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## Original article

# Comparison of the Disease Activity Score and Juvenile Arthritis Disease Activity Score in the juvenile idiopathic arthritis



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## ARTICLE INFO

### Article history:

Received 20 February 2014

Accepted 17 August 2014

Available online 27 November 2014

### Keywords:

Juvenile idiopathic arthritis

Rheumatoid arthritis

Disease Activity Score-28

Juvenile Arthritis Disease Activity

Score

## ABSTRACT

**Introduction:** The assessment of the activity of rheumatoid arthritis and juvenile idiopathic arthritis is made by means of the tools DAS-28 and JADAS, respectively.

**Objective:** To compare DAS-28 and JADAS with scores of 71, 27 and 10 joint counts in juvenile idiopathic arthritis.

**Method:** A secondary analysis of a phase III placebo-controlled trial, testing safety and efficacy of abatacept was conducted in 8 patients with 178 assessment visits. Joint count scores for active and limited joints, physician's and parents' global assessment by 0–10 cm Visual Analog Scale, and erythrocyte sedimentation rate normalized to 0–10 scale, in all visits. The comparison among the activity indices in different observations was made through Anova or adjusted gamma model. The paired observations between DAS-28 and JADAS 71, 27 and 10, respectively, were analyzed by linear regression.

**Results:** There were significant differences among individual measures, except for ESR, in the first 4 months of biological treatment, when five of the eight patients reached ACR-Pedi 30, with improvement. The indices of DAS-28, JADAS 71, 27 and 10 also showed significant difference during follow-up. Linear regression adjusted model between DAS-28 and JADAS resulted in mathematical formulas for conversion:  $[DAS-28 = 0.0709 (JADAS\ 71) + 1.267]$  ( $R^2 = 0.49$ );  $[DAS-28 = 0.084 (JADAS\ 27) + 1.7404]$  ( $R^2 = 0.47$ ) and  $[DAS-28 = 0.1129 (JADAS-10) + 1.5748]$  ( $R^2 = 0.50$ ).

**Conclusion:** The conversion of scores of DAS-28 and JADAS 71, 27 and 10 for this mathematical model would allow equivalent application of both in adolescents with arthritis.

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<http://dx.doi.org/10.1016/j.rbre.2014.08.009>

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## Comparação entre o Disease Activity Score e o Juvenile Arthritis Disease Activity Score na artrite idiopática juvenil

### R E S U M O

#### Palavras-chave:

Artrite idiopática juvenil  
Artrite reumatoide  
Disease Activity Score-28  
Juvenile Arthritis Disease  
Activity Score

**Introdução:** A avaliação de atividade da artrite reumatoide e da artrite idiopática juvenil é feita por meio de instrumentos distintos, respectivamente pelo DAS-28 e pelo JADAS.

**Objetivo:** Comparar o DAS-28 e o JADAS com a pontuação de 71, 27 e 10 articulações, na artrite idiopática juvenil.

**Método:** Foram avaliadas 178 visitas em oito pacientes com artrite idiopática juvenil, participantes de um ensaio clínico controlado de fase III, testando eficácia e segurança do abatacepte. Pontuaram-se as articulações ativas e limitadas, a avaliação global pelo médico e pelos pais em escala analógica visual de 0-10 cm e a velocidade de hemossedimentação convertida em escala de 0-10, em todas as visitas. A comparação entre os índices de atividade entre diferentes observações foi por Anova ou modelo ajustado Gama. As observações pareadas entre o DAS-28 e o JADAS 71, 27 e 10, respectivamente, foram analisadas por meio de regressão linear.

**Resultados:** Houve diferença significativa entre as medidas individuais, exceto a VHS, nos primeiros quatro meses de tratamento com biológico, quando cinco entre os oito pacientes atingiram a resposta ACR-Pedi 30, com melhoria. Os índices DAS-28, JADAS 71, 27 e 10 também apresentaram diferença relevante durante o período de observação. O ajustamento por meio de regressão linear entre o DAS-28 e o JADAS resultou em fórmulas matemáticas para conversão: [DAS-28 = 0,0709 (JADAS 71) + 1,267] ( $R^2 = 0,49$ ); [DAS-28 = 0,084 (JADAS 27) + 1,7404] ( $R^2 = 0,47$ ) e [DAS-28 = 0,1129 (JADAS-10) + 1,5748] ( $R^2 = 0,50$ ).

**Conclusão:** A conversão da pontuação do DAS-28 e do Jadas 71, 27 e 10 por esse modelo matemático permitiria a aplicação equivalente de ambos em adolescentes com artrite.

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## Introduction

Juvenile idiopathic arthritis (JIA) has a chronic course and great variability of outcomes, it may progress to spontaneous remission or be refractory to available treatments.<sup>1</sup> JIA subtypes represent different phenotypes, classified as oligoarticular (<5 joints), polyarticular ( $\geq 5$  joints), systemic, arthritis related to enthesitis, psoriatic arthritis, and undifferentiated or unclassified arthritis.<sup>2</sup>

In order to assess arthritis activity, it is essential to measure the response to treatment, and early treatment is crucial to the outcome. In children, the response to treatment, evaluated in clinical trials, involves six primary outcome measures: physician's global assessment, global assessment by the parents or by the patient, joint count in absolute numbers of inflamed joints and joints with limited range of motion, erythrocyte sedimentation rate (ESR), and functional capacity index. The minimum criteria for response (ACR Pedi 30) are defined as improvement of at least 30% in three of six measures, with not more than 30% of worsening in no more than one of these parameters, representing a cutoff of response differentiation in the treated group and in the placebo group in clinical trials.<sup>3</sup> Currently, the improvements that are considered clinically significant are those in excess of 50, 70, 90%, or even the inactive state of arthritis.<sup>4</sup> However, these measures are related to the response to treatment, and are not suitable as absolute measures of arthritis activity, because nature of calculation does

not allow absolute comparison of response between groups of patients.

The most commonly used in rheumatoid arthritis (RA) are the DAS<sup>5</sup> (Disease Activity Score) and DAS28<sup>6</sup> in its simplified version. JADAS<sup>7</sup> (Juvenile Arthritis Disease Activity Score), with three versions of joint scoring, was developed for JIA. Both use the same components for the absolute assessment of arthritis activity, including "active" joint count, physician's and patient's or his/her parents' global assessment, and laboratory tests, which may be ESR or C-reactive protein (CRP), and is useful in clinical trials and in daily practice.<sup>8</sup>

DAS28<sup>6</sup> combines information on the number of painful and swollen joints, with 28 joints being selected, as well as ESR or CRP and patient's global assessment measured on a visual analog scale (VAS) from zero to 10 cm. DAS28 score is calculated using a mathematical formula, and the activity of arthritis can be interpreted in categorical scale.

JADAS score<sup>7</sup> is performed by adding the four individual measurements: global assessment of arthritis activity by the physician, in 10-cm VAS, global evaluation by the parents/patients as measured in the same 10-cm VAS, where 0 indicates no activity and 10, maximum activity, ESR and joint count. There are three versions, scoring from 0 to 71, 0 to 27 or 0 to 10 joints.

Functional capacity is often assessed through a health questionnaire, the Childhood Health Assessment Questionnaire (CHAQ),<sup>9,10</sup> the corresponding version of the Health

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