Escuela FISIOBYM

Porteo y sus aplicaciones en Salud Materno-Infantil – UNIDAD DIDÁCTICA 4

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Contenidos

- Evidencia contacto precoz
  - Bebés (EJ1)
  - Mamás (EJ2)
  - Papás (EJ2)
- Evidencia práctica porteo
- Relevancia clínica

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Evidencia sobre beneficios de la PRÁCTICA DEL PORTEO

Escuela FISIO)SYM

(Impacto de la postura y dispositivos infantiles en la actividad muscular del raquis del bebé)

Positioning and baby devices impact infant spinal muscle activity

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ARTICLE INFO

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Infant
Tummy time
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Prone play

ABSTRACT

Infant positioning in daily life, particularly in relation to active neck and back muscles, may affect spinal development, psychosocial progression, and motor milestone achievement. Yet the impact of infant body position on muscle activity is unknown. The objective of this study was to evaluate neck and back muscle activity of healthy infants in common positions and baby devices.

Healthy full-term infants (n = 22, 2–6 months) participated in this experimental study. Daily sleep and positioning were reported by caregivers. Cervical paraspinal and erector spinae muscle activity was measured using surface electromyography (EMG) in five positions: lying prone, lying supine, held in-arms, held in a baby carrier, and buckled into a car seat. Mean filtered EMG signal and time that muscles were active were calculated. Paired t-tests were used to compare positions to the prone condition. Caregivers reported that infants spent 12% of daily awake time prone, 43% in supine-lying baby gear, and 44% held in-arms or upright in a baby carrier. Infants exhibited highest erector spinae activity when prone, and lowest cervical paraspinal muscle activity in the car seat. No differences were found between in-arms carrying and babywearing. This first evaluation of the muscle activity of healthy infants supports the importance of prone time in infants' early spinal development because it promotes neck and back muscle activity. Carrying babies in-arms or in baby carriers may also be beneficial to neck muscle development, while prolonged time spent in car seats or containment devices may be detrimental to spinal development.

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(Porteo: el rol del coste biomecánico en el desarrollo de herramientas de porteo)

WILEY InterScience®

AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY 133:841–846 (2007)

Infant Carrying: The Role of Increased Locomotory Costs in Early Tool Development

C.M. Wall-Scheffler,[1]* K. Geiger,[2] and K.L. Steudel-Numbers[1]

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KEY WORDS arm swing; tool use; baby carrying; energetics; locomotion

ABSTRACT Among the costs of reproduction, carrying one's infant incurs one of the greatest drains on maternal energy, simply because of the added mass alone. Because of the dearth of archaeological evidence, however, how early bipeds dealt with the additional cost of having to carry infants who were less able to support their body weight against gravity is not particularly well understood. This article presents evidence on the caloric drain of carrying an infant in one's arms versus having a tool with which to sling the infant and carry her passively. The burden of carrying an infant in one's arms is on average 16% greater than having a tool to support the baby's mass and seems to have the potential to be a greater energetic burden even than lactation. In addition, carrying a baby in one's arms shortens and quickens the stride. An anthropometric trait that seems to offset some of the increased cost of carrying a baby in the arms is a wider bi-trochanteric width. Am J Phys Anthropol 133:841–846, 2007.

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Wall-scheffleler et al. **Infant carrying: the role of increased locomotory cost in early tool development.** American journal of physical anthropology 133:841–846 (2007)

Gasto energético llevar a un bebé en brazos

=

Motivo para recurrir a dispositivo de ayuda

Valoró:

- Gasto de O2
- Información cinética, etc.

Bebé en brazos versus bebé en portebebé.

