The Physics of ٱلصَّلَاةُ

Exploring the Science Behind Islamic Prayer Movements

Introduction

ٱلصَّلَاةُ: A fundamental pillar of Islam

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"O ye who believe! bow down, prostrate yourselves, and adore your Lord; and do good; that ye may prosper." *(Quran 22:77)*

Introduction

ٱلصَّلَاةُ: A fundamental pillar of Islam

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Goal today?

Bite Sized Scientific Backed Chunks for you to bring home and Ponder.

Mechanics of Solat, قِيَام

Mechanics of Solat, قِيَام

But why?
Why is this the recommended position?

Mechanics of Solat, قِيَام

But why?
Why is this the recommended position?

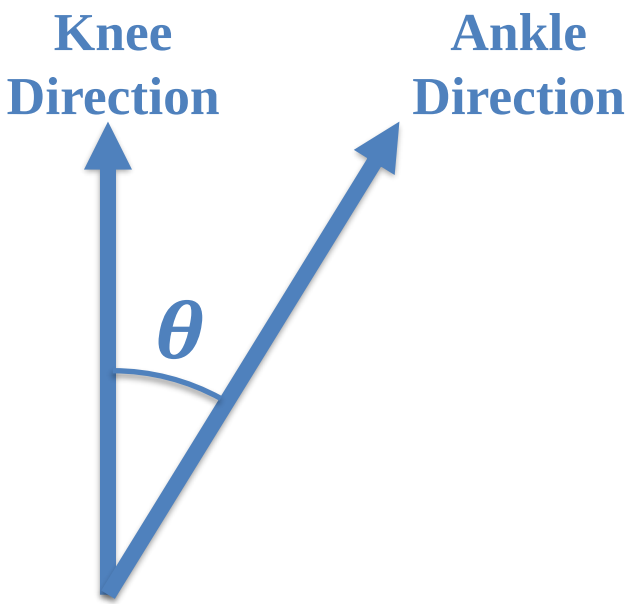
Torsional Force

Mechanics of Solat, قِيَام

But why?

Why is this the recommended position?

Torsional Force



Mechanics of Solat, قِيَام

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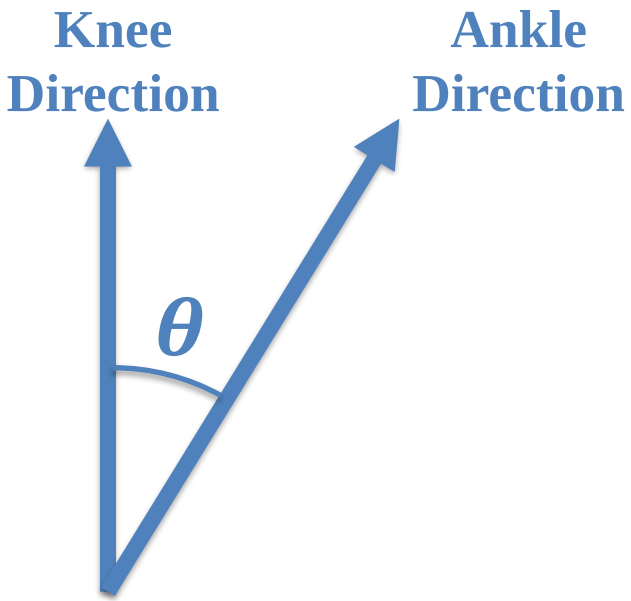


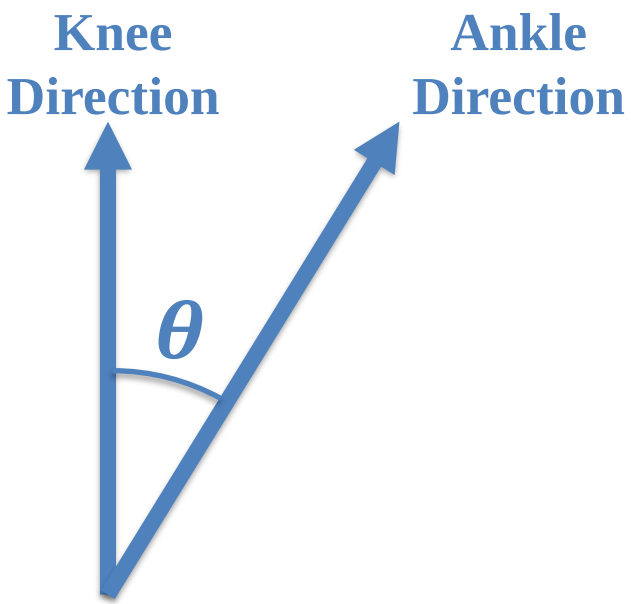
Torsional Stress Equation,

$$\tau = Fd \sin\theta$$

Mechanics of Solat, قِيَام

But why?
Why is this the recommended position?

Torsional Force



Torsional Stress Equation,

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Larger Angle,
Larger Stress.

