

**INFLUENCE OF ALIMENTARY REGIME ON SOME  
PARAMETERS OF SYNOVIAL FLUID IN DOGS WITH  
ARTICULAR CHONDRAL DEFECTS**

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**Summary**

Sick or traumatized cartilage has a limited regeneration capacity.

Tisular engineering catalogues among possible therapeutically methods (1, 5) for the articular condral defects repair using scaffolds implants loaded with chondro-progenitor cells (3, 8, 10, 12).

Glucosamine is part of normal cartilage. Studies show that glucosamine can reduce pain in osteoarthritis and improve articular performances (9,11).

In the present study we will follow the influence of glucosamine on the inflammatory process and on articular cartilage regeneration in dogs with articular chondral defects surgically induced/treated by synovial fluid analysis.

**Materials and methods**

The study was made on 13 healthy, common breed dogs, in which, under general anesthesia, cartilage defects were made on femoral trochlea and humeral head.

The size of the defects was analyzed by CT-Scan and by 3D reconstruction of obtained data; matrix/membranes with size and structure similar with cartilage defects induced were realized (CCEDUCOS / Polytechnic Institute Timișoara).

Matrix/membranes were loaded with chondroblasts at Immunology Center of IMF Victor Babes Timisoara.

Matrix fixation on femur was made with the help of osteosynthesis screws for maxillofacial reconstruction. The screw on of the screws was made in such way that the head of the screw to be under the level of articular cartilage surface.

Defects of the humeral head cartilage were filled by injection of 1 cm<sup>3</sup> of chondroblasts suspension.

Post-operative, for 5 months the dogs were differentiated fed in two groups and maintained in the same maintenance conditions. The dogs in experimental group were fed with special diet, with high glucosamine content (1000mg/Kg).

The control group received ordinary dry pet food with 10-30 % crude protein, 8-10 % fats and 3 % fiber. The vitamins level for the pet food are between 7 000 – 10 000 UI/kg A vitamin, 10-80 mg/kg E vitamin and 800 -1 600 UI/kg D<sub>3</sub> vitamin.

Synovial fluid obtained at 5 months post-operative by arthrocentesis after Werner (13), was examined by refractometry (RHC – 200 refractometer) and by microscopic cytology (LEISHMAN stain).

### Results and discussions

Results obtained by refractometric analysis of synovial fluid in both groups are presented in table 1.

Table 1.

#### Results obtained by refractometric analysis on experimental and control groups

Crt. no.	Weight (kg)	Sex	Group	Refractive index	Serum proteins g/100ml
1	15,5	female	experimental	1,338	0,6
2	13	female		1,339	1
3	15	male		1,339	1
4	12,5	female		1,335	0,2
5	10	male		1,337	0,6
6	15,4	male		1,337	0,4
7	11	male		1,338	0,6
8	10,5	male	control	1,340	1,9
9	10	male		1,338	0,8
10	11	male		1,338	0,9
11	17	male		1,337	0,2
12	12	female		1,338	0,6
13	15	male		1,338	0,2

In both groups, both parameters determined by refractometry (serum proteins and refractive index) were in normal limits, mentioned in literature (4, 7).

Results obtained by cytology exam of synovial fluid in both groups are presented in table 2.

Table 2.

**Results obtained by cytology exam on experimental and control groups**

<b>Crt no</b>	<b>Defect place</b>	<b>Treatment strategy</b>	<b>Group</b>	<b>Cytology exam</b>
1	medial femoral trochlea	matrix with condroblasts	<b>experimental</b>	increase of macrophages number / lymphocytes in normal limits
2	medial femoral trochlea	matrix with condroblasts		increase of macrophages number / lymphocytes in normal limits
3	lateral femoral trochlea	injection with condroblasts suspension		macrophages and lymphocytes in normal limits
4	medial femoral trochlea	matrix with condroblasts		increase of macrophages number / lymphocytes in normal limits
5	lateral femoral trochlea	membrane with condroblasts		macrophages and lymphocytes in normal limits
6	humeral head, great caudal tuberculum	injection with condroblasts suspension		macrophages and lymphocytes in normal limits
7	humeral head, great caudal tuberculum	-		macrophages and lymphocytes in normal limits
8	humeral head, great caudal tuberculum	-	<b>control</b>	increase of macrophages and lymphocytes number chondrocytes are present
9	medial femoral trochlea	-		increase of macrophages and lymphocytes number
10	humeral head, great caudal tuberculum	-		macrophages and lymphocytes in normal limits
11	lateral femoral trochlea	-		increase of macrophages and lymphocytes number
12	medial femoral trochlea	-		increase of macrophages and lymphocytes number
13	lateral femoral trochlea	-		macrophages and lymphocytes in normal limits, chondrocytes are present

In experimental group in which condroblasts suspension was used, cytology of synovial fluid was in normal limits. The obtained results after joint injection with 1 cm<sup>3</sup> of condroblasts suspension are similar of those obtained on rabbits (8).

In 75% of individuals in which matrix or membranes, loaded with chondroblasts and fixed with screws were used, an increase of macrophage number and lymphocyte in normal limits were observed.

In 60% of individuals from control group feeded with normal diet, an increase of macrophages and lymphocyte. Results are similar with those obtained in other studies (2, 7).

### Conclusions

The increase of lymphocyte and macrophage number in individuals feeded with normal diet, denote presence of degenerative modifications developed secondary to articular defects induced by surgery;

Incomplete cover or uncover of screw head by new born articular cartilage determined the maintain of an intraarticular irritation which does not permit the evaluation of the glucosamine implication in the healing process of induced articular cartilage defects;

Increase of macrophage number and normal levels of lymphocyte in individuals with matrix/membranes fixed with screws denote the presence of immunologic nonspecific reaction (foreign body reaction).

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