INTRODUCTION
Presented non-invasive method for monitoring movements of vertebrae has been developed as a supportive tool for the assessment of the long-term therapy outcome in patients with back problems. The obtained experimental results indicate wide possibilities of practical use of the novel method.

METHOD
Fife volunteers participated in the study so far. To capture the data, the 3D system of cameras - Qualisys - was used. Qualisys works with some special markers which position records in scanned area in time. The markers were sticked at processi spinosi and their movement from the erect sitting position to the flection and extension under defined conditions was recorded.

The situation was solved as 2D problem in plane of symmetry of the body. For objective evaluation, the origin of coordinate system was placed to vertebra L5, which does not change its position during monitored movements. In the next step, the vectors of translations of single markers were defined and calculated (Fig. 1).

The obtained data were evaluated by the intraindividual comparison of slopes of regression lines fitted on captured courses between and after the therapy (red ellipse in Fig. 2). The higher slope means higher range of the movement and vice versa.

RESULTS AND DISCUSSION
The results are summarized in Tab. 1. The line below the slope data gives correlation coefficients R2, magnitude of which clearly indicate practical usability of our approach. The results shows that patients with limitation to one direction have reached improvement but at the expense of movement limitation in the opposite direction. Only the patient 2 who has sometimes suffered from backpain without any movement limitations shows increase of range of movements in both directions. We can thus conclude that there exists a relationship between range of the flection and extension evidently with limitation of the total range, which is defined as summation of both. Based on comparison of the results obtained from the measurements and from patient examination by a physiotherapist, we can also assume that there is a possibility to find the blocked vertebrae as points with the highest distances from the regression lines.

CONCLUSIONS
Based on the results of all 5 volunteers, we can with very good precision conclude that the decrease or increase in magnitude of vectors of translation of single vertebrae during flection and extension of the backbone has a linear character. The range of the movement of the total backbone and of a single vertebrae can be defined by the slope of the regression line. Further development of the method and verification of its results will be realised within the frame of some diploma and PhD theses.

Table. 1: Present results of the study

<table>
<thead>
<tr>
<th>Patient</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flection</td>
<td>27,807</td>
<td>32,629</td>
<td>33,946</td>
<td>33,461</td>
<td>31,430</td>
</tr>
<tr>
<td>Extension</td>
<td>7,982</td>
<td>12,005</td>
<td>13,456</td>
<td>13,148</td>
<td>13,134</td>
</tr>
</tbody>
</table>

Figure. 1: Definition of vectors of translation

Magnitudes of the vectors were plotted in a graph (see Fig. 2) in the sequence vertebrae – counting from 1 to 17 in direction from cervical vertebrae.

Figure. 2: Data Evaluation