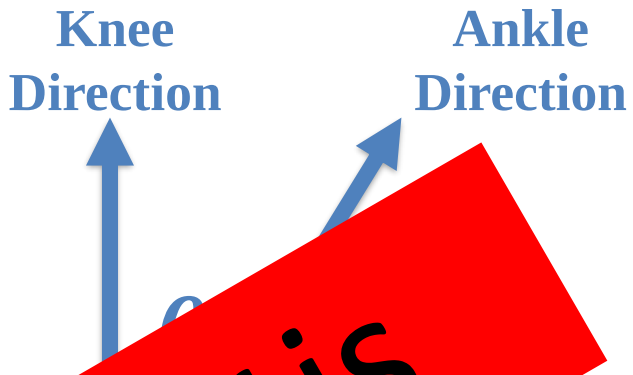
Mechanics of Solat, قِيَام

But why?

Why is this the recommended

Tor
Force

Osteoarthritis



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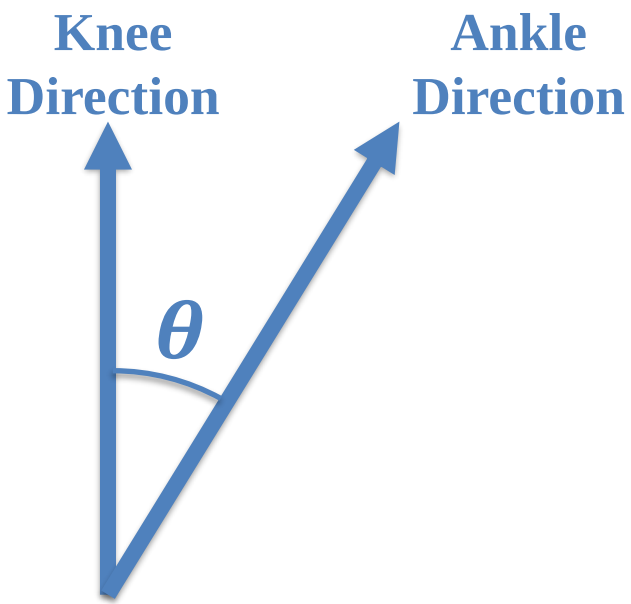

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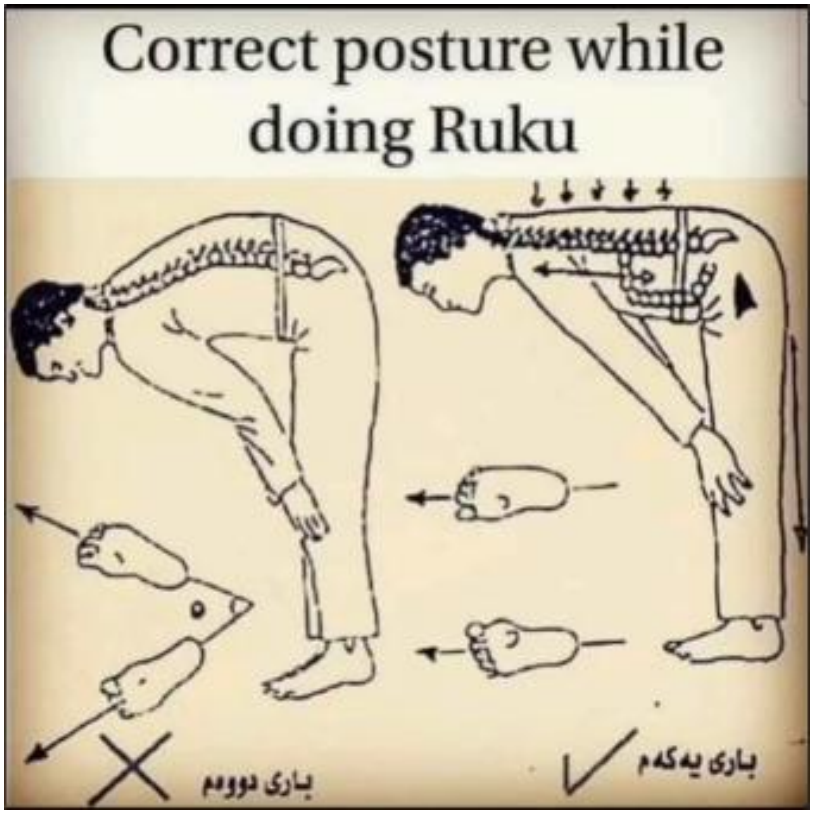
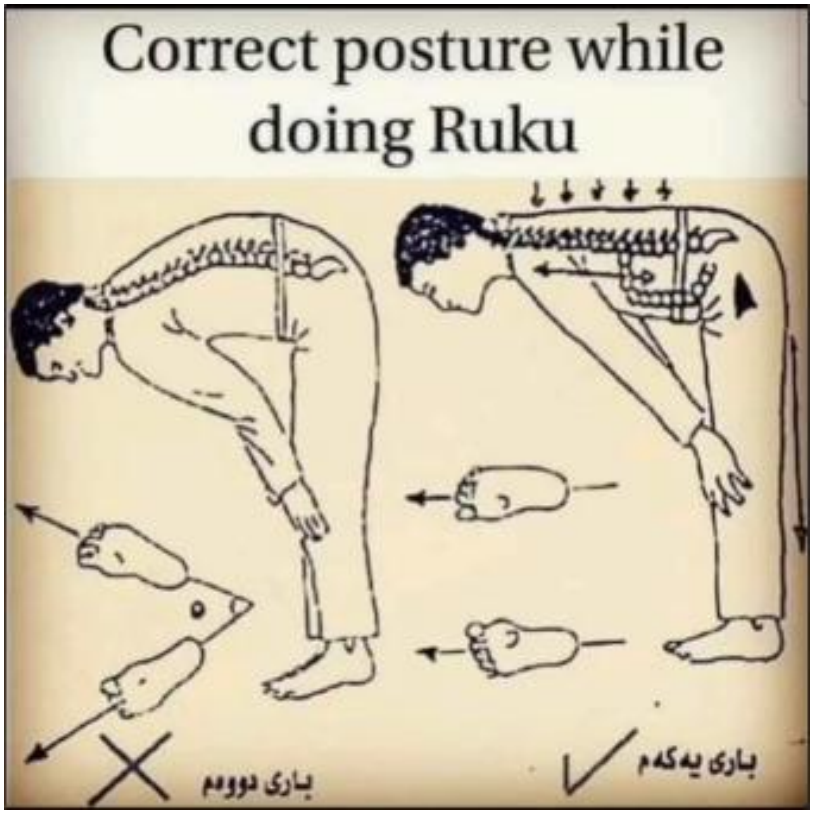
Increasing Risks of Osteoarthritis

