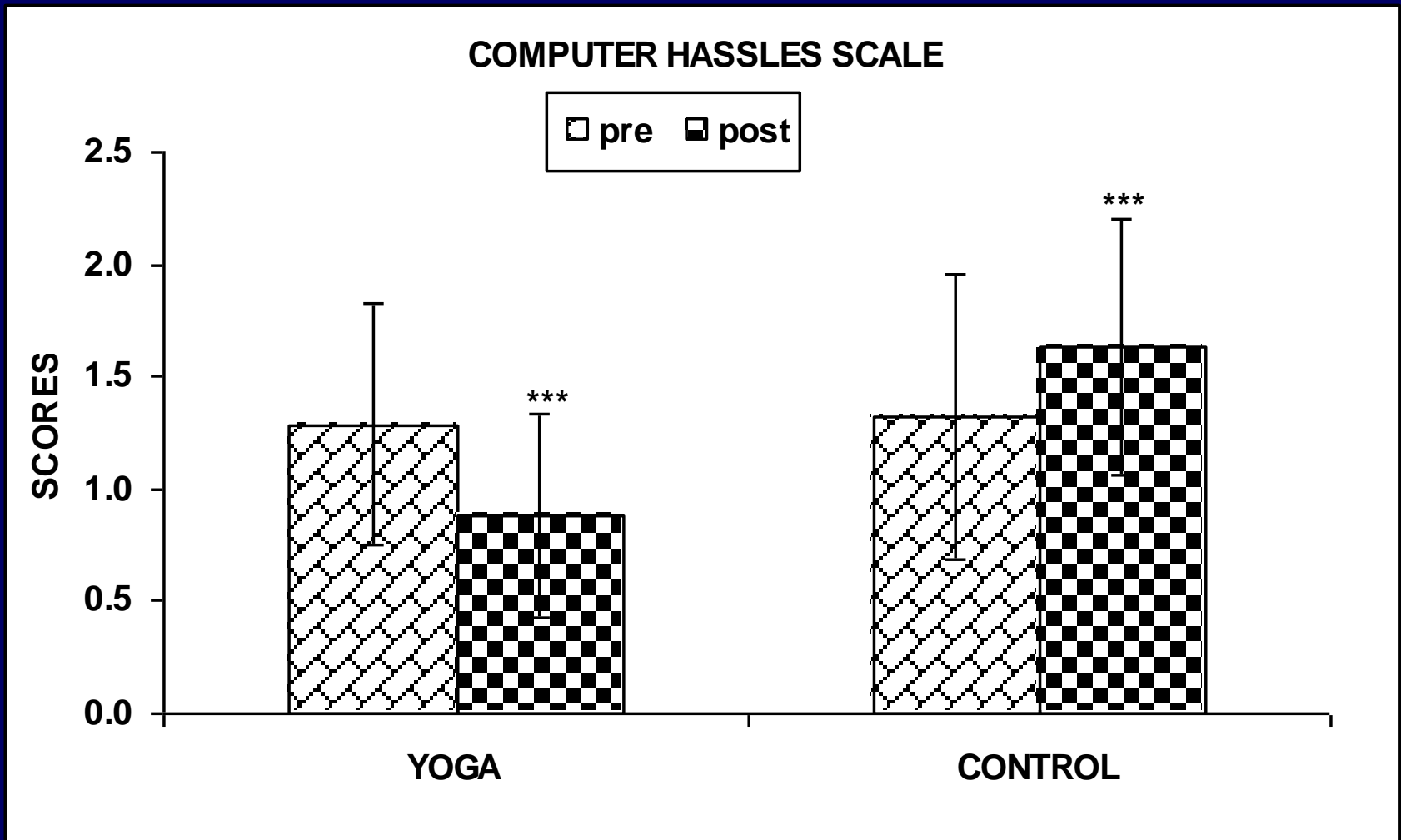
# Yoga for Professional Computer Users: Musculoskeletal performance



# Yoga for Professional Computer Users: Musculoskeletal performance



# Yoga for Professional Computer Users: Mental strain





*Yoga: a conscious evolution*