transferred into beta-tricalcium phosphate scaffolds using either centrifugation or simple diffusion. Six types of implants (beta-tricalcium phosphate matrixes) were implanted into subcutaneous pouches. In the control group saline-immersed implants were used; in the group 2 the ex vivo cells were transferred into the implant by diffusion and in the group 3 by centrifuging; in the groups 4, 5 and 6 the implants were processed as in first three groups, respectively, but 12.5 microgram of rhBMP-2 was added to the each implant.

After 21 days the implants were removed and dissected systematically. Hematoxylin-eosin histochemical staining was used. Histomorphometry analysis was performed following the principles of stereology.

Results and discussion
Main results are present in Table. Bone formation was found only in the implants where rhBMP-2 was introduced. The other implants consisted mostly of connective tissue and in lesser extent of the unchanged scaffold. However, no distinctive differences were found between the implants where rhBMP-2 only or implants where differentiated cells and rhBMP-2 were introduced. The results show clearly that osteoinduction is crucial in ectopic bone formation if there is no cellular dysfunction present. The inductive effect of rhBMP-2 cannot be compensated by the abundance of the pre-differentiated osteogenic cells as shown by the absence of bone induction in the groups 2 and 3 in this model.

<table>
<thead>
<tr>
<th>Group</th>
<th>Ratio of formed bone</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Ratio of connective tissue</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<td>*</td>
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<td>95%</td>
<td>Ns</td>
<td>Ns</td>
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<td>**</td>
<td>*</td>
</tr>
<tr>
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<td>Ns</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>99%</td>
<td>Ns</td>
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<td>*</td>
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<td>*</td>
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<tr>
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<td>Ns</td>
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<td>*</td>
<td>*</td>
<td>*</td>
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<td>Ns</td>
<td>Ns</td>
<td>*</td>
<td>*</td>
<td>*</td>
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<td>58%</td>
<td>Ns</td>
<td>Ns</td>
<td>*</td>
<td>*</td>
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</tbody>
</table>

Table. Average relative volumes of bone and connective tissues and cross-charts of statistical differences between the groups

* p<0.001, **p<0.01, ns – statistically insignificant

Heterotopic ossification (HO) is a frequent pathological phenomenon after total hip arthroplasty. Incidence of HO after the total hip arthroplasty is in average 43%. Most often classification from Brooker and co-authors has been used to assess the HO. Overall 47% of all studies published until the 1999 have used Brooker’s system, but there has been reported a “fair” reproducibility (Cohen’s kappa 0.5) of this system.

The aim of the present study was to estimate the influence of used classification system to the evidence of HO, to assess the reliability of the more often used classification systems, to determine the sources of errors in the assessment-process of HO and, to compose a new classification system with higher reliability.

Four investigators assessed HO in 111 patients applying most often used classification systems and the new system. Six investigators measured dimensionality of HO in 28 patients applying method of digital planimetry. Kappa statistics of all the compared classification systems were

X-ray diagnosis of heterotopic ossification. Sources of the errors and amendment of the assessment system

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Heterotopic ossification (HO) is a frequent pathological phenomenon after total hip arthroplasty. Incidence of HO after the total hip arthroplasty is in average 43%. Most often classification from Brooker and co-authors has been used to assess the HO. Overall 47% of all studies published until the 1999 have used Brooker’s system, but there has been reported a “fair” reproducibility (Cohen’s kappa 0.5) of this system.

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Four investigators assessed HO in 111 patients applying most often used classification systems and the new system. Six investigators measured dimensionality of HO in 28 patients applying method of digital planimetry. Kappa statistics of all the compared classification systems were
calculated. Main sources of errors were detected by dispersion model.

Average evidence of HO differed up to 1.4 times if the different systems were applied to assess HO. Therefore, using literature data, always the criteria of a system used should be taken into consideration.

Most important source of errors in the HO assessment was the error of diagnosing process. This source consisted of two components: inter-observer variation that formed 25.5% (+/-8.0%; p=0.0015) of total error and intra-observer variation that formed 60.9% (+/-7.3%; p<0.0001).

Technical performing error had less contribution in total error, namely 8.0% (+/-0.6%; p<0.0001) and subspecialisation of the investigators did not cause any systematic bias having a proportion of 5.7% (+/-4.9%; p=0.2457).

Reliability of the Brooker’s system was lowest among the compared systems. Combining the Della Valle’s system which had high reliability with the Brooker’s system, we composed a new classification preserving high reliability. The results obtained using the new classification allow comparison with the results obtained using each of the parent classifications.

### Results of surgical treatment of C1 subluxation in rheumatoid arthritis patients

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#### Introduction
The aim of the presentation is to compare different fixation techniques in patients with severe C1 subluxation with neurologic impairment.

#### Material/Method
16 patients with C1 subluxation were operated during 2003-2007. 12 of them suffered from severe neck pain (group A). In 4 patients myelopathy (RANAWAT IIIA) due to the narrowing of the posterior atlanto-axial interval or invagination of C2 odontoid process was diagnosed (2 patients) (group B). All patients demonstrated high grade of rheumatoid arthritis activity. Patients with neck pain underwent C1-C2 posterior fixation with elastic cables (5 cases) and APOFIX hooks (7 cases). 4 patients with spinal cord compression underwent posterior decompression by resection of C1 arch and craniocervical fixation.

#### Results
Relief of neck pain in the group A was achieved in 10 patients. In one patient (fixation with cables) secondary dislocation of C1 occurred with following tetraplegy. One patient complained for persistence of neck pain. In the group B in 3 patients the neurologic deficit regressed. In one case the implant must be removed because of wound infection and after wound healing the fixation was performed again.

#### Conclusions
1. Surgical treatment of rheumatoid arthritis patients with C1 subluxation provides pain relief and regress of neurologic deficit.
2. In patients with neck pain without neurologic deficit posterior C1-C2 fixation with hooks is safer as fixation with cables.
3. In patients with narrowing of posterior atlanto-axial interval with or without invagination of odontoid process, resection of posterior arch of C1 and craniocervical fixation is required.