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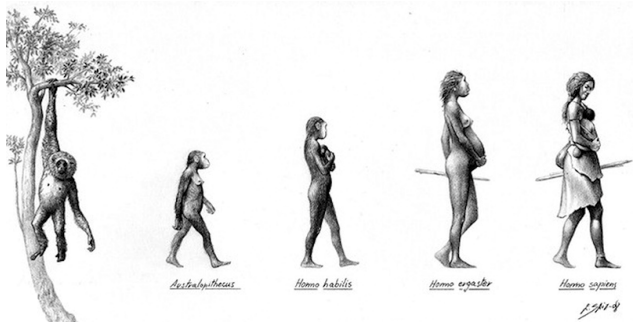
Incógnita desde el punto de vista antropológico



Autor: Eduardo Saiz Alonso

*(Efectos de **transportar** a un bebé en la postura de las mujeres en la marcha y bipedestación)*

Effects of transporting an infant on the posture of women during walking and standing still

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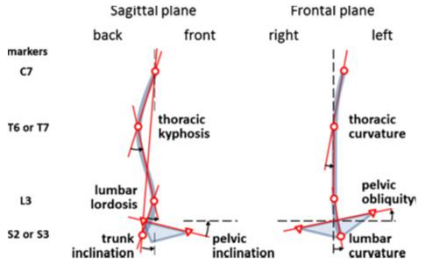
Bipedalism
Infant carrying

ABSTRACT

We investigated the effects on women of carrying an infant in front, focusing on the pelvic and spinal posture and the displacement of the body's center of gravity. For such, we compared mothers to non-mothers not carrying anything or carrying the same load (a doll) and the mothers carrying their infants. Twenty mothers and 44 women who did not have children were analyzed for their movement and posture during walking and standing still with a motion capture system. Walking while carrying a load was slower and with a shorter stride length than while not carrying a load. The mothers' group walked slower and with a shorter stride length than the non-mothers' group. During walking and standing still, the women decreased their angle of pelvic anteversion, increased lumbar lordosis, increased thoracic kyphosis, and increased trunk backward inclination while carrying a load in comparison with not carrying anything. In addition, we observed some small differences in the spinal angles of mothers when carrying their infants compared to when carrying a doll. When standing still, the women carrying a load displaced backwards their vertical projection of the center of gravity to exactly compensate the destabilizing load at the front that resulted in no net change of the body-plus-load center of gravity. In general, these changes are qualitatively similar to the ones observed during pregnancy.

L.D Junqueira et al. **Effects of transporting an infant on the posture of wowen during walking and standing still.** Gait & posture 41 (2015): 851-846

- Transportar a un bebé <u>en brazos</u> produce cambios significativos en la ángulos pélvicos y raquídeos:
  - → Reducción de anteversión pélvica (*)
  - → Aumento de la lordosis lumbar
  - → Aumento de la cifosis dorsal



Localización de los marcadores utilizados para la medida de los ángulos raquídeos y pélvicos.
L.D Junqueira et al. Effectos of transporting an infant on the posture of wowen during walking and standing still. Gait & posture 41 (2015): 851-846

L.D Junqueira et al. **Effects of transporting an infant on the posture of wowen during walking and standing still.** Gait & posture 41 (2015): 851-846

Reducción de anteversión pélvica (*)

→ gran variabilidad entre sujetos

→ cada mujer presenta diferentes ángulos pélvicos y raquídeos en el plano sagital,

→ pero las adaptaciones en todos los casos son similares.

*(Portear con bandolera afecta a la **neuromecánica de la columna lumbar y torácica** durante la bipedestación y la marcha*

Gait & Posture 67 (2019) 172–180

Contents lists available at ScienceDirect

Gait & Posture

journal homepage: www.elsevier.com/locate/gaitpost

Sling-based infant carrying affects lumbar and thoracic spine neuromechanics during standing and walking

Stefan Schmid[a,b,*], Michèle Stauffer[b,c], Judit Jäger[b], Renate List[b,d], Silvio Lorenzetti[b,e]

ARTICLE INFO

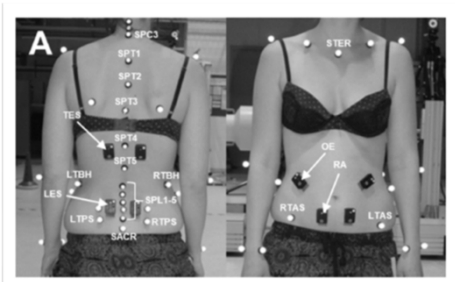
ABSTRACT

Schmid S, et al.
Sling-based infant carrying affects lumbar and thoratic spine neuromechanics during standing and walking.
Gait & posture 67 (2019): 172-180

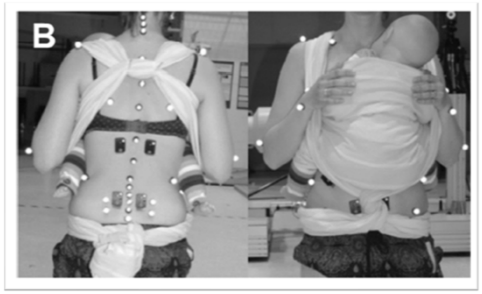
- **OBJETIVO**: explorar el efecto inmediato de diferentes técnicas de porteo, a partir de un modelo tridimensional de la pelvis y raquis, así como la actividad muscular durante la bipedestación erguida y la marcha en mujeres.

