



POSTER PRESENTATION

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# Pathologic motion patterns in patients with progressive pseudorheumatoid arthropathy of childhood

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From 18th Pediatric Rheumatology European Society (PReS) Congress Bruges, Belgium. 14-18 September 2011

## Introduction

Progressive pseudorheumatoid arthropathy of childhood (PPAC) is a specific subtype of spondyloepiphyseal dysplasia (SED) tarda. The skeletal disorder is characterized by polyarthropathy of large and small joints. Typical signs are prominent epiphysis, progressive joint stiffness, muscle weakness and early fatigue [1]. Optimized physiotherapy is the only effective strategy to slow down the progress of functional disability.

## Aim

Quantification of pathologic motion patterns during walking.

## Methods

In a retrospective study eight adolescents suffering from PPAC (sex:female=1; male=7; age:14.6y; weight:50.0kg; size:1.42m; BMI:25) were compared with 20 healthy young person (cg) (sex:female=17, male=3; age:17.9y; weight:53.8kg; size:1.59m; BMI:21). 3D-gaitanalysis was

performed with infrared cameras and the Plug-in-Gait Model. Analyses focused spatio-temporal and kinematic parameters in the sagittal plane. Mann-Whitney-U-Tests ( $p < 0.05$ ) and correlation calculations (Pearson) between age, body-mass-index (BMI), kinematic and spatio-temporal-parameters were used for statistical analysis.

## Results

Patients with PPAC walk very slow ( $p < 0.001$ ) with short step length ( $p < 0.001$ ) and broadened step width ( $p < 0.001$ ). The foot off occurs noticeable late ( $p < 0.001$ ). The kinematic data are highly significant different to the cg in pelvis, hip, knee and ankle. Especially the range of motion (ROM) in the hip, in the knee flexion (loading response) and extension (single support phase) as well as the ankle ROM (plantar flexion while push off) are decreased. Within the PPAC-group high negative correlations appear between BMI and ankle ROM (plantar flexion (push off)) ( $r = -.860$ ).

**Table 1 Selection of kinematic results in pelvis, knee and ankle joint**

	PPAC (n=8)		Control Group (n=20)		M.-W. -U-Test Sign. (2-tailed) p<0.01
	Median	Q25/Q75	Median	Q25/Q75	
Pelvic tilt	19.4	(15.1/21.6)	11.2	(8.5/12.8)	p<0.001
Hip ROM (Flex/Ext)	32.0	(28.3/34.6)	44.0	(42.0/46.4)	p<0.001
Knee ROM (Flex, loading response)	5.3	(4.4/6.9)	11.6	(10.7/13.4)	p<0.001
Knee ROM (Ext, single support1)	2.5	(1.1/4.7)	15.4	(13.6/17.8)	p<0.001
Ankle ROM (Plan-Flex, push off)	12.8	(11.3/13.0)	29.7	(26.8/35.5)	p<0.001

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## Conclusion

The results are determined by very small ROM in the lower limb due to distinctive joint stiffness and muscle weakness. The effects of muscular weakness are intensified by high body weight.

The use of 3D-gaitanalysis is a helpful tool to individualize functional treatment to decelerate the progressive joint destruction in the lower limb.

## Acknowledgements

The authors wish to thank the German foundation for children's rheumatism for supporting this study.

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Published: 14 September 2011

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doi:10.1186/1546-0096-9-S1-P269

**Cite this article as:** Hartmann *et al*: Pathologic motion patterns in patients with progressive pseudorheumatoid arthropathy of childhood. *Pediatric Rheumatology* 2011 **9**(Suppl 1):P269.

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