Mechanics of Solat, رُكوع



Why is it important to keep your back straight?

Mechanics of Solat, رُكوع

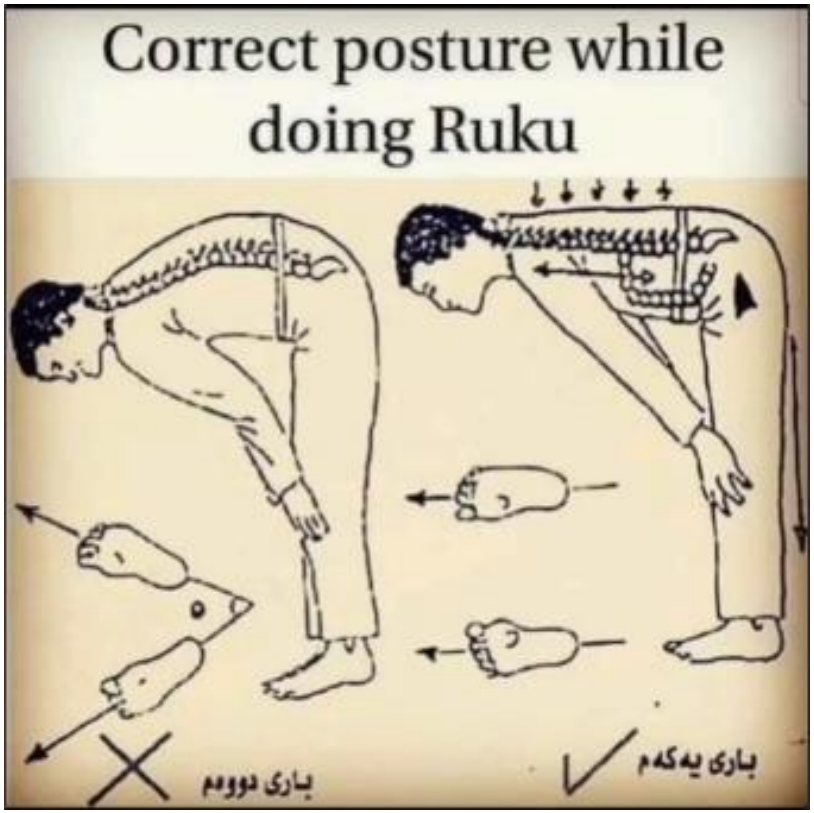


Why is it important to keep your back straight?

Abu Mas`ud Al-Badri, who said: The Messenger of Allah (peace and blessings be upon him) said: "A man's Salah is not valid until he straightens his back in bowing and prostration."

Reported by Abu Dawud (855), At-Tirmidhi (265) who said it is sound and authentic, An-Nasa’i (1027), and Ibn Majah (870).