Schmid S, et al.
Sling-based infant carrying affects lumbar and thoratic spine neuromechanics during standing and walking.
Gait & posture 67 (2019): 172-180

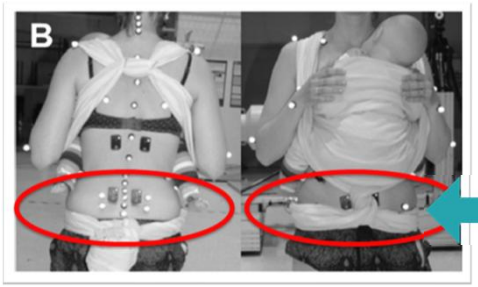
- **SE ESTUDIARON 3 CONDICIONES.** Ángulos pélvicos, raquídeos y registros EMG**:**
  A. Sin muñeco salado
  B. Porteando al muñeco salado DELANTE
  C. Porteando al muñeco salado en LATERAL (pref. / no pref.)



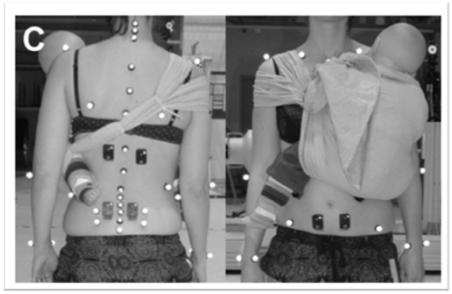
Schmid S, et al. Sling-based infant carrying affects lumbar and thoratic spine neuromechanics during standing and walking. Gait & posture 67 (2019): 172-180



Schmid S, et al. Sling-based infant carrying affects lumbar and thoratic spine neuromechanics during standing and walking. Gait & posture 67 (2019): 172-180



Schmid S, et al. Sling-based infant carrying affects lumbar and thoratic spine neuromechanics during standing and walking. Gait & posture 67 (2019): 172-180



Schmid S, et al. Sling-based infant carrying affects lumbar and thoratic spine neuromechanics during standing and walking. Gait & posture 67 (2019): 172-180

Schmid S, et al. **Sling-based infant carrying affects lumbar and thoratic spine neuromechanics during standing and walking.** Gait & posture 67 (2019): 172-180

CONCLUSIONES:

- Portear a un bebé con una bandolera, alternando ambos lados, ayuda a prevenir el dolor musculesquelético causado por un aumento de lordosis lumbar e hiperactivación de la musculatura paraespinal.

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Schmid S, et al. **Sling-based infant carrying affects lumbar and thoratic spine neuromechanics during standing and walking.** Gait & posture 67 (2019): 172-180

LIMITACIONES:

- Tamaño muestral: 15
- No considera activación a diafragma pélvico ni transverso del abdomen.

Escuela FISIO)SYM

*(Efectos de transportar un bebé en los arcos de movimiento **de miembro inferior:** porteo versus transporte en brazos)*

Full length article

Effects of infant transportation on lower extremity joint moments: Baby carrier versus carrying in-arms

