

The International Cartilage Repair Society (ICRS) -Histological Visual Scale. A Preliminary Report of the Histological End Point Committee. I. Human Biopsies, Toronto Consensus.

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Cartilage repair procedures have gained acceptance during the last few years. There is a growing interest in the cartilage community to develop proper assessment tools in order to evaluate current and future technologies enhancing/facilitating the repair/regeneration of this hyaline organized tissue.

Methods to evaluate repair procedures include arthroscopic imaging, probing (mechanical measurement), MRI, histological and biomarkers monitoring. All these outcome measures provide complementary information, have no real value as a "stand alone" indicator and must be correlated to the clinical data.

Based on the results of the discussion of the workshop that was organized in Murten in 1999 by the ICRS, The International Cartilage Repair Society has constituted a Histological End Point Committee whose mission is to suggest a simple method of evaluation and to provide a morphological catalogue which can be used for the validation of other techniques such as MRI, mechanical testing, biomarkers etc.

The committee has analysed hundreds of cartilage biopsies after repair procedures performed in humans. Only 60 % of the biopsies analysed had morphological criteria allowing a possible observation/diagnosis of the specimens. It has been decided that biopsies which can be considered for histological scoring are only biopsies that contain subchondral bone, that can be orientated and which are in one piece. All other samples should be excluded.

The classification relies on morphological criteria that can be observed on H&E and/or Toluidine Blue Stains. It is recommended to study histological specimens under polarized light.

Morphological Criteria

I) Surface

- Smooth, Continuous 1
- Discontinuities, irregular 0

II) Matrix

- Hyaline 4
- Mixture Hyaline/Fibrocartilage 3
- Fibrocartilage 1
- Fibrous Tissue 0

III) Cell Distribution

- Columnar 3
- Mixed Columnar/Clusters 2
- Clusters 1
- Individual Cells/ Disorganized 0

IV) Cell Population Viability

- Predominately Viable 2
- Partially Viable (population) 1
- < 10% Viable 0

V) Subchondral Bone

- Normal 2
- Active Remodeling 1
- Bone Necrosis/Granulation Tissue/
Detached/Fracture Callus at base 0

VI) Mineralization

- Normal 1
- Abnormal/Inappropriate Location 0

The individual scores must NOT be summed but reported separately. Method to report a biopsy score: i.e. (I/1, II/3, III/3;...)