Mechanics of Solat, رُكوع



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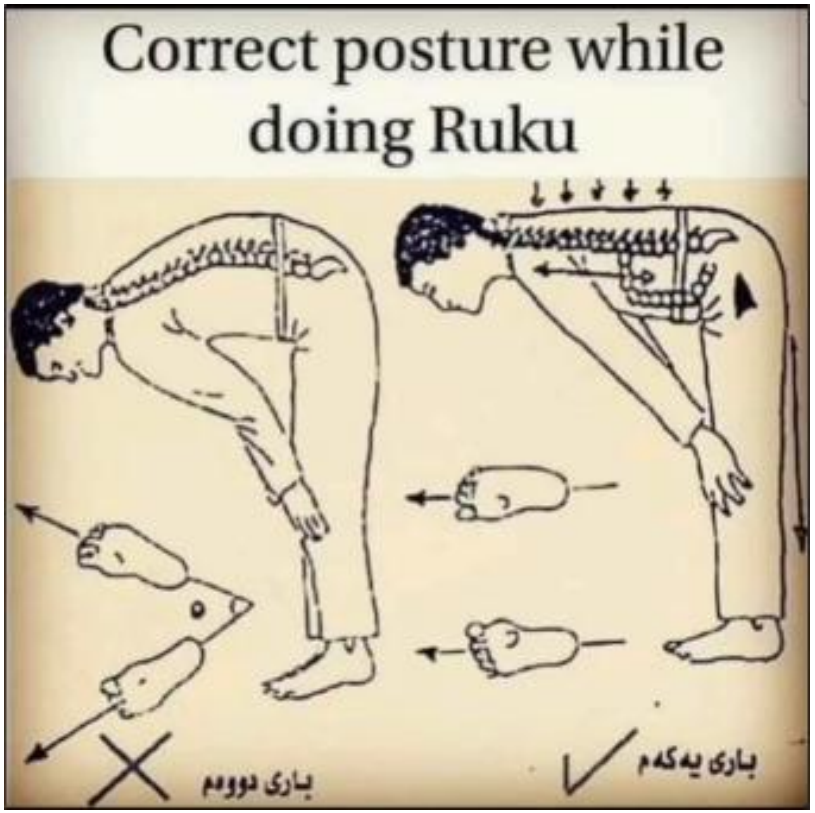
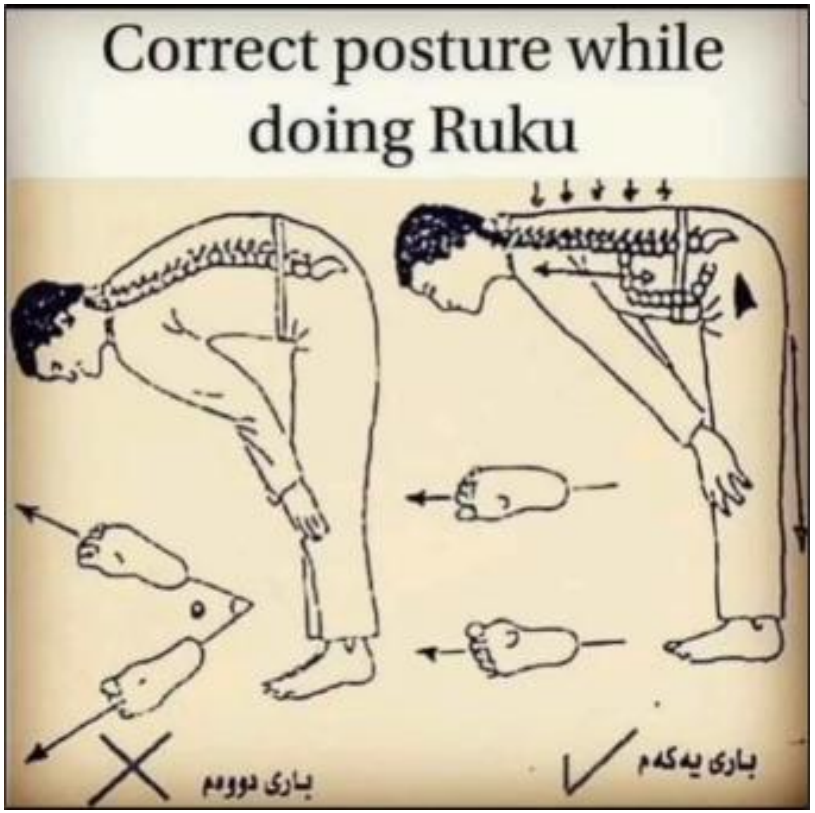


Why is it important to keep your back straight?