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ARTICLE INFO

Keywords:
Anterior load
Infant carrying
Walking gait
Lower extremity
Kinetics

ABSTRACT

Background: The act of babywearing is recognizably a task of load carriage and has gained popularity among millennial caregivers.
Research Question: The implications of babywearing on lower extremity joint moments of the caregiver are still unknown during prolonged transport and a direct comparison of babywearing to carrying an infant in-arms has not been previously conducted.
Methods: Eighteen females participated in this study by performing 3 conditions: a) 3 min walking unloaded (UL), b) 15 min walking while carrying a mannequin infant in-arms (IA), and c) 15 min walking while wearing a mannequin infant in an anteriorly positioned baby carrier (BC). Two separate data analyses were conducted using a repeated measures ANOVA. First, UL compared to the initial minute of walking for IA and BC. Second, UL compared to the final minute of walking for IA and BC.
Results: During initial minute comparisons, both IA and BC conditions increased joint moments in the frontal and sagittal plane at the knee with no change at the ankle and hip. During final minute comparisons, IA maintained the increases in the knee frontal plane joint moments observed during initial minute comparisons but also increased at the hip; however, BC generally showed no statistical difference from UL. Carrying an infant in a baby carrier more closely resembles unloaded walking, while carrying an infant in-arms appears to increase the mechanical load placed on the knee and hip joints in the frontal plane through an increase in joint moments.
Significance: During prolonged transportation, caregivers might choose to employ a baby carrier as opposed to carrying an infant in-arms, as in-arm carriage increases the loading knee abduction moment by 8.7% and the loading knee extension moment by 16.7%.

Escuela FISIO)SYM

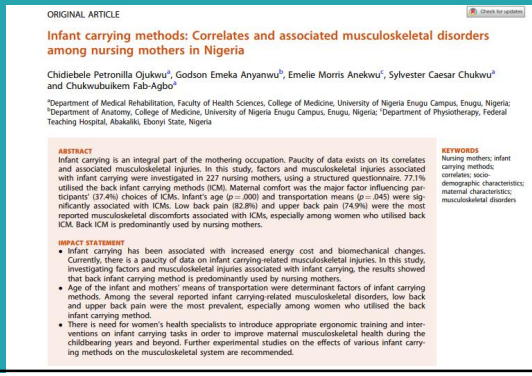
Williams L, et al. **Effects of infant transportation on lower extremity joint moments: Baby carrier versus carrying in-arms**. Gait & posture 70 (2019): 168-174

CONCLUSIONES DE INTERÉS:

- Menor sensación de sobrecarga en la articulación de la rodilla cuando utilizan un portabebé, en comparación con llegar al bebé en brazos, al caminar más de 15 minutos.

Escuela FISIO)SYM

(Métodos de porteo: disfunciones musculoesqueléticas asociados en la madres porteadoras en Nigeria)



ORIGINAL ARTICLE

Infant carrying methods: Correlates and associated musculoskeletal disorders among nursing mothers in Nigeria

Chidiebele Petronilla Ojukwu[a], Godson Emeka Anyanwu[b], Emelie Morris Anekwu[c], Sylvester Caesar Chukwu[b] and Chukwubuikem Fab-Agbo[a]

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ABSTRACT

Infant carrying is an integral part of the mothering occupation. Paucity of data exists on its correlates and associated musculoskeletal injuries. In this study, factors and musculoskeletal injuries associated with infant carrying were investigated in 227 nursing mothers, using a structured questionnaire. 77.1% utilised the back infant carrying methods (ICM). Maternal comfort was the major factor influencing participants' (37.4%) choices of ICMs. Infant's age ($p = .000$) and transportation means ($p = .045$) were significantly associated with ICMs. Low back pain (82.8%) and upper back pain (74.9%) were the most reported musculoskeletal discomforts associated with ICMs, especially among women who utilised back ICM. Back ICM is predominantly used by nursing mothers.

IMPACT STATEMENT

- Infant carrying has been associated with increased energy cost and biomechanical changes. Currently, there is a paucity of data on infant carrying-related musculoskeletal injuries. In this study, investigating factors and musculoskeletal injuries associated with infant carrying, the results showed that back infant carrying method is predominantly used by nursing mothers.
- Age of the infant and mothers' means of transportation were determinant factors of infant carrying methods. Among the several reported infant carrying-related musculoskeletal disorders, low back and upper back pain were the most prevalent, especially among women who utilised the back infant carrying method.
- There is need for women's health specialists to introduce appropriate ergonomic training and interventions on infant carrying tasks in order to improve maternal musculoskeletal health during the childbearing years and beyond. Further experimental studies on the effects of various infant carrying methods on the musculoskeletal system are recommended.

