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Gait analysis and Bobath physiotherapy in adults with Down syndrome[☆]

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KEYWORDS

Down syndrome;
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Abstract

Introduction: Down syndrome (DS) is a chromosomal disorder with variable phenotypic expression, although different patients share some common features. Among them, hypotonia, ligament laxity and delayed psychomotor development stand out. These traits can improve with early therapy, but remain as gait instability and pathologic compensatory strategies in adult patients.

Pathological gait in DS patients has been studied previously, but the treatment of motor problems has not been approached from a neurological rehabilitation viewpoint, focused on quality of function.

Objectives: The aim of this study was to describe the gait alterations in a sample of patients with DS and to assess changes after Bobath physiotherapy.

Material and methods: An experimental prospective uncontrolled study was performed. Ten adults with DS (mean age: 28 years) were assessed at baseline and after 10 sessions of Bobath physiotherapy treatment. Quantitative data (such as step length or walking speed) and qualitative data (such as characteristics of arm movements and instability) were recorded by an evaluator blinded to the treatment received.

Results: Clear deviations with respect to normal adult gait were found, and a trend towards improvement after physiotherapy treatment. The results were significant in the correction of pitch angle and its symmetry.

The study has revealed the potential benefits of physiotherapy in adults with DS and the need to complete more studies in this sense.

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PALABRAS CLAVE

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Desarrollo
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Fisioterapia;
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Análisis de la marcha y fisioterapia Bobath en adultos con síndrome de Down**Resumen**

Introducción: El síndrome de Down (SD) es un trastorno cromosómico de expresión fenotípica variable, aunque con rasgos comunes en los distintos pacientes. Entre ellos, destaca la hipotonía, hiperlaxitud ligamentosa y el retraso en el desarrollo psicomotor. Estos rasgos mejoran con la terapia temprana, pero persisten en forma de inestabilidad de la marcha y compensaciones patológicas en el adulto.

La marcha patológica en estos pacientes ha sido objeto de estudios previos, pero el tratamiento de los problemas motores no ha sido abordado desde un enfoque neurorrehabilitador, dirigido a la calidad del funcionamiento.

Objetivos: El propósito del presente estudio es describir las alteraciones de la marcha en una muestra de pacientes con SD y evaluar los cambios después del tratamiento con fisioterapia Bobath.

Material y métodos: Estudio prospectivo experimental de tipo ensayo no controlado. Diez personas adultas con SD (edad media: 28 años) fueron evaluadas en situación basal y después de 10 sesiones de fisioterapia Bobath. Se recogieron variables cuantitativas (como longitud del paso, velocidad de la marcha) y variables cualitativas (como calidad del braceo o inestabilidad) a través de un evaluador ciego al tratamiento fisioterápico.

Resultados: Se encontraron claras desviaciones respecto a la marcha adulta normal y una tendencia a la mejoría después del tratamiento fisioterápico. Esta mejoría fue significativa en la corrección del ángulo y en la simetría del paso.

Se pone de manifiesto el potencial beneficio de la fisioterapia en adultos con SD y alteraciones de la marcha, así como la necesidad de realizar más estudios en este sentido.

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Introduction

Down syndrome (DS) is a genetic-based disorder having variable phenotype expression in different individuals. In spite of that, there are shared clinical manifestations (specific physiognomy, cognitive disabilities that vary in degree, hypermobility, muscular hypotonia, and growth delay).

Individuals with DS frequently suffer from motor disability, which includes slowness of movements and reaction times, as well as posture and balance problems. Delayed motor development is linked to the muscular hypotonia and ligament mobility, although neuropathological alterations (such as cerebellar dysfunction, delay in myelination or proprioceptive and vestibular deficits) can also have an effect.^{1,2} The presence of rigidity and early joint deterioration is typical in these individuals as well. All of this contributes to the presence of gait and balance disorders from infancy that lasts till adulthood.

Over the past several years, several studies on and descriptions of gait biomechanics in children and adults with DS have been published.²⁻⁷ Various interventions to help the motor problems of these individuals have also been reported, based on physical training in strength or resistance.⁸⁻¹³ In 2011, Mendonza et al.¹³ compared the effects of aerobic training and resistance exercises in adults with and without DS, demonstrating similar benefits for the patients with DS and the control individuals. That study also revealed improvements in walking economy after the intervention, with qualitative

benefits, not only quantitative ones. Nevertheless, the physiotherapeutic approach aimed at improving gait quality in adults with DS is a relatively undocumented matter at present.

Among the different physiotherapy methods, the Bobath concept is based on taking advantage of plastic neurological changes to achieve normal movement, which leads to optimal function. This treatment type has demonstrated its efficacy in clinical practice in patients with movement alterations caused by a neurological disease and has been used successfully in children with DS.¹⁴⁻¹⁶

Based on these data, this study was set up with the goal of identifying the pathological features of walking in 10 adults with DS and assessing potential benefits of treatment using Bobath physiotherapy.

Material and methods

A prospective, evaluator-blinded uncontrolled experimental study was performed. The sample consisted of 10 patients with DS, aged between 22 and 39 years, with autonomous walking. The patients lacked any other disorder that might interfere in movement and gait (whether permanently or temporarily). The patients participated in the Down Syndrome Foundation's Sports Section in Madrid (Spain) and were selected consecutively, when they voluntarily offered consent or by their legal guardian.

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