Spinal Alignment in Ruku, Torque on Spine

Hip Flexion vs Lumbar Flexion

Mechanics of Solat, رُكوع



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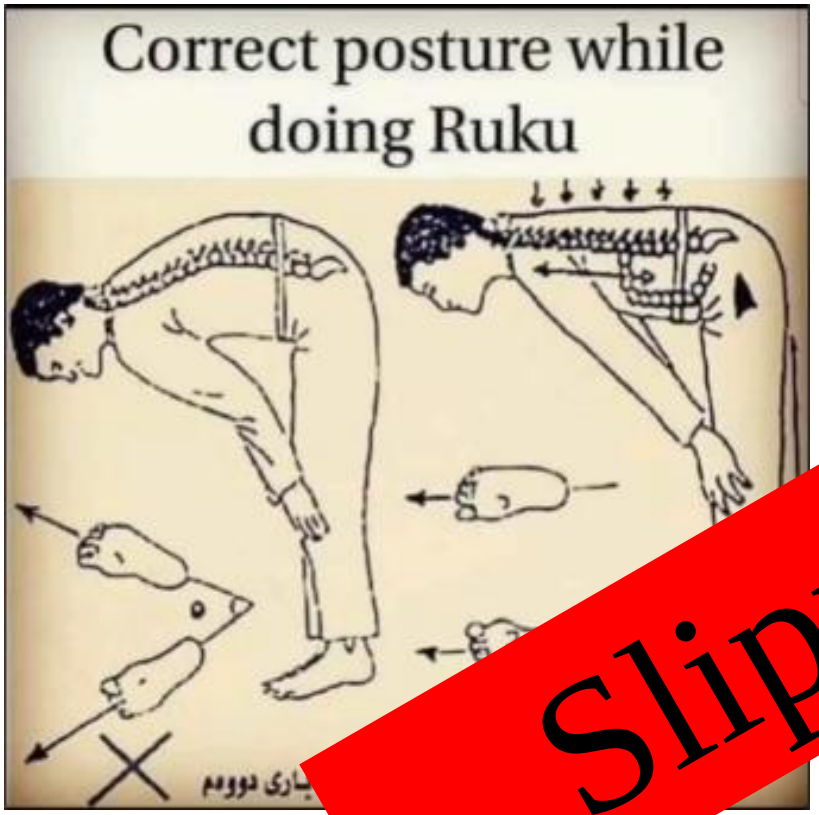
$$\tau = \vec{r} \times \vec{F}$$

$$r_{lumbar} > r_{hip}, \tau_{lumbar} > \tau_{hip}$$

Mechanics of Solat, رُكوع



Slipped Disc

Why is it im[illegible]ant to keep your back straight?

Spinal Al[illegible] Ruku,

[illegible] Lumbar Flexion

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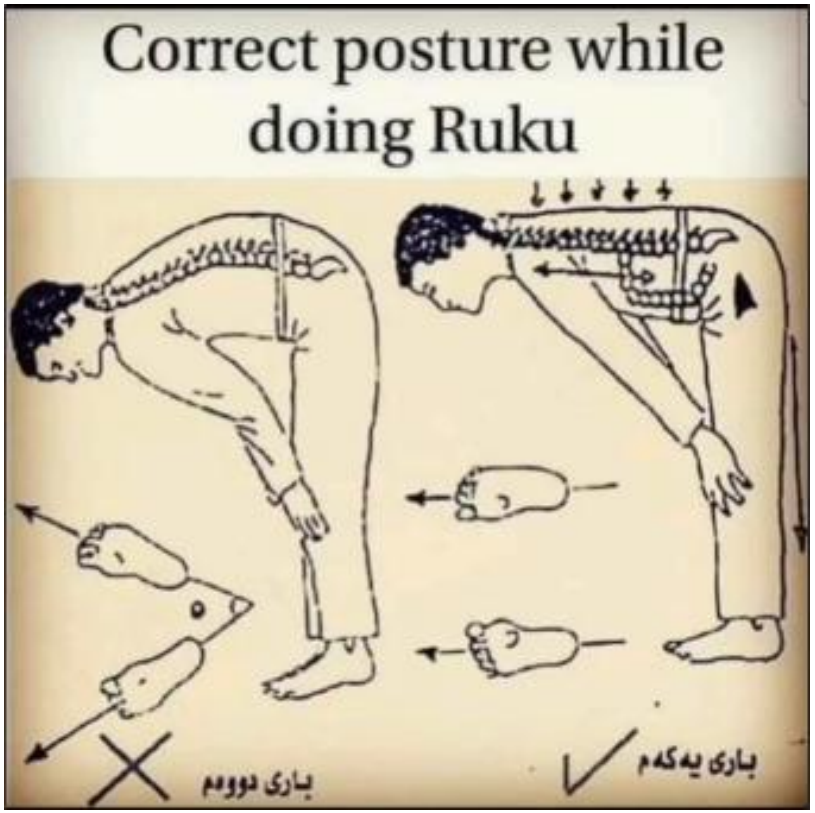
$$r_{lumbar} > r_{hip}, \tau_{lumbar} > \tau_{hip}$$

Mechanics of Solat, رُکوع



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Less strain on the spine

Slipped Disc

Mechanics of Solat, رُكوع

Maintaining straight back in ruku' is so important that…

International Journal of Human and Health Sciences Vol. 07 No. 02 April'23

Case Report

Ruku's Position Might Improve Scoliosis Curve Angles of 18-Years Old Female with Mild Thoracic Adolescents Idiopathic Scoliosis: A Case Report

Olympia Zahradewi[1], Eko Ari Setijono[2], Trianggoro Budisulistyo[3], Yuyun Yueniwati[4]

From the study:
"In this study, it was found that doing daily prayer in everyday life and performing the movement of Ruku' properly can improve vertebral column position."