KEYWORDS

Nursing mothers; infant carrying methods; correlates; socio-demographic characteristics; maternal characteristics; musculoskeletal disorders

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Ojukwu, C. P. et al **Infant carrying methods: Correlates and associated musculoskeletal disorders among nursing mothers in Nigeria.** Journal of Obstetrics and Gynaecology, 2017. 37 (7): 855-860.

- Tamaño muestral: 227.
- Descriptivo, se administró un cuestionario (no valoración postural).
- Afecciones musculoesqueléticas frecuentes:
  - Dolor lumbar
  - Dolor dorsal alto.
- **Especialmente entre quienes porteaban a la espalda.**

Escuela FISIO)SYM

Ojukwu, C. P. et al **Infant carrying methods: Correlates and associated musculoskeletal disorders among nursing mothers in Nigeria.** Journal of Obstetrics and Gynaecology, 2017. 37 (7): 855-860.

- **Creencias erróneas:**
  - Las posturas más cómodas no siempre eran las más adecuadas a nivel musculoesquelético.
  - Alto número de participantes creían que era necesaria inclinación anterior del tronco durante el porteo en la espalda.
- Recomienda (re)educación postural para reducir riesgos de disfunciones musculoesqueléticas.

Escuela FISIO)SYM

(Métodos de porteo: ¿cuál es el método de elección?)

HEALTH CARE FOR WOMEN INTERNATIONAL
https://doi.org/10.1080/07399332.2019.1615915

Taylor & Francis

Infant-carrying techniques: Which is a preferred mother-friendly method?

Chidozie Emmanuel Mbada[a], Owanike Shakirat Adebayo[a], Matthew Olatokunbo Olaogun[a], Olubusola Esther Johnson[a], Abiola Ogundele Ogundele[b], Chidiebele Petronilla Ojukwu[c], Olabisi Akinwande Akinwande[d], and Moses Oluwatosin Makinde[a]

[a]Department of Medical Rehabilitation, College of Health Sciences, Obafemi Awolowo University, Ile-Ife, Nigeria; [b]Department of Medical Rehabilitation, Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Nigeria; [c]Department of Medical Rehabilitation, College of Health Sciences, University of Nigeria, Enugu Campus, Enugu, Nigeria; [d]Physiotherapy Department, University College Hospital, Ibadan, Nigeria

ABSTRACT

Infant carrying is still trendy among African mothers than in other climes, however, carrying techniques vary mostly along cultural divides. Using a pretest–posttest quasi-experimental design, the authors evaluated the effect of three types of infant-carrying techniques on cardiopulmonary function, metabolic expenditure, fatigue demand, and locomotion. Front wrap infant-carrying technique led to a marginally higher cardiopulmonary demand. Hip sling technique resulted in greater metabolic expenditure and oxygen consumption with high rate of perceived exertion, while back wrap technique did not significantly decrease locomotion parameters. The authors recommend back wrap infant carrying technique based on its slightly lower effects on cardiopulmonary function, metabolic expenditure, fatigue demand, and locomotion.

ARTICLE HISTORY
Received 9 April 2018
Accepted 3 May 2019

Escuela FISIO)SYM

Mbada CE, et al. **Infant-carrying techniques: Which is a preferred mother-friendly method?** Health Care Women 2019 Aug 22: 1-14.

- **OBJETIVO:**

  Valorar el efecto de 3 técnicas de porteo en:

  - función cardiopulmonar,
  - consumo metabólico,
  - locomoción.

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Mbada CE, et al. **Infant-carrying techniques: Which is a preferred mother-friendly method?** Health Care Women 2019 Aug 22: 1-14.

- Fular delante: mayor demanda cardiopulmonar
- Bandolera: mayor consumo de oxigeno
- Fular a la espalda: discretamente menor impacto a nivel cardiopulmonar, gasto metabólico y a nivel locomotor (marcha).

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En resumen

La práctica del porteo tiene ventajas a nivel de gasto energético y biomecánico

- Existe repercusión a nivel de la neuromecánica lumbar, torácica y de miembro inferior.
- No existe bibliografía que valore el impacto que la práctica del porteo tiene sobre el suelo pélvico.
- Los autores coinciden en la necesidad de comprender sus ventajas y riesgos desde el punto de vista de la salud matero-infantil.

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Nos vemos en la práctica