"With the correlation of the data above that shows the consistency and lots of amount, it will deform scoliosis back to the normal shape faster than the ones that didn't. "

Mechanics of Solat, رُكوع

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International Journal of Human

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Ruku's Position Might Im… …emale with Mild Tho… …eport

Olympia … …astyo[3], Yuyun Yueniwati[4]

Sakit Skoliosis boleh sembuh

From the st…

"In this study, … in everyday life and performing the movement of … …ertebral column position."

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Mechanics of Solat, سُجُود

Biomechanical Response of the Upper Body during Prostration in *Salat* and the Child's Pose: a Preliminary Study

FATIMAH IBRAHIM, PhD, MScE, BScEE[1)], SITI A. AHMAD, PhD, MSc, BEng[1,2)], PARK JONG WOO, BEng[1,3)], WAN ABU BAKAR WAN ABAS, PhD, BSc[1)]

[1)] *Medical Informatics and Biological Micro-electro-Mechanical Systems (MIMEMS) Specialized Lab, Department of Biomedical Engineering, Faculty of Engineering, University of Malaya: 50603 Kuala Lumpur, Malaysia. E-mail: fatimah@um.edu.my*

[2)] *Department of Electrical and Electronic Engineering, Faculty of Engineering, Universiti Putra Malaysia*

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[3)] *Department of Biomedical Engineering, Inje University*

Purpose?

Sujud

vs

Child's Pose

https://eprints.um.edu.my/9267/

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Purpose? Sujud vs Child's Pose

Method?

Electromyographic Signals from upper body muscles measured

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Purpose? Sujud vs Child's Pose

Method? Electromyographic Signals from upper body muscles measured

Results?

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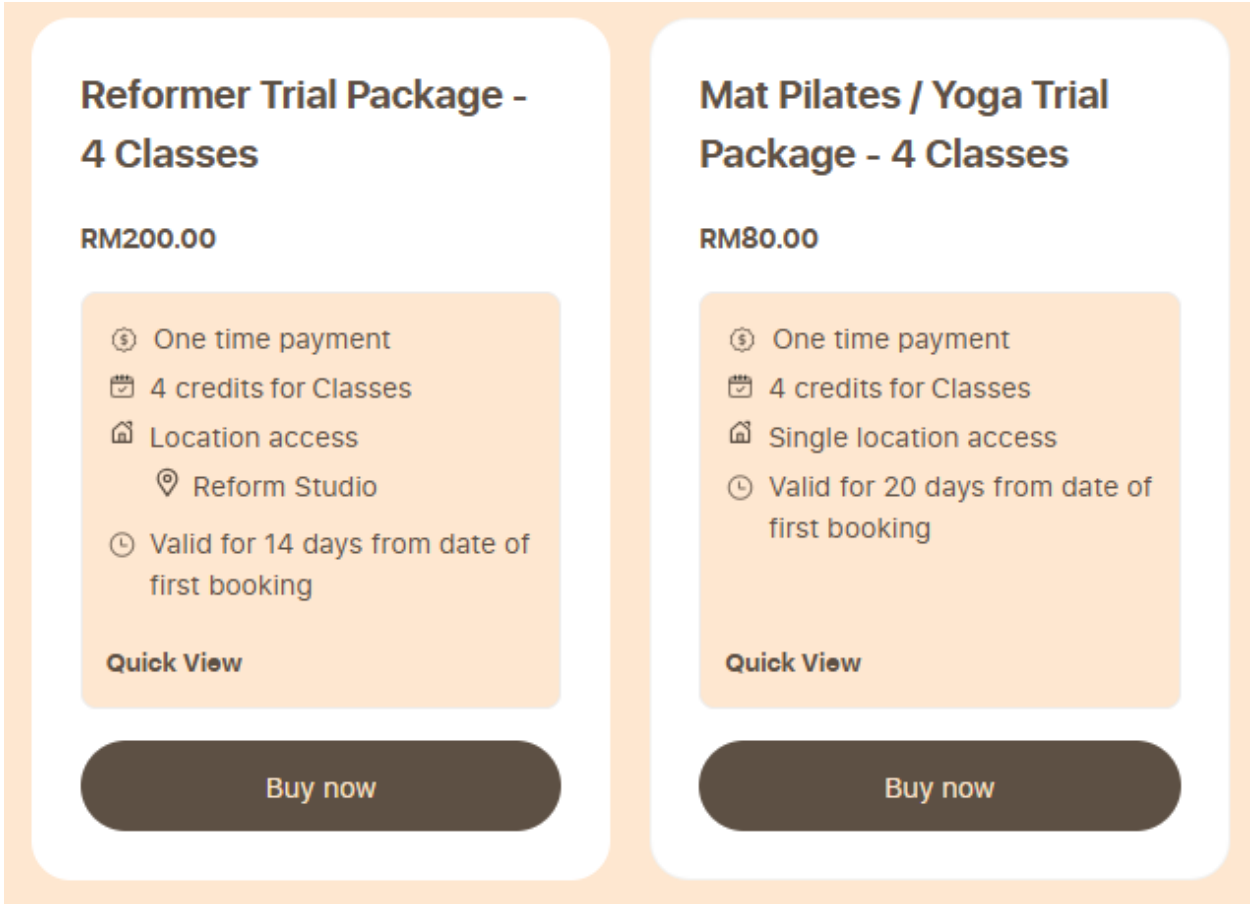
IKLAN

Harga Kelas Yoga/Pilates di Kuching!



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Purpose? Sujud vs Child's Pose

Method? Electromyographic Signals from upper body muscles measured

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Table 3. The overall mean and peak EMG values during prostration and in the child's pose

		BB	TB	PM	SC
Mean, v	Prostration	14.95	99.35	25.85	12.8
	Child's Pose	18.05	49.1	26.1	16.65
Peak, v	Prostration	39.15	222.5	51.1	32.4
	Child's Pose	67	136.95	86.6	79.8

BB–Biceps brachii, TB –Triceps brachii, PM –Pectoralis major, SC–Scapula

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Jimat Duit, Solat je

https://eprints.um.edu.my/9267/

Other studies related to Solat!

Comparison of Hamstrings Flexibility among Regular and Irregular Muslim Prayer Offerers

Arbela Sharif[1], Sajid Mehmood[2], Basit Mahmood[3], Ayesha Siddiqa[4], Muhammad Aleem Altaf Hassan[5*], Mahad Afzal[6]

[1]*Hajveri University, Sheikhupura*
[2]*Physical Therapy Department, University of Health Sciences, Lahore*
[3]*Physiotherapy Department, Aziz Fatimah Medical and Dental College, Faisalabad*
[4]*University of Sargodha*
[5*]*University of Portsmouth, United Kingdom*
[6]*University of Management and Technology*

The study concluded that Ruku's posture has a significant positive effect on hamstring flexibility.

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Solat kuatkan Hamstring

The study d that Ruku's posture has a significant positive ef on hamstring flexibility.

Other studies related to Solat!

Heterogeneity in Rate of Decline in Grip, Hip, and Knee Strength and the Risk of All-Cause Mortality: The Women's Health and Aging Study II

Qian-Li Xue [1,2], Brock A Beamer [3], Paulo HM Chaves [1,2], Jack M Guralnik [5], Linda P Fried [4]

▸ Author information ▸ Copyright and License information

PMCID: PMC3058914 NIHMSID: NIHMS235828 PMID: 21054287

The publisher's version of this article is available at J Am Geriatr Soc

In summary, muscle strength is an important marker and a potential cause of mortality risk in old women. Monitoring the rate of decline in grip and hip flexion strength in addition to the absolute levels may greatly improve the identification of women most at risk of dying.

Other studies related to Solat!

Heterogeneity in Rate of Decline in Grip, Hip, and Kne th and the Risk of All-Cause Mortality: The Women's Health y II

Qian-Li Xue [1,2], Brock A Beamer [3], Paulo HM Chaves [1,2], Jack M

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PMCID: PMC3058914 NIHMSID: NIHMS235

The publisher's version of

Kaki kuat, risiko mati rendah

In summa is an important marker and a potential cause of mo old women. Monitoring the rate of decline in grip and hi ion strength in addition to the absolute levels may greatly improve the identification of women most at risk of dying.

Other studies related to Solat!

Asian Journal of Islamic Psychology
Vol. 1, Issue 1, pp. 1-7, 2024
https://doi.org/10.23917/ajip.v1i1.3702

Asian Journal of Islamic Psychology

Muslim Prayer (Salah), and Its Restorative Effect: Psychophysiological Explanation

*Bayu Suseno[1]
[1]Faculty of Psychology, Universitas Muhammadiyah Surakarta, Indonesia
*Corresponding email: bs324@ums.ac.id

Physiologically, salah makes the PNS activity higher and SNS activity lower, and the brainwave, namely alpha, which is part of CNS and related to relaxed conditions, is higher.

Interestingly, the relaxation effect of salah is higher in the prostration position.

Other studies related to Solat!

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Asian Journal of Islamic Psychology

Muslim Prayer (Salah), and Its Restora
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Relax

Physiologically e PNS activity higher and SNS activity lower, and the brainwave, n , which is part of CNS and related to relaxed conditions, is higher.

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Other studies related to Solat!

Activity Monitoring of Islamic Prayer (Salat) Postures using Deep Learning

Anis Koubaa*,¶,‡, Adel Ammar*, Bilel Benjdira*, ‖, Abdullatif Al-Hadid*, Belal Kawaf*,
Saleh Ali Al-Yahri*, Abdelrahman Babiker, Koutaiba Assaf, Mohannad Ba Ras

*Robotics and Internet-of-Things Lab (RIOTU), Prince Sultan University, Riyadh, Saudi Arabia.
† CISTER Research Centre, ISEP, Polytechnic Institute of Porto, Porto, Portugal
¶Gaitech Robotics, China.
‖Research Laboratory SEICT, LR18ES44. National Engineering School of Carthage, Tunisia.

Email: (akoubaa, aammar, bbenjdira)@psu.edu.sa

We propose to develop an artificial intelligence assistive framework that guides worshippers to evaluate the correctness of the postures of their prayers. This paper represents the first step to achieve this objective and addresses the problem of the recognition of the basic gestures of Islamic prayer using Convolutional Neural Networks (CNN).

Other studies related to Solat!

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‖Research Laboratory SEICT, LR18ES44. National Engineering School of Carthage, Tunisia.

Email: (akoubaa, aammar, bbenjdira)@psu.edu.sa

What PC set up did they use to achieve this?

For the experimental setup, we used a workstation powered by an Intel Core i9-9900K (Octa-core) processor, with 64GB RAM, and an NVIDIA GeForce RTx2080T (11 GB) GPU, running on Ubuntu 16.04 LTS.

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Email:
j@psu.edu.sa

Mahal, ikut je kelas ustaz

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Other studies related to Solat!


Original article

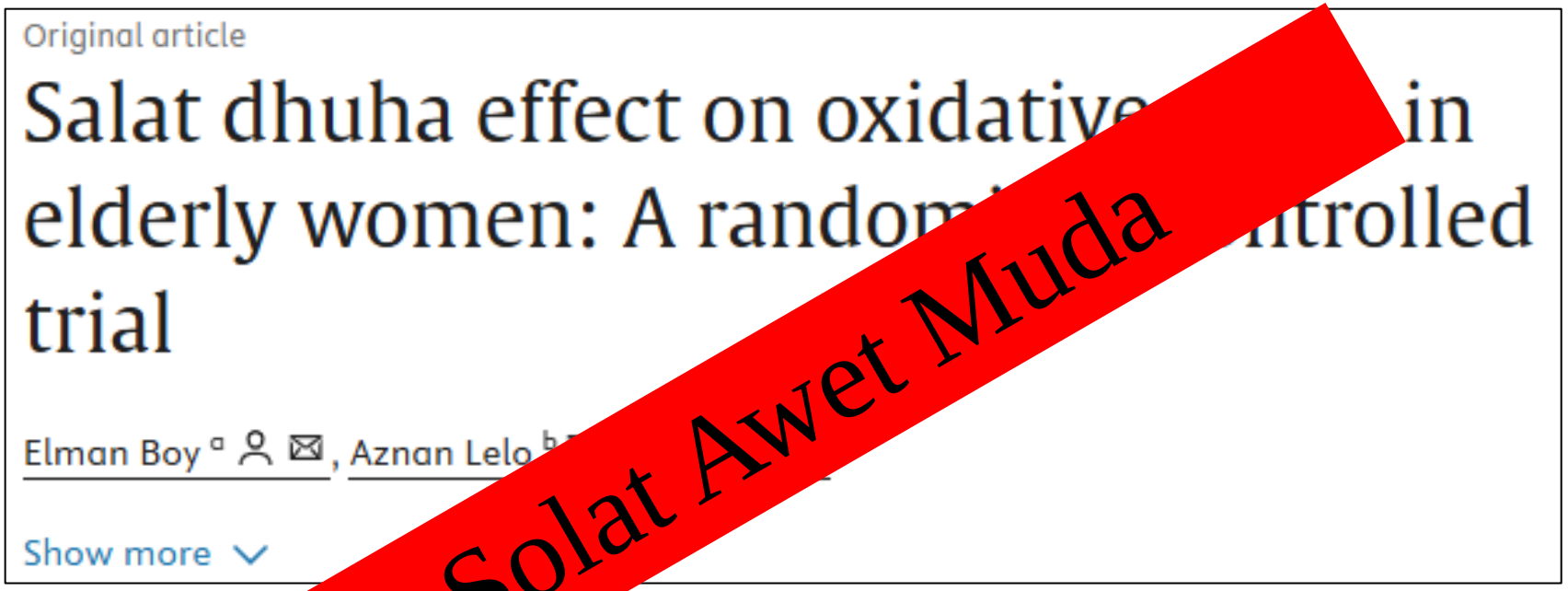
Salat dhuha effect on oxidative stress in elderly women: A randomized controlled trial

Elman Boy [a], Aznan Lelo [b], Sagiran [c]

Show more

The result of this study showed that mild to moderate intensity physical activity in the form of 8 rakaat of Salat dhuha significantly reduces oxidative stress, leading to better antioxidant protection in elderly women.

Other studies related to Solat!



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Solat Awet Muda

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Sekian, Terima Kasih.